

AMENDED Exhibit 14

PLAINTIFFS' OMNIBUS OPPOSITION TO DEFENDANTS' MOTIONS FOR SUMMARY JUDGMENT

Case No.: 4:22-md-03047-YGR

MDL No. 3047

In Re: Social Media Adolescent Addiction/Personal Injury Products Liability Litigation

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UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA

IN RE: SOCIAL MEDIA)
ADOLESCENT ADDICTION/)
PERSONAL INJURY PRODUCTS)
LIABILITY LITIGATION) MDL No. 3047
_____) Case No. 4:22-md-03047-YGR
)
This Document Relates To:)
)
ALL ACTIONS)
_____)

***** HIGHLY CONFIDENTIAL (COMPETITOR) *****
PURSUANT TO PROTECTIVE ORDER

VIDEOTAPED DEPOSITION OF
LARRY BIRNBAUM, Ph.D.
AUGUST 15, 2025
9:05 a.m. to 6:29 p.m.
at
Covington & Burling
850 10th St NW, Washington, DC 20001

Reported By: Amanda Blomstrom, RMR, CRR,
CSR TX #8785/CA #12681/IL #84-3634

GOLKOW - VERITEXT
877.370.DEPS | fax 917.591.5672
deps@golkow.com

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APPEARANCES

FOR THE PLAINTIFFS:

MOTLEY RICE LLP

BY: WARREN PREVIN, ESQ.

BY: ABIGAIL BURMAN, ESQ.

401 9th Street, NW

Suite 630

Washington, D.C. 20004

202.386.9610

pwarren@motleyrice.com

aburman@motleyrice.com

FOR THE STATE OF CALIFORNIA:

OFFICE OF THE CALIFORNIA ATTORNEY GENERAL

BY: MEGAN O'NEILL, ESQ.

455 Golden Gate Avenue

Suite 11000

San Francisco, California 94102-7004

415.510.4400

megan.oneill@doj.ca.gov

FOR THE STATE OF TENNESSEE:

OFFICE OF THE TENNESSEE ATTORNEY GENERAL

BY: CHRIS A. DUNBAR, ESQ.

UBS Tower

315 Deaderick Street

Nashville, Tennessee 37243

615.741.3491

chris.dunbar@ag.tn.gov

FOR THE STATE OF NEW JERSEY:

OFFICE OF THE NEW JERSEY ATTORNEY GENERAL

BY: MANDY K. WANG, ESQ.

124 Halsey Street

Fifth Floor

Newark, New Jersey 07101

973.648.2052

mandy.wang@law.njoag.gov

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Page 3

1 APPEARANCES (CONT'D)
2 FOR THE DEFENDANTS META PLATFORMS, INC., F/K/A
3 FACEBOOK, INC.; FACEBOOK HOLDINGS, LLC; FACEBOOK
4 OPERATIONS, LLC; FACEBOOK PAYMENTS, INC.; FACEBOOK
5 TECHNOLOGIES, LLC; INSTAGRAM, LLC; SICULUS, INC.;

6 AND MARK ELLIOT ZUCKERBERG:
7 COVINGTON BURLING LLP
8 BY: MICHAEL N. KENNEDY, ESQ.
9 BY: ANDREW J. HENLEY, ESQ.

10 One CityCenter
11 850 10th Street, NW
12 Washington, D.C. 20001
13 202.662.5215
14 mkennedy@cov.com
15 ahenley@cov.com

-and-

16 BY: JUNMO KIM, ESQ.
17 The New York Times Building
18 620 Eighth Avenue
19 New York, New York 10018-1405
20 ckim@cov.com

21 ALSO PRESENT:

22 JOHNNATHAN RUFF

LITIGATION TECHNICIAN:
JUSTIN BILY, Novak

VIDEOGRAPHER:

DeSHAWN WHITE, Golkow

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Page 4

ZOOM APPEARANCES

Annie Kouba, Motley Rice
Chris Chiou, Wilson Sonsini
Corin Stigall, CO OAG
Elizabeth Orem, CO OAG
Haylee Privitera, King & Spalding
Jason L. Lichtman, Lief & Cabraser
Jess Carroll, Motley Rice
Josh Olszewski, CA DOJ
Katy Lawrimore, Motley Rice
Krislyn Launer, CT OAG
Kristen Lejnieks, Jones Day
Kristin Huber, Bass Berry & Sims
Lindsey Barnhart, Covington
Lucy Malone, Wagstaff
Mandy Wang, NJ OAG
Matt Donohue, Wilson Sonsini
Mohamed.Said, Munger Tolles
Patrick Gurski
Shaheen.Sheikh, CO OAG
Steve.Kaufmann, CO OAG
Tom
Verna Pradaxay, NJ OAG
Zach Richards

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1 don't work in neural networks, but I work in the
2 applications of these things to the kinds of problems
3 that are at issue in this case.

4 Q. Okay. You said you're not an expert in
5 clinical psychology, neuroscience, psychiatry, and
6 epidemiology, correct?

7 A. That's true.

8 Q. Okay. Are you an expert in any behavioral
9 science?

10 A. No.

11 Q. And you haven't authored papers in any of
12 the fields I just mentioned?

13 A. I've published papers with psychologists,
14 so there might be some papers I've done in
15 psychology, yes.

16 Q. What papers are those?

17 A. I did a paper with Doug Medin on decision-
18 making, a number of -- maybe a couple decades ago or
19 something like that. So papers -- there are
20 occasional papers that were published in psychology
21 journals or conferences or the Cognitive Science
22 Conference that would be -- maybe border on

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1 psychology or where I was working with psychologists.

2 Q. Okay. But in those papers, you weren't
3 lending your expertise in those particular fields to
4 those works, correct?

5 Let me reask the question.

6 Because you're not an expert in cognitive
7 psychology -- let me reask the question. Withdrawn.

8 Because you're not an expert in cognitive
9 science or psychology, when you were coauthoring
10 those papers, those were not the fields in which you
11 were offering expertise, correct?

12 A. I think my colleagues were sufficiently
13 competent to judge whatever I was offering and
14 whether it was valuable or not.

15 Q. Okay. You haven't received grant money
16 to study issues within any of the fields that I
17 just mentioned, correct; clinical psychology,
18 neuroscience, psychiatry, epidemiology, behavioral
19 science?

20 A. Grants.

21 I mean, I might have been on a grant that
22 was involved in a cognitive science project of some

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1 kind, but I -- I can't recall.

2 Q. Okay. So the best of your recollection,
3 you can't --

4 A. Best of my recollection. My focus has
5 been in computer science, obviously.

6 Q. Okay. And you haven't taught courses in
7 any of the fields I just mentioned, which, again, are
8 clinical psychology, neuroscience, psychiatry,
9 epidemiology, and behavioral science?

10 A. I mean, I've taught courses that touch on
11 those or I've co-taught courses with faculty members
12 that might touch on those subjects.

13 Q. What courses are those?

14 A. I mean, I think a long time ago I taught a
15 course in cognitive science, an intro course to
16 cognitive science. I had to teach an HCI course
17 once. I mean, I think there is a couple of courses
18 along those lines. That's not really behavioral
19 science, but it's as close as computer science comes,
20 I suppose, to behavioral science.

21 Q. Okay. But you don't keep yourself abreast
22 of developments in those fields, right?

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1 A. It's not my area of professional
2 expertise, no. In general, things touch on it.

3 Q. Okay. Are you offering any opinions
4 concerning whether use of Meta's products is
5 associated with an increased risk of depression?

6 A. I'm not.

7 Q. Are you offering any opinions concerning
8 whether use of Meta's products is associated with an
9 increased risk of anxiety?

10 A. I'm not.

11 Q. Are you offering any opinions concerning
12 whether use of Meta's products can cause an increased
13 risk of any mental health problem?

14 A. I'm not.

15 Q. Are you offering any opinions whether use
16 of Meta's products by teenagers can lead to an
17 increased risk of eating disorders?

18 A. No.

19 Q. Suicidality?

20 A. No.

21 Q. Okay. Is it fair to say at a general
22 level you didn't examine whether or to what extent

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1 Meta's products pose risks of harm to users?

2 A. I'm not an expert in that area, and I
3 wouldn't offer an opinion in this context around
4 something like that.

5 Q. Okay. Are you familiar with the term
6 "problematic use"?

7 A. I am.

8 Q. What does that term mean?

9 A. It was a term used, I mean primarily
10 within Meta itself, to talk about people generally
11 overusing their services, I think using it too
12 frequently or using it too much time or using it at
13 inappropriate times, things that would interrupt
14 the -- interrupt their lives in ways that might be
15 not helpful to them living a healthy life.

16 Q. Okay. Are you offering any opinions
17 regarding whether Meta's users experience problematic
18 use?

19 A. No.

20 Q. So you aren't offering any opinions
21 regarding whether the design of Meta's products can
22 lead to problematic use for some people?

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1 MR. KENNEDY: Objection to form.

2 THE WITNESS: I'm offering opinions about
3 the design of Meta's systems insofar as they lie
4 within my area of expertise, and I think whether they
5 were designed to lead to certain kinds of outcomes,
6 such as problematic -- whether they were specifically
7 designed, for example, in certain ways to encourage
8 problematic use, let's put it that way.

9 BY MR. WARREN:

10 Q. Okay. I understand the sentence that you
11 just said, but, respectfully, it wasn't quite an
12 answer to my question. So let me ask it again, and
13 if it's not clear what I'm asking, you just let me
14 know.

15 Are you offering any opinions regarding
16 whether the design of Meta's products can lead to
17 problematic use for some people?

18 MR. KENNEDY: Objection to form; asked and
19 answered.

20 THE WITNESS: I -- I think the answer is
21 no.

22 BY MR. WARREN:

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1 of -- a kind of a cold start problem for content as
2 well.

3 So -- so it's intentional in the
4 sense that Meta -- Meta's systems need to gather
5 information about that content in order to be able to
6 properly recommend it to people. But it's -- so they
7 do that. I mean, the alternative would be not
8 introducing new content, I suppose.

9 So if you believe that a functional
10 requirement of a system should be that it can grow
11 and introduce new content, then it's kind of
12 unavoidable as well.

13 But it is intentional because they want to
14 be able to introduce new content.

15 Q. Okay. In any event, we have here listed
16 ten reasons for variability in the user feeds of
17 Instagram and Facebook?

18 A. Correct.

19 Q. You agree with that?

20 Okay. Let's talk about an eleventh.

21 When you reviewed Meta's source code, did
22 you see any README files that contained references to

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1 Q. And "Daily Active Users" is a measure of
2 engagement at the user-wide level, correct?

3 A. Correct, yes.

4 Q. Okay. So is it fair for me, in the
5 aggregate, to put a box around all of these proxies
6 and metrics and to label them "User Engagement"?

7 MR. KENNEDY: Objection to form.

8 THE WITNESS: I think in different ways
9 they are measures of user engagement; sometimes in
10 the aggregate, sometimes with respect to individual
11 items, but, yes.

12 BY MR. WARREN:

13 Q. Okay. So you're not disputing that Meta's
14 ranking systems employ user engagement objectives,
15 are you?

16 A. No.

17 Q. Okay. And you're not disputing that
18 Meta's ranking algorithm optimizes for engagement
19 proxies, right?

20 A. Optimizes for engagement proxies.

21 Meta's ranking system is trying to
22 determine what are the most relevant things, safest

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1 the natural and intuitive presumption that users will
2 use the system on more days if they find the content
3 that it makes available to them relevant."

4 Did I read that correctly?

5 A. Which paragraph are we on again, 94?

6 Q. No, 104.

7 MR. KENNEDY: 104.

8 THE WITNESS: 104, okay.

9 BY MR. WARREN:

10 Q. And I can do it again, once you get there.

11 A. Yes, it goes on to say other things, but
12 it says that.

13 Q. Okay. And you don't offer a citation in
14 support of that, right?

15 A. No.

16 Q. Okay. What methodology, if any, did you
17 follow to verify your intuition or presumption that
18 user engagement metrics are a reasonable proxy for
19 user value?

20 MR. KENNEDY: Objection to form.

21 THE WITNESS: I -- I view these as, in
22 some sense, arguments, or containing their own

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1 arguments; in other words, you're free to disagree,
2 and perhaps you do disagree, that -- that, for
3 example, it's a natural and intuitive presumption
4 that if somebody uses the system on more days, it's
5 because they're finding the relevance, safety, and
6 quality of the content it presents to them to be high
7 enough to warrant them to actually use it on more
8 days. So I put that clause in, intuitive and
9 natural.

10 I think these are the, I would -- I would
11 dare say that, although I haven't interrogated them,
12 that these are the reasons why Meta's engineers use
13 these.

14 There is two reasons why they're using any
15 metric that they're using. One is that they think or
16 hope that it's a proxy for the thing they care about,
17 and the other is that it's measurable and actionable
18 in a certain sense. So like that they can actually
19 measure it.

20 And so because they can't measure things
21 on the right, they're looking for proxies on the
22 left. I -- I think if you -- if anybody thinks that

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1 they have better proxies, I -- I'm sure the company
2 would be very open to -- to looking at what those
3 would be.

4 And, in fact, I think that they
5 probably -- I don't know for a fact, but I imagine
6 that this is something they think about quite a bit.

7 BY MR. WARREN:

8 Q. Okay. Well, I appreciate your answer. My
9 question was a little bit simpler. And it's really
10 about how you formed the opinions that you have
11 expressed --

12 A. I based it on --

13 Q. Sorry, I have to --

14 MR. KENNEDY: Let him finish.

15 BY MR. WARREN:

16 Q. Okay. So my question utilized the word
17 "methodology" very intentionally. So I'll ask it
18 again.

19 What methodology did you use to verify
20 your natural and intuitive presumption that the
21 proxies of user engagement optimized for by Meta's
22 ranking system are, in fact, a good proxy for user

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1 value?

2 MR. KENNEDY: Objection to form.

3 THE WITNESS: I suppose logic and -- and
4 my understanding of how people behave intuitively.

5 BY MR. WARREN:

6 Q. Okay. Did you cite any peer-reviewed
7 studies on this topic?

8 A. I did not.

9 Q. Did you cite any Meta internal documents
10 on this topic?

11 MR. KENNEDY: Objection to form.

12 You can answer.

13 THE WITNESS: I did not. I, elsewhere in
14 my report, cite to Meta documents that make it clear
15 that they're aware of the distinction between the
16 proxies and the actual goals of the system and that
17 this is something that they think about and discuss.

18 MR. WARREN: All right. Move to strike
19 everything after "I did not."

20 MR. KENNEDY: We disagree.

21 BY MR. WARREN:

22 Q. Now, you said that you principally rely on

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1 how people behave, but you're not a psychologist --

2 A. Correct.

3 Q. -- as we've established?

4 A. I'm not.

5 Q. Okay. And you didn't conduct any user
6 surveys to understand how people behave with respect
7 to these ranking systems, correct?

8 A. I did not.

9 Q. What's the known or potential error rate
10 of the methodology you used to establish that the
11 proxies on the left are a reasonable way to evaluate
12 the goals on the right?

13 MR. KENNEDY: Objection to form.

14 THE WITNESS: These are my opinions based
15 on my experience in the field and what I under -- how
16 I understand people who build these systems, and I've
17 built such systems myself, actually think about how
18 to -- how to actually assess things like relevance.

19 BY MR. WARREN:

20 Q. Yeah.

21 A. And -- what was your question? What's
22 the --

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1 Q. What is the known or potential error rate
2 for the technique you used to establish that the user
3 engagement metrics on the left are reasonable proxies
4 for the goals on the right?

5 MR. KENNEDY: Objection to form.

6 THE WITNESS: I'm not a hundred percent
7 sure how one would even go about doing that, but,
8 yeah, I mean, I think it's -- the error rate of the
9 method I used -- the method I used, I think, is logic
10 based on -- we could go through the arguments about
11 whether you agree with me or not on these -- on these
12 things, but I would say fundamentally it comes down
13 to my understanding, experience of the field and, I
14 would say, logic.

15 BY MR. WARREN:

16 Q. Okay. So your methodology isn't capable
17 of being tested in any scientific way, correct?

18 MR. KENNEDY: Objection to form.

19 THE WITNESS: Well, I don't agree with
20 that, I suppose. I think I could give a set of
21 engineers who work in this space lists of features of
22 behaviors that people engage in, and we could, I

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1 suppose, ask them whether they think these are
2 reasonable proxies. And we could put on that things
3 that are things like, the person ate an ice cream
4 cone after watching the video, or something like
5 that, and we would ask if that was a reasonable
6 proxy.

7 And I think that -- I think -- I mean, I
8 have nothing to say other than I -- I caveated these
9 with these are my beliefs based on, I think,
10 reasonable -- reasonable and sensible engineering
11 intuitions.

12 BY MR. WARREN:

13 Q. Okay. So because you didn't actually
14 survey any engineers about this proposition, your
15 methodology around such survey instrument is not
16 capable of being tested, let alone replicated. True?

17 MR. KENNEDY: Objection to form.

18 THE WITNESS: I guess -- I guess I would
19 just ask, what are the other engagement -- what are
20 engagement metrics that -- that organizations that
21 are trying to do this utilize, and, you know, are
22 they different from these engagement metrics.

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1 BY MR. WARREN:

2 Q. Because you didn't actually survey any
3 engineers about your proposition, your methodology --

4 A. That's correct. It's based on my
5 experience and intuition.

6 Q. -- it's not capable of being tested or
7 replicated?

8 MR. KENNEDY: Objection to form.

9 THE WITNESS: You could ask other people
10 or you could ask other -- you could ask your experts,
11 for instance.

12 BY MR. WARREN:

13 Q. Okay. I'm not sure how to disprove your
14 intuition. How would I go about doing that?

15 MR. KENNEDY: Objection to form.

16 THE WITNESS: Well, look, I think
17 there's -- we can think of reasons why somebody --
18 well, I don't want to go through all this.

19 There's a -- I think we could do a bunch
20 of thought experiments about -- about, you know, for
21 example, would you share a content item with your
22 friends if you didn't think it was interesting or

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1 relevant in some way.

2 BY MR. WARREN:

3 Q. Okay. So I want to make sure I have the
4 bases of this set out. And what I've heard you say
5 is logic; I've heard you say how people behave; and
6 now I've heard you say thought experiments.

7 A. I would say intuitions about how people
8 behave, because I didn't do any studies; you're
9 correct.

10 Q. Okay. Have we basically got this down?

11 MR. KENNEDY: Objection to form.

12 THE WITNESS: I think so. I mean, that's
13 the methodology I used.

14 BY MR. WARREN:

15 Q. Okay. Are you a smoker?

16 A. No.

17 Q. Do you know anyone who is a smoker?

18 A. I know someone who used to be a smoker.

19 Q. If a smoker increases their use of
20 cigarettes from one to three packs a day, does that
21 indicate cigarettes are more valuable to them?

22 MR. KENNEDY: Objection to form;

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1 incomplete hypothetical.

2 THE WITNESS: I wouldn't say yes, but an
3 economist would say yes, I suppose.

4 BY MR. WARREN:

5 Q. But you wouldn't say yes?

6 A. It's for this reason that these proxies
7 are inexact measures of value.

8 Q. If a user's time spent on Instagram
9 increases from two to three hours a day, do you know
10 with any certainty that the user is getting more
11 value from the platform?

12 MR. KENNEDY: Objection to form.

13 THE WITNESS: So I -- I certainly believe
14 that there are diminishing returns to most of the
15 aggregate metrics that are involved.

16 BY MR. WARREN:

17 Q. If a user's --

18 A. Okay.

19 Q. -- time spent on Instagram increases from
20 two to three hours a day, do you know with any
21 certainty that the user is getting more value from
22 the platform?

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1 A. Okay.

2 Q. Actually, tell you what, let's first do
3 Tab 21.

4 A. I guess I should put all of these over
5 here, except the report.

6 Q. I'm throwing a lot of paper at you, sir,
7 I'm sorry.

8 A. It's okay.

9 Q. It's just part of the gig.
10 This will be Exhibit 22.

11 (Exhibit Meta-Birnbaum-22 marked.)

12 MR. KENNEDY: Give me that other copy,
13 please.

14 BY MR. WARREN:

15 Q. Okay. Have you seen this document before?

16 A. If I -- I believe I have, but if I
17 haven't, I've seen documents that are quite similar.
18 But I think I have seen this document. I certainly
19 remember the wording under "Goal Map" here and some
20 of these metrics. So if I haven't seen this, I've
21 seen something very similar to it.

22 Q. Okay. And just to get a clean record.

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1 Exhibit 22 in front of you has the Bates No.

2 META3047MDL-065-00337077.

3 Okay. This appears to be a document
4 titled "H2'23 FB App Goal Map, Goals and Goal Metric
5 Targets."

6 Do you agree with that?

7 A. It does say that.

8 Q. Okay. So it's setting out the goals and
9 goal metric targets for Facebook in the second half
10 of 2023?

11 A. Correct.

12 Q. And if you look at the bottom, it
13 indicates that the goal metric for business value was
14 revenue-weighted time spent, correct?

15 A. Correct.

16 Q. Okay. So just so we have a clear picture
17 here. As of the second half of 2023, Facebook was
18 measuring business value through a metric called
19 "revenue-weighted time spent"; yes?

20 A. That seems to be the case.

21 Q. Okay. And by 2024, at least the latter
22 half, it had shifted to measuring business value

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1 opinion about whether Meta should have warned
2 parents, teens, or the public at large about
3 potential harms flowing from its ranking algorithm;
4 yes or no?

5 A. I am not a business ethicist, so I'm
6 not -- I'm not offering an opinion on that.

7 Q. Okay.

8 A. No.

9 Q. So before we leave this document, can you
10 turn to Slide 22, please.

11 A. This is the same document?

12 Q. Yes, indeed.

13 A. Page 22?

14 Q. Yes, sir.

15 A. Okay. Thank you.

16 Q. What's the title of this slide?

17 A. It's called: Monetizable Users of Value.

18 Q. "Monetizable User Value"?

19 A. Correct.

20 Q. And do you see it defines that term in the
21 first bullet?

22 A. The weighted sum, the time spent,

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1 monetization efficiency of that time spent, yes.

2 Q. So to put that in plain English. Meta
3 tracks how much money it can earn from every minute
4 someone spends on Facebook, right?

5 A. That's right.

6 Q. Okay. Can you flip one slide forward.

7 A. To the previous slide.

8 Q. Can you direct your attention to the first
9 bullet at the bottom, please, under "Methodology
10 Details."

11 A. This is under the one that begins, "For
12 the first time in recent years"?

13 Q. Sorry, I meant the next slide-slide, not
14 the next page. It begins with "Monetizable User
15 Value - Product Breakdown."

16 A. Okay. Yes. Thank you.

17 Q. Okay. You see the first bullet at the
18 bottom?

19 A. I do.

20 Q. Okay. And that indicates that monetizable
21 user value was a goal metric, right?

22 A. Sure.

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1 Q. Meaning it's measurable and optimizable?

2 MR. KENNEDY: Objection to form.

3 THE WITNESS: "Facebook App Fixed MUV."

4 Yes.

5 BY MR. WARREN:

6 Q. Okay. You didn't mention monetizable user
7 value as a goal metric in your report, did you?

8 A. No.

9 Q. Okay.

10 Time for a break?

11 MR. KENNEDY: Sure.

12 MR. WARREN: All right. Take a quick one.

13 Thank you.

14 THE VIDEOGRAPHER: The time is 3:22 p.m.

15 We are now off the record.

16 (Recess taken.)

17 THE VIDEOGRAPHER: The time is 3:36 p.m.

18 We are now on the record.

19 BY MR. WARREN:

20 Q. Okay. Let's switch topics.

21 You agree that Meta has no means for
22 assessing the relationships among two or more content

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1 items being considered for inclusion in someone's
2 feed?

3 A. In general, that's true.

4 Q. And that's known as pointwise
5 optimization?

6 A. I think that's what they call it, yes.

7 Q. Okay. And it means that Meta's ranking
8 algorithm considers each piece of content in
9 isolation without reference to other pieces of
10 content that might appear before or after in the
11 finalized slate?

12 A. That's correct. Modulo some additional
13 things, but that's the basic -- the basic
14 architecture is that, yes.

15 Q. Did you say "modulo"?

16 A. I apologize. There are some other
17 aspects to it, but the basic architecture is as
18 you've described.

19 Q. Okay. You agree that content that's not
20 otherwise harmful can become harmful when aggregated
21 in the user's feed, true?

22 A. I think that's a possibility, yes.

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1 A. They consistent of separate, separate sets
2 of -- they are separate sets of programs, or, rather,
3 they are -- they consist of sets of programs. If you
4 want to label one set content moderation and call
5 that a system, I -- I don't see an objection to that.
6 I just don't want to leave the implication that
7 content recommendation is -- is not actually
8 intimately connected with it in a variety of ways.
9 That's all.

10 Q. I think you've made that point now --

11 A. Okay.

12 Q. -- like four or five times.

13 A. And I apologize for being repetitive, but
14 I -- but I --

15 Q. And it's just not an answer to my
16 question. So you've made the point.

17 My question is simply: From a software
18 engineering perspective, from the perspective of
19 code, there is a set of programs and protocols that
20 comprise the content moderation system and there is
21 another set of programs and protocols that comprise
22 the content recommendation system.

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1 sequence like this is kind of beyond their
2 capabilities, which, in fact, is one of the points
3 in my -- in my -- in my report.

4 BY MR. WARREN:

5 Q. Let's posit that the construction of this
6 sequence just happened without there being someone
7 who was orchestrating it in an intentional way with
8 the deliberate goal of harming the user. Okay? Can
9 we posit that? The sequence is just a picture.

10 A. I don't know how likely the sequence is.
11 I mean, I'd have to go through all the letters. I
12 mean, this is an extremely unlikely sequence, in
13 fact. If you went through --

14 Q. Okay. Let's change the hypothetical then.
15 Let's say it's a hypothetical that comes from a
16 client example of getting a series of dieting tips
17 that become more and more extreme and that eventually
18 turn into pro-anorexia content and eating disorder-
19 promoting content. Okay? And let's posit that none
20 of those individual pieces of content was violative
21 of any content moderation policy on Meta's platform.
22 Can you accept that hypothetical --

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1 A. So --

2 Q. -- as we --

3 A. -- first of all, thank you for giving me a
4 real example --

5 Q. Sure.

6 A. -- that actually makes some sense.

7 Q. Okay.

8 A. I appreciate that.

9 Q. And do understand the example?

10 A. I do.

11 Q. Okay.

12 A. Absolutely.

13 Q. Okay. And, again, part of this
14 hypothetical is that no individual piece of content
15 on its own is --

16 A. Might be --

17 Q. -- violative of a content moderation
18 policy?

19 MR. KENNEDY: Let him finish.

20 THE WITNESS: Yeah, none of them by
21 themselves might be particularly problematic.

22 //

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1 BY MR. WARREN:

2 Q. Okay. So improving the enforcement of
3 content moderation policies in that example is not
4 going to fix the problem with the sequence, is it?

5 A. So --

6 MR. KENNEDY: Objection to form.

7 THE WITNESS: -- a couple of things to say
8 about this. I mean, so I guess here we're into a
9 particular kind of problem, which I addressed
10 somewhat in my report and which is raised in the
11 Complaints, concerning sort of focusing in on
12 particular areas of content that are problematic and
13 leading to a user seeing a lot of content in a
14 certain -- in a certain area, which, each by
15 themselves might not be a particular problem, but
16 taken together in the aggregate could be -- could be
17 sort of, let's say, potentially harmful or -- or
18 something that they find objectionable or that is
19 emotionally problematic for them. This, in fact, as
20 a -- as a sort of a potential extrapolative problem
21 of content recommendation systems, which I discuss in
22 my report and which is discussed of course in the

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1 Complaint and in many of the -- of your experts'
2 reports as well, and, you know, it's a serious
3 problem for the reasons that you are -- and a
4 difficult problem for exactly the reasons that you
5 raise here and that we're now discussing.

6 And so the question becomes, you know,
7 if you're asking me what do -- what can Meta's
8 Recommendation Systems do about this problem --

9 BY MR. WARREN:

10 Q. Let me pause you there, because I'm not.
11 I'm asking you: Can Meta's content moderation
12 policies fix that problem?

13 MR. KENNEDY: Objection to form.

14 THE WITNESS: Can the content moderation
15 policies by themselves with the current technology?
16 It's -- it would be quite difficult.

17 BY MR. WARREN:

18 Q. Okay. Can better enforcement of content
19 moderation policies fix the problem you just
20 identified?

21 MR. KENNEDY: Objection to form.

22 THE WITNESS: I think it depends what you

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1 harmful sequences be better if they did this? I
2 think the answer is yes. Of course, that would also
3 give them the ability to produce harmful sequences
4 through sort of variations, if -- to the extent that
5 variations in -- in -- in relevance constitute a
6 variable reward schedule and insofar as that actually
7 works, then -- then they would also be able to do
8 that deliberately.

9 But, as you say, they don't, in general --
10 or, as I just said, they don't in general have that
11 capability.

12 BY MR. WARREN:

13 Q. Okay. What are filter bubbles?

14 A. Filter bubbles are, it's akin to some of
15 the problems we just talked about earlier where, in
16 some sense, it's the -- it's a kind of reasonable
17 extrapolation from the way content recommendation
18 systems work; that, because they try to recommend to
19 you content that they think you prefer based on your
20 previous preferences, that you might get into a state
21 where you're always being presented with content with
22 a similar point of view, for example. That you're

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1 not -- you're not really able to see a bigger
2 picture, that you're kind of trapped in a certain
3 sense, and you keep being reinforced for your beliefs
4 and you don't see things that might contradict those
5 beliefs, for example, or other points of view. It's
6 often raised in connection with things like political
7 discussion in the country.

8 And, you know, I think it's a -- again,
9 it's a plausible extrapolation of how these things
10 operate, like some of the other problems we talked
11 about previously.

12 I don't know the extent to which it really
13 is a problem. That would be another kind of computer
14 scientist's job to assess, in some sense. But I take
15 it for granted that it's a legitimate concern.

16 Q. Okay. And it's a legitimate concern, not
17 just in the context of news and misinformation,
18 right?

19 MR. KENNEDY: Objection to form.

20 THE WITNESS: It could be.

21 BY MR. WARREN:

22 Q. Okay. But you have not examined yourself

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1 Q. In any event, you don't --

2 A. It might.

3 Q. -- dispute the possibility that it might,
4 right?

5 A. It could.

6 Q. Okay. And, again, to be clear, this
7 phenomenon of rabbit-holing can arise with lots of
8 different types of content, right?

9 A. Correct.

10 Q. And it arises from the structure of the
11 ranking algorithm, not from any particular kind of
12 content, right?

13 MR. KENNEDY: Objection to form.

14 THE WITNESS: So to the extent that the
15 system is trying to present you with content that
16 it will hope you find relevant and interesting
17 because you have found similar content relevant and
18 interesting in the past, or people like you have
19 found similar content interesting and relevant in the
20 past, I think this is a plausible extrapolation of
21 the -- of the operations in these systems that this
22 could arise and it probably does arise.

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1 BY MR. WARREN:

2 Q. Okay.

3 A. I don't know for sure or the extent to
4 which it does --

5 Q. Okay.

6 A. -- so -- I apologize, what was your
7 question, though?

8 Q. My question was simply that the phenomenon
9 of rabbit-holing is a -- let me withdraw the
10 question.

11 The phenomenon of rabbit-holing, to the
12 extent it occurs, arises from the operation of the
13 ranking system, not from any particular piece or type
14 of content, right?

15 MR. KENNEDY: Objection to form.

16 THE WITNESS: That's correct.

17 BY MR. WARREN:

18 Q. Okay. And the phenomenon of filter
19 bubbles, likewise, arise from the operation of the
20 ranking system, not from any particular piece or type
21 of content, right?

22 A. That's correct.

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1 Meta's systems can and maybe do apply different
2 weights for teen users?

3 A. I've said so in my report.

4 Q. Okay. Did you examine how the ranking
5 systems behaves for teen users in particular?

6 A. As compared with how it would -- would for
7 other people or --

8 Q. Yeah.

9 A. I mean, I -- I generally looked and -- I
10 mean, I generally looked and saw that the weights
11 were different, obviously, for teens. That's what it
12 means to have a distinct value model.

13 Q. Okay.

14 I'm going to hand you one more piece of
15 code. This is META3047MDL-SC-001 --

16 A. Are we done with this one?

17 Q. Yes.

18 A. Okay.

19 Q. -- -000000007.

20 A. Thank you.

21 Which one am I to look at.

22 Q. Can you read the name of the feature at

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1 Line 699?

2 A. It says, "User is at work or school."

3 Q. So Meta had built the technical capability
4 to infer whether a user was at school?

5 A. It seems so.

6 Q. And the code we looked at previously shows
7 that Meta could infer whether a user was a teen?

8 A. We saw that, yes.

9 Q. So between the two, Meta could have used
10 these features to suppress notifications to teens
11 during school hours?

12 MR. KENNEDY: Objection to form.

13 THE WITNESS: I didn't investigate -- my
14 report does not concern the notification mechanisms
15 of -- I was talking about content recommendation.

16 BY MR. WARREN:

17 Q. So you don't know whether Meta did that?

18 A. I don't.

19 Q. Meta could have used these features to
20 reduce teen engagement with its platforms during
21 school hours, correct?

22 A. I don't know the answer to that question.

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1 Q. Well, are you aware of whether Meta did
2 that?

3 A. You mean did they send fewer notifications
4 based on this; is that what you're trying to ask?

5 Q. No. I'm asking whether Meta changed the
6 value model for teenagers to reduce their usage of
7 the platform during school hours.

8 A. I -- I don't think so.

9 Q. Okay. But it --

10 A. But I don't know for sure. But I don't
11 think so. I saw nothing that looked like that, no.

12 Q. Okay. But it --

13 A. And this refers again to the notification
14 algorithm, as far as I can tell. Well, I think you
15 mentioned that this was about notifications. Maybe
16 I'm wrong.

17 Q. What about that refers to notifications?

18 A. It doesn't, and I -- maybe I inferred
19 that. I thought you had mentioned notifications.

20 Q. Well, it was a question I asked you,
21 but --

22 A. I see, okay. So the answer is, I don't

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1 know.

2 Q. Okay. But it is clear that they had the
3 ability to do that if they wanted to?

4 MR. KENNEDY: Objection to form.

5 THE WITNESS: Could do --

6 BY MR. WARREN:

7 Q. It's clear, based on this review of code,
8 that Meta could have changed the value model for
9 teenagers to reduce their engagement with their
10 platforms during school hours, correct?

11 MR. KENNEDY: Objection to form.

12 THE WITNESS: I don't know the answer to
13 that question. I didn't consider that.

14 BY MR. WARREN:

15 Q. So it's possible?

16 MR. KENNEDY: Objection to form.

17 THE WITNESS: It might be possible.

18 BY MR. WARREN:

19 Q. Okay. We have a little bit of
20 housekeeping to do. I don't have any other
21 substan- -- well, I actually have one more
22 substantive question.

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REPORTER'S CERTIFICATION
DEPOSITION OF LARRY BIRNBAUM, Ph.D.

AUGUST 15, 2025

I, Amanda Blomstrom, a Notary Public in and for
the District of Columbia, hereby certify to the
following:

That the witness, LARRY BIRNBAUM, Ph.D., was
duly sworn by the officer and that the transcript of
the oral deposition is a true record of the testimony
given by the witness;

That the deposition transcript was submitted to
the witness or to the attorney for the witness for
examination and signature;

I further certify that I am neither counsel for,
related to, nor employed by any of the parties or
attorneys in the action in which this proceeding was
taken, and further that I am not financially or
otherwise interested in the outcome of the action.

Certified to by me this 18th day of August,
2025.



Amanda Blomstrom, CRR, RMR, CLR
Texas CSR No. 8785
California CSR No. 12681