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TRANSCRIPT

Member Discussion

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DR. GUTMANN: We will spend the rest of the day deliberating about the potential recommendations to the President and the discussion behind those recommendations. The President's charge to us is very broad. He asked us to examine ethical consideration of both neuroscience research and the application of neuroscience research findings. We provided our initial response earlier this year in Volume I of the Gray Matters report stressing the importance of ethics integration early and throughout neuroscience reports. And I'm pleased to report, actually, that NIH and other agencies are taking this seriously and convening groups, including bioethics experts in their deliberations. And that, really, we shouldn't take for granted because, as Raju and others have pointed out, this is the way the development of genomics actually was - - avoided having the sort of heavy hand of regulation, rather than actually integrating early on. And so that was basically the headline of our report: Integrate ethics in neuroscience and integrate it early. And the rest were details. So we have discussed ethics and neuroscience for some time now, several years, actually. We have had meetings on and off about this. We laid the groundwork for this project at meetings in 2011 and 2012. A long time ago. And we received the President's charge last July. We are going to bring together the topics that we have discussed over the past few years to formulate some of our thoughts and our recommendations. And there are three areas, three particular areas that have stood out in our discussions as ripe for elaboration, for different reasons. Some of those areas are ripe for basically showing what the understandings and misunderstandings are and they may not lead to any strong recommendations other than to educate people on what an accurate knowledge and understanding of this is. And other of these topics may be ripe for some recommendations that are more policy specific. We will see. Here are the three areas: First -- and these are only in order that we are going to deliberate them, they are not in any particular order except perhaps

going from more general to more specific. Cognitive enhancement, we already began discussing. We are going to do that in this session. Second, Consent Capacity. We'll do that second. And third, Law and Neuroscience. We have three discussion sessions on our agenda today and I hope that we can devote each session to one of these topic areas. And I would like us to focus on two critical questions that we will address in our report. One, what should we say about this issue in our report. And two, what specific recommendation or recommendations should we make. And let's start with cognitive enhancement, which can include the use of neuroscience drugs and technologies. And it can be on-label, off-label, direct-to-consumer use. Many considerations emerge. We have already introduced some of those considerations in our earlier session. And I thank Lisa Lehmann, and I thank the presenters, Serena and Margaret, for getting us started here. I want to focus our discussion on what to say about this issue in our report and what specific recommendations we should make. And I have the great pleasure of introducing Steve -- Dr. Steve Hauser and Dr. Anita Allen who will take us away on this. I'll moderate it. But Steve, I understand you are going to start and then Anita is going to step up to the plate and then we'll just open it up for Commission discussion. And again, anybody who has a question or comment, please write it down and we will bring it up here. So, Steve, please begin.

DR. HAUSER: Thank you, Amy. We thought we would finish strong, so Anita will finish for us. I will be brief and speak mostly about two things. First, a very brief overview based upon what we have heard in numerous earlier meetings and also this morning about where we might focus thinking about the landscape of cognitive enhancement and what we are speaking about. And second, mention some thoughts and ideas for principles and directions that we might explore further. And then Anita will speak more specifically about possible recommendations

that the Committee could think about. So just to begin, and Amy spoke about this in the introduction, what are we talking about in 2014? What is real? And really, there are three things that are real. The first are drugs. These are in several categories. They are the stimulants: Methylphenidate, Ritalin, dextroamphetamine, other related drugs, Adderall. These we know work through very specific or relatively specific stimulation pathways that might improve focus, as well. The second is a broader class of drugs that work on different and multiple transmitter systems in the nervous system: Modafinil, Provigil is the trade name, or Nuvigil. Drugs that initially were developed for sleep but now may have broader off-label use. The third category are cholinesterase inhibitors which, by their name, work on cortical cholinergic neural pathways. Drugs like Aricept, developed for memory impairment but may also have broader use. And we spoke this morning about other types of drugs, most of which are stimulant related, that may include the caffeine that most of the Commission members enjoyed this morning. So drugs are the first. And I would say also about the drugs, that for all of these off-label uses, most of the evidence thus far shows incremental if inconsistent effects in healthy populations. The second big area we could call brain stimulation or brain modulation for cognitive enhancements. We've heard about transcranial magnetic stimulation which depolarizes nerves, it activates nerves. It is FDA approved for depression but also incrementally useful. Other developing methods, direct current stimulation that changes the baseline electrical level, the resting potential of nerve cells, but doesn't actually turn them on. And then the third, also discussed this morning and earlier, are neuroscience-based enhanced learning tools. In addition to those that are marketed, there are a number in the academic world, some of them video games focused on activating or altering frontal pathways that interact with cognitive learning and behavioral systems. So those are the three: Pharmaceuticals, electrical adjuncts, and

enhanced learning through neuroscience. So we heard many times, and Amy said very clearly this morning, what I think all on the Commission agree with: There is nothing inherently wrong with the concept of cognitive enhancement. But one question that we asked earlier is are there limits, and if so what are the limits. Is there an equivalent to human cloning, a decision that no human cloning should take place in the cognitive enhancement arena? Without a clear answer, how will that decision be made? How will those decisions be made? What buy-in will be important? What if down the road, certainly not today, we can begin to think about constructing neural -- human neural systems, transferring attributes into experimental animals, or even mimicking a human nervous system with software? We have spoken about the risk/benefit profile which will guide and should guide the use of therapies deemed reasonable. There's probably no such thing as an intervention that's completely safe. And it's an issue of benefits that need to outweigh the drawbacks, and honest discussion of what is known and what is not known. We have spoken about other issues: Authenticity, potential for coercion, fair access, distributive justice. Does this cheapen accomplishments if it's easier to do things? But I think that as we are preparing our report we should focus on the real issues as well as those that are maybe not so real, and recognize that there are some issues that can be solved by reasonable people and others that will be far more difficult. And to paraphrase what Thomas Murray said to us, formerly from the Hastings Center, a key will be not to handle the marginally useful things that we have in November 2014, but how do we handle the surprises. How do we handle the larger achievements? And how do we proactively prepare for these future developments which may be unexpected? So I would close by just raising two concepts that we might want to dive in a little deeper as a Commission. We might broaden the concept of cognitive enhancement to think about the range of ways that the human nervous system can be enhanced. And this

involves, importantly, motor, behavior, as well as cognitive enhancements. There's a lot of science that the capacity to cooperate with others, to delay gratification even in childhood, to regulate our emotion may be as or more important than specific elements of an IQ or cognitive response in determining success. And success and happiness are not always linked. So I think that we should broaden this concept. Motor enhancements are an area that is being used broadly off-label and sometimes to the detriment of young people and not-so-young people. There will also be other attributes that neuroscience can arguably enhance. Some would argue maybe this is not an enhancement. What about short sleepers? We used to think that if you didn't sleep much, this was dangerous. But recent studies of short sleepers show that they live very long lives, they are often successful, and they tend to be inherent optimists. So understanding the clock genes that regulate our circadian pathways, there will likely be novel sleep-promoting or less sleep-requiring opportunities. And I think whatever we do should consider a broader range of ideas, as well as the likelihood that better ways to inhibit myostatin and build stronger muscles -- we all know about the steroid and related compound issues in sports. And then -- so the first would be to broaden the concept of cognitive enhancement to a broader neural -- enhancement of multiple neural attributes. And the second was addressed, in part, in our first report but is so important that we cannot lose track of the importance of promoting an informed public. And Stephen Ward from Oregon put it more bluntly than many of us would. A key challenge, he said, is how to deal with the baloney. And I think very similar to our synthetic biology report, how can we speak in a useful way about goals for promoting education, communication, fact-check mechanisms, how to put real teeth into these concepts.

DR. GUTMANN: Thank you very much. And bravo. I think you've helped us outline a way of proceeding, so it's really terrific. Raju, can we hold and do Anita and then open it up?

And you will be first.

DR. KUCHERLAPATI: I don't know what Anita is going to talk about but I have some specific suggestions to what Steve talked about.

DR. GUTMANN: Great. Terrific. So you will be first and we will just have Anita go and then I will call on you.

DR. ALLEN: Thank you. And I think that much of what I'm saying is going to be an echo to what we just heard. I think that one of the directions which would be useful to go would be more research; research about what we know about the prevalence of enhancements and their safety and efficacy. And in the prevalence area I was struck this morning by how little we know about the exact prevalence of usage among high school students or college students, the general public, the worried well, the elderly. To what extent aren't the newer interventions being used and by what populations and for what kinds of reasons. So I think that's an important thing that merits funded research. And at the same time, I think as we are looking at new pills and other sorts of pharmaceuticals we should also be looking at the prevalence of deliberate changes in behavior and environment and education that are aimed at cognitive enhancement. As Steve was suggesting, we could very much stand to explore and recommend that others explore why we care about cognitive enhancement. Why is it important? Is it because we care about addressing congenital problems, defects? Do we care about accident victims? Do we care about mental disorders? Do we care about aging? Knowing why we care might also be helpful to point us in directions about what kinds of other research and ethical measures we need to be undertaking. I think that there is a sense that we care because we think it's a good thing to be, quote/unquote, normal. And what it means to be normal of course changes. Normal is not exactly an uncritical norm, as it were. But I think people value self-care,

they value relationships, they value economic and political independence. And if cognitive enhancements under that name or some other can actually bring people closer to normal lives, that would be a very good thing. So then research, research on prevalence, safety, and efficacy. An excellent point that was made this morning about safety. If you just think about the safety of taking one methylphenidate tablet every time you have a math exam, it looks like it might not be all that unsafe. But if you think about it in the context of young people who might also be consuming other kinds of pharmaceuticals plus alcohol, caffeine, et cetera, then the safety of the intervention becomes much more problematic. So we need to think about the safety of these interventions in a much broader way than just looking at the pill itself or the drug itself. You know, we need to know more about the efficacy. If, in fact, people don't get as much as they think out of the drugs and the drugs have risks for heart conditions or blood pressure, we need to then know that better and educate the public about the limited efficacy of the drugs that they might be inclined to take. So, more research there. Another thing I think we should be thinking about is the importance of just old-fashioned self-help, self-care measures. We focus a lot on the complex new pharmaceutical interventions and brain interventions but we don't focus as much as we should on just what things within our control that we can do to make our lives better and enhance our cognition. So we should definitely put a priority, recommending that a priority be placed on educating the public and the medical profession as to the importance of exercise and sleep and lead abatement and better education in schools because, of course, are stimulating young people's brains may be the best enhancement of all. But the behaviors that we can change and address to make ourselves healthier need to be addressed. I mean, if alcohol -- alcohol is an anti-enhancement for most people. Let's cut down on drinking alcohol. So the things that we can do within our control, the things we can teach people to do that are very inexpensive need to be

emphasized more. And I would certainly want us to be recommending that we do something to improve the priority given to ordinary interventions in this area for those kinds of reasons. We do care and we can do something about it. Of course, once you have in place access to products that enhance cognition and you have in place programs and educational schemes that are designed to make people more aware of the value of diet, exercise, sleep, et cetera, questions arise about, well, do all consumers -- does everyone have the same access to this kind of knowledge and these kinds of opportunities. Good food is not something which everyone has access to. The ability to sleep well is something which is maybe more available to some people than others. But if there are concerns about access, especially to expensive pharmaceuticals, we need to have, from a justice point of view, some kind of structures in place to ensure that we don't have a population of the haves and have-nots. Those who can afford the great education, the access to sleep, the wonderful diets, and then those who, by virtue of poverty or isolation, have no access to similar kinds of self-help and ordinary remedies to improve and maintain brain function. Another set of issues that we need to worry about, or mentioned by Steve, they have to do with coercion. I think a lot about this. If you have in place -- again, whether they are new, novel interventions or just reemphasizing of common sense like sleeping more, there are concerns about coercion and whether people who perhaps would not want to adopt an intervention should be in some sense coerced to do so. Whether children should be, by their parents, coerced to take medications or engage in other kinds of behaviors or strategies in order to make them better functioning, from the enhancement point of view. To what extent do we force people. Do we force people to force their children, and so forth. Do we force people who are incarcerated. To what extent do we use what we think are proven, reliable, safe, and effective enhancements? Do we use those in a way which involves coercing people who might

not want them to nevertheless get on board with the program. With that in mind, it's important to have guidelines for practitioners and public policy folks, because if we are going to go down this path, there should be uniform standards used by nurses and doctors and psychiatrists and psychologists who don't have a world in which some people are, because of anxiety, being given drugs of one sort and others are given no drugs or drugs of some other sort. We need to have it clear what's a reasonable and effective and safe protocol for treating and addressing different kinds of problems. And I think it would be great to give people greater guidance. Because even the psychiatry profession itself is sometimes not as well-informed about the various options and what the social and medical risks are of those various options. So guidelines for everybody would be helpful. It would also give -- parents need guidelines on when to pursue the medication route, for example, as opposed to other kinds of interventions. Lastly, I want to say something about this very important topic that Dan raised about ethical assessment. I think that we need to be recommending that ethicists spend a great deal of time as we move forward assessing whether or not we want to go far ahead in the area of enhancements. Do we want to get to normal or do we want to get to super human? I think we've all been inundated these days by video games and science fiction images of humanity where human beings are Cyborgs who have extraordinary extra-human capacities. Well, if science makes that possible, should we go that way? Should we go that way with humans, with animals? What's wrong with that? Is there anything wrong with wanting to be better than we are? How do we balance the virtues of humility with the very familiar hubris that goes along with being a human being, as well? And what role will drug companies and the government play in either pushing forward in this very, very fraught with ethical concern domain of super enhancements? How much will they restrain the capacity to go in those directions. And what do we lose by way of human

authenticity and character if we allow ourselves to become not just human but super human?

DR. GUTMANN: Great. Thank you. Raju.

DR. KUCHERLAPATI: Terrific. Both of you. That's a terrific start. I'm going to make a couple of comments that we might want to think about incorporating in our report. Some of them might be obvious, but let me state them. First of all, I wanted to point out that the way that we are talking about neuroscience now, in the context of that report, encompasses actually lots of areas of science and medicine that were considered to be distinct. I think that, you know, for example, neurology and psychiatry were completely different sorts of entities for a long period of time in how people train, how they take care of people, and so on and so forth. But now it is emerging that those are not two distinctive fields, but they're the same. Similarly, neuroscience is a separate entity, or studying worms or some other sorts of things. But now, you know, we are trying to bring together all of these different types of things. And of course, other sorts of medical fields, like geriatrics and pediatrics are also becoming an integral part of all the things that we have talked about. So I think we should talk about that a little bit in the beginning of what it is when we talk about neuroscience, neuro ethics. What are we talking about? And trying to, Steve, like you suggested, to make it broad. The second comment I want to make is that much of the stuff that, you know, both of you talked about, we have to put that into context. So what I mean by that is that, first of all, we have to define that there are, you know, human pathological conditions under which it is necessary to intervene and to try to enhance cognition, right? So people like me who are getting old, you know, might -- because of age might require cognitive enhancement. Or people who have a disease like Alzheimer's would need to have cognitive enhancement. Or in the case of children, we can debate whether ADD and ADHD, you know, whether they need this, but certainly the people who take care of them think that

such type of cognitive enhancement is important and it is necessary. And we have to separate those types of cognitive enhancement as opposed to so-called normal people and how we deal with them. Right. And the other comment that's very -- so certainly in the case of disease areas, certainly in other fields -- for example, if a person is diagnosed with stage 4 cancer, for example, and they think that they have only two months to live, there may be extraordinary types of things, drugs that would be given to them in an experimental fashion that would be considered to be okay, right? Whereas such a drug may not be appropriate for somebody else in another condition, right? So there are certain sets of circumstances when, you know, unusual types of treatments may be okay. We have to define that that's indeed the case. With regard to normal, so-called normals, if we look at the population, with regard to anything that we talk about, any aspect of the human aspect of it, you know, height or intelligence or cognitive ability, it's a bell curve, you know? There are people all over the place, right? And so what are we talking about here? Which of those populations are we talking about, right, when we talk about these types of things? Again, maybe at one end of that spectrum it is okay to be able to do certain types of things that may not be okay at the other end. So unless we truly recognize that there is a significant amount of variation, and how you deal with them is important. So -- and I just wanted to talk about some of the things, like the drugs, for example -- you know, you give Ritalin to children who are diagnosed with ADHD, or something, and some children respond and other children don't respond. It may have nothing to do with the drug. It may be our understanding of it, what the disease is, what the underlying basis for the disease is, and what the target for this drug is, right? And that type of thing is happening in other areas of neurology, or in genetics it's happening, but we don't know about this so we cannot paint a broad brush and be able to say that this drug or this other drug is bad or good. But we need to be able to know

whether our knowledge base is such that, you know, we're not able to identify the right groups of people who will be able to benefit from that. So we have to distinguish all these different things. And, Steve, one thing that, you know, at the beginning of the report we might consider sort of putting together some of these overall thoughts and define what we are talking about. And maybe even give specific examples, as we have done in other reports, of situations where, you know, a cognitive enhancement approach, any of the ones that you talked about, whether they are pharmaceutical, electrical, or enhanced learning things, are wonderful, and where something like that has not been so great. And so that would sort of, you know, put everything into relief as to what is really important.

DR. GUTMANN: And where there's fear and concern and we have so little knowledge base that we need more knowledge base there. Good. Dan.

DR. SULMASY: Thanks. I think this has all been –

DR. GUTMANN: I have Dan, John, Christine.

DR. SULMASY: I think this has all been very helpful. I'm just a little concerned about the ambiguity in the phrase of per se permissible. I'm not sure that it captures exactly what we want to say or has a danger being misinterpreted. So I think that what we probably want to say is that not all forms of enhancement are immoral, right? I think that's really what we want to say. But I think we also want to avoid the sort of common fallacy of the continuum which is very common in this sort of enhancement debate, which is a version of the Sorites problem. How many grains of sand make a heap? Right? At some point it will be a heap, but where do we draw that line? And I think we don't want to say or give the impression that we are saying that, well, drinking coffee is okay, therefore implanting transhumanizing brain chips in everybody's brains is okay as long as we have equal access to them. I don't think that's what we

want to say. So I think we've got to be careful to sort of point out that that fallacy is common while still saying that, you know, there are certain forms of enhancement that ought to be considered morally permissible. And then we can focus on the kinds of issues that I think are the really important ones that I've heard, like the questions of whose choice is it to be enhanced. Is it coercion, manipulation questions; the short-term versus long-term questions; whether we are bypassing the deep and broadly applicable capacities to do the same thing; safety and alternatives; the questions of unfair advantage and the sort of arms race that can lead to when one person gets access to this and the next person needs to in order to just keep up. Questions of moral enhancement which might be part of or considered sometimes part of the enhancement, et cetera. So I think those are the real issues you want to focus on. And just my concern is that the per se permissible language can be misinterpreted I think as the sort of fallacy of the continuum. And I want to make sure we avoid that in this discussion.

DR. GUTMANN: So I don't think we want to say it so it suggests that the default is suspect. So we can say enhancing cognition is not in itself suspect. In itself, it's not suspect. And then you have to ask questions about each kind. One of the things I liked about what Steve said that we hadn't said before and I think -- nothing has been said to disagree with it, so I just want to make sure, is that it would be important, since we are focusing, because it is neuroscience, on the issues that have been out there about cognitive enhancement, we not just focus on the cognitive enhancement but also the other forms of neural enhancement. Because I think an unintended side effect of focusing on this cognitive enhancement is totally unintended, because the critics have -- the side effect, I think, is that people think, "Oh, that must be something a lot of people think is good." And it makes cognitive enhancement seem more attractive than some other forms of enhancing your ability to control your motor skills, for

example. So I just think it's an important -- it's important, given we are talking about neuroscience, not just to talk about --

DR. SULMASY: Yeah. Certainly I'd agree with broadening it. But the same sort of question of the fallacy of the continuum applies to these other kinds of enhancements, as well. So I just want to make sure that we -- it's so common in the literature that I really think it would be very valuable for us to explicitly repudiate that.

DR. GUTMANN: Yes. Good. Good. Jim had a question.

DR. WAGNER: Actually, it was your question but I want to make sure that we actually talk about this, Dan. To hear Amy say that enhancements in and of themselves are not immoral, nothing wrong with that, and then to hear your -- you begin that same paragraph by saying not all enhancements are immoral. We are going have to come to a place, where are we jumping on this --

DR. SULMASY: Maybe my sort of take-out might be, if you want to put a positive spin on the way I do it is, "Plenty of forms of cognitive enhancement are morally innocent."

DR. GUTMANN: Good. That's fine. Just as long as we don't phrase it to make the default it's suspect. Okay? And also, it falls into the fallacy of the term, is such a loaded term, we have to be careful of it. Okay. John.

DR. ARRAS: Well, first, thank you for framing the issues so beautifully. I have to do something similar at 2:30 and now I've got serious performance anxiety. But enough about me.

DR. GUTMANN: Some people may have some off-label drugs for you.

DR. ARRAS: So I want to circle back on a theme that Raju was articulating, making distinctions between, you know, interventions that might bring people up to something like normalcy versus interventions that take people well beyond. So I think that there's a need in this

report for a fair amount of conceptual clarification. Okay? So just the definition of enhancement is one area that needs some serious work. Another is the distinction between enhancement and treatment or enhancement and therapy. I mean, there are a lot of efforts to drive a clear wedge between those notions, to try and develop a kind of value-free conception of disease or health. But I have always suspected that those are, you know, infiltrating various value judgments at various points. And the treatment/enhancement distinction pops up I think in a lot of the enhancement literature. So you have to be self-conscious about invoking those kinds of distinctions and self-conscious about what kind of implications they might have. Now, another just short point I wanted to make with regard to Stephen's attempt to broaden the scope of this. In the literature of enhancement, there's been quite a bit of talk in the last couple of years about moral enhancement. Okay? So not just cognitive, but moral. And so it's not just, you know, motor activities, it's not just cognitive. But it's actually sort of attempting by whatever means to make us more altruistic, less violent, whatever. Okay? And I think that that could be a theme that could be tucked into this section. I think this could be an interesting thing. I'm actually going to be talking about this in my current seminar on neuroscience and ethics in a couple of weeks. But I've got to do that reading soon.

DR. GUTMANN: Thank you. Christine?

DR. GRADY: So thank you to Steve and Anita. And if you wait long enough on the queue, your opinions have already been expressed. What I wanted to say was I think somewhat similar to what John just said and also building on Raju's comments. I think we -- one of the things we can do -- Amy, you asked what can we do? One of the things we can do is be very clear about what we mean by "enhancement." Because there is a danger, I think, in the sort of common understanding of what that means, means sort of above normal or from normal better.

And I think if that's what we want to focus on, then we are sort of suggesting in a sort of indirect way that all of the very important work that some of these modalities can be used for to maintain cognitive function or restore cognitive function or behavior or motor, whichever one we are going to focus on, are less important or we already know more about them, or something like that. And I don't think that's what we want to convey.

DR. GUTMANN: I think Steve captured this really well in his outline but -- and we're going to have to be explicit about this. We do not want to subscribe to, buy into, the most common aspect of the literature which is there's this just clear distinction between enhancing cognition above normal, and therapy below normal. Now, we also don't want to suggest there's just some mindless continuum. And Steve outlined it in a way that doesn't buy into that. I think we are going to have to say up front, we are taking on this issue in order to debunk some of the misunderstandings out there, that are ethical misunderstandings as well as, if you will, practical cognitive. They are cognitive/ethical. Let me put it this way: I think the term, the way it is commonly used, is misleading. And it is misleading in a way that is very unproductive of thinking clearly about the ethics of it and what's good and what's not so good. What's better and what's worse. So I think we can do that. But to ignore the topic because it is misleading would just leave it out there the way it is.

DR. GRADY: I didn't mean we should ignore it. I think, though, that we have to be cognizant of the fact that the term has a loaded meaning.

DR. GUTMANN: That's what we should say, then.

DR. GRADY: And we have to be really clear about what we mean by it and what we're trying to say. Because so many of the things, the recommendations that I think Anita is suggesting, the more research, fair access and things like that, are relevant to all of the above,

sort of all the possible ways we can think about what enhancement might mean, without having to get into the quagmire of what is the line between treatment and enhancement which I think is -- people have been working on it for a long time and not solved.

DR. GUTMANN: And I think a big focus is what Steve said, promoting and informing the public. And that's a key challenge.

DR. GRADY: Can I just add one other sort of minor thing? We've talked a lot about research to investigate benefits, efficacy, risk, side effects, those kinds of things. I think that is all really important. The one thing I wondered about was cost effectiveness, whether we should say anything about that.

DR. GUTMANN: I don't know. Nita?

DR. FARAHANY: So first, thank you to both Steve and Anita for highlighting this in a very useful way to frame the conversation. I'm going to express my reservation again about how much we can say meaningfully on this topic. And I know that it's probably one of the better and more fully debated topics in neuro ethics. And I would want for us to be very careful about thinking about what can we, as a Commission, say that's different and novel and useful at this level? To whom are we directing those recommendations? And what's the purpose of the recommendations? I think some of the things that Steve outlined are useful and in accord with things that we have said in the past that could be helpful. But let me speak about some of the issues that have been raised more specifically. So first I agree entirely that we should broaden the scope, but I wouldn't even use the word "enhancements" because the broad topic which we are talking about are different forms of neuro modification. And how you characterize things as neuro modification really are -- could be enhancements, could be diminishments. So one example is the use of something like propranolol to try to decrease fear memories and to do so

as a way to prevent the development of PTSD in trauma victims. That's a form of enhancement in that they are less likely to develop PTSD. It is also a form of diminishment in that they are selectively diminishing certain memories, the end point to be dampening certain memories. There's social disinhibition, which is a positive side effect of alcohol but it is certainly a diminishment in some form rather than an enhancement in every form. And so trying to draw the line between what is enhancement versus what is therapy versus what is diminishment versus what is modification, I think they are pretty artificial lines and it's a debate that has been had and one that I think we don't want to end up using a term that has simply become a term of art that doesn't capture the broader concerns that we have been talking about here. So I would suggest we move away from that, to begin with.

DR. GUTMANN: But to take you literally means we shouldn't use the term. We have to use the term. It is out there. We have to debunk the term, deconstruct it, go beyond it. But part of our job -- in almost everything we are dealing with there's a robust literature and so on. But part of our job and our charge is to say something about the ethics of neuroscience research and its use. And I think in keeping everything -- consistent to everything you said is that we look at the topic of cognitive enhancement and improve upon, from our Commission's perspective, on the way it ought to be discussed. And everything you said after that, other than we shouldn't use the term, is consistent with the things we have been saying. I mean, we shouldn't buy into the term but we need to recognize the way it's used. It's like -- I mean, when we took on Craig Venter's notion that he was creating life, we shouldn't -- I mean, we took it on in order to say he wasn't doing that.

DR. FARAHANY: So on this first point that I want to make, I'm not suggesting that we don't make reference to terms that people use in the literature. I'm suggesting we not use that as

our own framework for the term as we discuss it. When we get to neuroscience and law, for example, many people call it neuro law. I have problems with people doing "neuro" words for everything. So I think what I'm proposing is we don't stay within the framework since the concerns that we have addressed are much broader in scope; the motor coordination ones and motor enhancements ones, moral enhancement. Each of these, I think, would be much more useful if we could start a new dialogue about the broader issues that we are concerned about rather than trying to stay within a label that has been self-defeating in many ways. The second issue is I want to endorse the recommendation that Steve made about factcheck.org. They say a broader -- and kind of the most valuable thing I think that is consistent with what we have proposed in past reports is this idea that information forcing types of recommendations or information forcing types of approaches are incredibly valuable. And especially in this area, because there's a lot of conflicting data out there about the value of brain training games, about all sorts of different things. And people who are, in many cases, desperate because they are noticing cognitive decline or they're facing dementia or Alzheimer's or things like that are investing a tremendous amount of money in snake oil. So I think having something like factcheck.org would be extremely valuable in empowering people to make better choices about their use of limited resources. On the distributive justice concerns, you know, as we -- if we go the direction of neuro modification -- and this will tie into the next issue I'm going to talk about, the fallacy that Dan raises. You know, this is true of every area. This isn't something special or unique about neuro modification. Everything we do modifies our brain in some way and modifies our brain in permanent ways. Simply being here present today does so. Drinking tea, having education, having good access to food, having healthcare, all of these things have powerful effects on our neuro state. And so the kind of answer of every new opportunity to stop

distributive justice appears to me as kind of a hollow approach to policy-making. And I'm not sure that saying that things like we should all have equitable access to neuro modifications is either meaningful or productive as a conversation in this area. So talking about structural changes to try to make sure everybody has access to it, it's far more complex than that. Just this one example. Some of the studies on modafinil show that people who are at the lower end of the bell curve enjoy greater improvement in cognition than people who are at the higher end. And so what would equitable access in that context mean, given that there's a differential effect and how much improvement you can expect from any particular thing? So I think I would recommend we stay away from kind of empty rhetoric in that area. On the fallacy point that Dan raises, I think I disagree. And I disagree because I think there are unique concerns that different modalities of neuro modification raise. And those concerns for me are primarily safety, efficacy, permanency. But they are not really about naturalness or authenticity or things like that. Because again, I believe everything we do changes our brain in some ways. And the idea that there's something suspect about a brain implant and not suspect about caffeine to me is more about social norms of what we have embraced and become comfortable with rather than being particularly concerned of anything at any other end of the continuum. So I don't think it's false that we recognize these things as continuum. I think it's accurate to say that one of the problems that has stymied the debate and conversation in this area is the fact that it's so hard to draw a line anywhere along what is a continuum, since everything, in fact, does enhance the brain. And so I -- that's part of what persuades me that this isn't as big of an issue is the things that we have already come to accept that weren't previously accepted are on the same continuum of trying to improve human flourishing. And in this area which is so different than other areas, from my perspective, enhancement or modification is about flourishing. The last thing I want to

talk about is a potential issue on regulation and ways to -- a specific type of recommendation that we might contemplate. One problem in areas of improvement of health or prevention or overall kind of enhancing drugs or devices is that the traditional mode of regulation looks at risks and benefits but it's very difficult to quantify the benefit to any particular individual of a modification that improves them over their existing status. So our existing regulatory models, which were designed for therapeutic purposes but not for beneficial purposes, limit the ability of different drugs and products to get to the marketplace, which to me as bigger problem of access than any of the more traditional structural problems of access in this domain. And so trying to evaluate and come up with a new model of how we might approve and get to market in a safe and efficacious way, these different drugs, recognizing that "benefit" may need a new meaning in this context, I think could be a valuable and pretty concrete thing forward.

DR. GUTMANN: Barbara. And then we are going wrap up this session and go to the next, because time is limited.

DR. SULMASY: Quick response since I was --

DR. GUTMANN: Really quick.

DR. SULMASY: Just to say that I'm not sure that we disagree, actually. All I'm suggesting what's fallacious is to conclude, from the fact that there is a continuum, that therefore everything is morally permissible along the continuum. I think that you might want to make -- all you have to do is make an argument for a particular place along the continuum.

That's what the fallacy is, that you can't automatically --

DR. KUCHERLAPATI: But we have to agree there is a continuum.

DR. SULMASY: Yes.

DR. KUCHERLAPATI: We have to draw a line, but you can't say there's no continuum.

DR. SULMASY: No, no, absolutely.

DR. GUTMANN: I'm sorry. I'm working on an old timeline here. So I now have the new timeline. Great. Okay. Barbara.

DR. ATKINSON: I've been interested in the research questions that you would ask around this. And it's not a simple area to be doing research in. I think mostly because a lot of scientists wouldn't agree that some of the ways off-label that these drugs are being used or being proposed are worthwhile for scientific research studies or clinical trials. And so maybe have been -- and maybe would have trouble even passing a human subjects committee in some of these kinds of areas if you tried to propose studies looking at how college students might use multiple drugs or things like that. But I think that one of the things that might be useful is to actually do comparisons with the ordinary sleeping and exercise and diet kinds of things as opposed to drug use and actually finding some data on whether there really is an enhancement over and above. Not just comparing it to nothing, but comparing it to things that are simple things that can be done that can be useful for everybody and everybody has access to.

DR. GUTMANN: So Steve raised the question -- Steve began, I thought, very -- the whole thing was extremely useful, Steve and Anita, so thank you both. It begins with a whole range of examples of what people often refer to when they are referring to cognitive enhancement and then goes on - and this is where I think we are in heated agreement - then goes on to say we need to broaden this to the range of ways the human nervous system can be enhanced. And also Nita and Dan agree that there is a continuum of ways; doesn't mean because there's a continuum all are equally, you know, good or bad or efficacious or not efficacious. In fact, we know they are not. Right? So that's very helpful. And I think we can really run with that and broaden the understanding and the debate. I think one of the most

important aspects of this report is what Steve said, promoting an informed public. And I think we should run with that. Now, Steve, you asked a question and I'd like to open it up for you, how you would answer it and how anyone on the Commission would answer it. Is there anything in this area -- so we said there's nothing -- enhancing cognition is not, in itself, suspect and there's a range of dealing with cognition, improving it. And if you improve cognition, you could be doing it therapeutically or you can be doing it where it's -- no doctor is going to prescribe it, but you make your cognition better either in a given instance or overall than it would otherwise be. But here's the question: Is there an equivalent in this area to human cloning? That's what you asked. And there are all these -- is it the human Cyborg? Which isn't the equivalent of cloning because when cloning came about there was a clone of a sheep named Dolly. And that raised the real question. So I'm just throwing that out, first, for Steve. Is there some -- let me tone it down a bit. If not an equivalent, what is the analogy here to human cloning, and to what extent is it equivalent?

DR. HAUSER: Well, if I knew that answer I would have framed it in a declarative way rather than as a question. I again would go back to the beginning of some of our deliberations where we -- in fact, where we lead in our first volume, that there is nothing unique about these questions that we are asking in the neurosciences, but in some aspects they come into sharper focus. And the concept of making an individual's genome permanent, the human cloning concept is certainly beyond the bell curve and something that is formally prohibited. So what if we were to begin with the possibility that neuro modulation -- and one could argue whether this is enhancement or not. But presumably the purpose of it is that the function and the ability to live in your environment is enhanced by the manipulation. So even if it is decreasing the role of an attribute that is unhealthy for that goal, it would potentially be functionally enhancement. So

what if we were to say, off the cuff, that manipulations that are not permanent or are not transferred to progeny are more reasonable than manipulations that become a permanent external entity? I guess the equivalent might be, in genetics, where -- what about gene therapy? Is gene therapy that enhances a genome different from a cassette that does not get integrated in the genome?

DR. GUTMANN: Yeah. Could I go in a totally different direction? Because I don't think -- I think the distinction between enhance -- the distinction between improving the working of the human mind such that it's in some way permanent versus temporary or some way -- I don't think there's a good/bad here. So in the literature and in the debate out there, the closest equivalent I can find to human cloning, and it isn't -- is in the cognition sphere, and that is the debate over whether you can create a computer that thinks just like a human being. In other words, whether it is possible to have -- and if it were, you know, whether it's possible to create an entity that is just like a human being because it thinks just like a human being. And there's a robust debate --

DR. WAGNER: Huge literature.

DR. GUTMANN: -- about that. And I don't think -- you know, there's no -- it turns out that turing -- there's a turing test and it hasn't been passed. But there's a robust debate that even if you could pass the turing test, it would still be the equivalent of a human being. And it's a very esoteric -- you know, I don't -- it's an esoteric debate, it's a really important philosophical debate, it has real practical import because it has to do whether -- with just what you said, Steve, whether other aspects of human thinking, which have to do with emotions and control over behavior and the ability to express one's self in a way that is not -- that is part of our consciousness, is important. But there is a big literature out there and a lot of concern that in our

age of thinking about how to manipulate the mind, we are forgetting what the difference is between a machine and a human being. And that overlaps with the Dolly debate. Okay. So I think it's important to put it out there because it's really part of the -- it's going to be part of the debate moving forward.

DR. ALLEN: Just to follow up on the things that we're frightened of. So the Dolly debate analog could be the machine that has the capacity of human cognition. But the other, I think, scary line that we may not want to cross is where you have a human being who has been manipulated such that they no longer experience negative emotions or regret, sadness; their painful memories, as Nita mentioned, are dispelled. I think we would -- to me that's a Dolly moment when it's possible to do that, and we are tempted to do it. And it may be that it's not a drumline change, it's a change in one person. But the idea of human beings who are just like us except they are not burdened by pain, regret, sadness, et cetera, that, to me, is something of ethical import and it is even perhaps more imaginable than the brain that has the human capacity.

DR. KUCHERLAPATI: I'm trying to think of answering Steve's question. I can't think of any, actually. And even this issue about the cloning and so on and so forth, that's a social construct in the present society, right?

DR. GUTMANN: Right.

DR. KUCHERLAPATI: That's not considered to be important. It happens all the time.

DR. GUTMANN: Social constructs are important.

DR. KUCHERLAPATI: No, I understand. But social constructs can also change, and they do change. You know, in terms of cloning, for example, identical twins, this is the nature's way of cloning. That's exactly what happens. So I'm not sure of absolutes. If you consider in this

neuro area, for example, right, people with schizophrenia were sort of put into cold -- ice cold water baths, right? That was considered to be okay. If you asked me today, I would say absolutely that's inappropriate. Or doing frontal lobotomy would be considered to be okay forty years ago. It would not be considered to be okay today. So I think things change so that I don't think there's any absolute thing that you'd be able to say in terms of this particular subject that should be considered to be absolutely morally wrong. DR. GUTMANN: So my moral philosopher has to say we are speaking as the Bioethics Commission today. The fact that -- and you said you think this is absolutely wrong with regard to lobotomy. We have to say what we believe today. That's the same thing with science. The evidence changes. We don't know what a hundred years from now scientific evidence will tell us, but we have to do the best we can today.

DR. KUCHERLAPATI: But I guess the distinction that we have to make is that so therefore there is no absolute. That's what I'm saying. Because when science changes, our social constructs will also change, so that actually says there is not an absolute thing.

DR. GUTMANN: We don't have -- that depends on what you mean by "absolute." It is absolutely wrong to commit genocide. And there are other absolutes, too, in the sense that we know them as well as we can know anything. And there is no -- we can't imagine a human world in which that would not be the case. There are a lot of things that we could imagine changing, I just think that --

DR. KUCHERLAPATI: Just a lot of thinking about that. In my own simple-minded way of thinking about that is that, you know, killing would be considered to be absolutely immoral. But clearly there are circumstances under which killing is considered to be okay or even approved. So that's what I am saying. The context is important but there is probably no absolute.

DR. GUTMANN: Nita.

DR. FARAHANY: I think that the long-term, short-term, or the future generation issue actually reveals to us a different issue rather than it being the issue itself. So I think thinking about the harm to others and the harms to future generations is important. I mean, one debate that happens quite a bit in the enhancement debate is libertarian principles versus paternalistic principles; self-autonomy, decisions that a person can make for themselves versus the harm it causes to others. So to both Steve's point and Anita's point, I'm not troubled by a single individual who, for example, suffers a rape being offered the option of taking propranolol to dampen their fear memories and to decrease their risk of developing PTSD. But I would be troubled with an entire society having in-the-water propranolol after 911 so that our social construct and understanding of what happened and our fear and inhibitions about things would occur. So I think what the long-term and short-term issues, and whether or not there are certain things that are off limits, has a little bit more to do with who is making the choice. Are we imposing the choice on another person? Are we given the choice? And what are the consequences to the choice we might be able to make on others? And so I think the harm principle in libertarianism is a useful limitation in this context to understand what are the social consequences of individuals being able to do neuro modifications. And if those are grave, then we need to be concerned about them. So for future generations, if there was something neuro modification-wise that would pose some sort of risk to future generations then I would be concerned about it. I'm not aware of anything in that context yet. But something similar would be, I'm concerned about the use or the imposition of drugs or devices on children where we don't understand what the long-term implications are. So thinking about doing increasing activation in one area of the brain which might come at a consequence of a different area of the brain. So you have a child who's very good at some particular function but loses some other

function over time. We do that anyway with reading and other types of functions, but as we think about more direct brain interventions, I think understanding who the actor is and who gets to make the choice and what the social consequences are is, to me, the bigger issue, the consequence of which and some of the dimensions of which may be long-term, short-term, whether or not there's fear memories or other types of memories modified.

DR. GUTMANN: Good. I think that builds on this. I have Jim and then Dan.

DR. WAGNER: You know, I have listened almost entirely to this, and I'm actually troubled by the direction of the conversation and the scope of the conversation. And correct me, please, if I'm wrong. I think much of what we have been talking about is in some ways -- and I'll try to support this, some ways out of character for how we have discussed other issues and I think perhaps even beyond the scope. The scope that we have been asked to address, right, is the direction of research for the brain project.

DR. GUTMANN: No. Actually, the scope is that, plus the use of neuroscience more generally in society. It's very much that.

DR. WAGNER: Let's make sure that's right, Amy. Because I'm concerned -- when I say out of character, we have drifted into a realm that I associate with something that we addressed before and actually discharged, and that was the precautionary principle that says one shouldn't even consider doing research in areas that could lead to applications that we can imagine being detrimental, right? I think we have a lot to contribute. And I hope, even if I'm wrong and we should be talking so heavily about applications, speculative and demonstrably possible, even if I'm wrong and we should be talking about those things, there is another rich conversation that we need to have in this area about where the knowledge gaps are that can help us ethically inform future uses. And in the past, our character has been to say that we don't find the pursuit

of knowledge immoral in and of itself. In fact, we have assumed it's amoral to pursue knowledge. And if we don't have a conversation -- and shame on us if we don't have a conversation also about what we think the gaps are that may or may not -- excuse me, they are not currently being addressed in the research directions in which we are going. And I'm concerned that we have jumped ahead in a very seductive conversation and set of conversations that may keep us from fulfilling if not the principle charge, which I had assumed, but if it's not the principle charge it's at least an important component of our charge of how we guide research, and what the ethical questions would be in neuroscience research and technology.

DR. GUTMANN: I think that what set this off is the question of is there something like Dolly. And it was not meant --

DR. WAGNER: No, it's not.

DR. GUTMANN: Oh, no. Okay. So --

DR. WAGNER: Go ahead.

DR. GUTMANN: No, I don't want to go ahead because I want to figure out what set it off because I think that for sure our charge is broader than neuroscience research. And in fact, if it isn't broader then we are pretty much done with our deliberations because the first report pretty much said what needed to be said there, with the exception of some more specific things that we will say about neuroscience research. But it is part of our charge, and also I think really incumbent on us as a Bioethics Commission to try to clarify for the sake of public education, which I dare say is our best hope here now, what some of the misunderstandings are out there and what are some of the potential, consistent with our principles. So I --

DR. WAGNER: I hear you and I appreciate the correction. If that's the case, then let's be really confident also that cognitive enhancement, consent issues, and intersections of law and

neuroscience are the three big categories and that -- we build -- we explain why it is that we are not going to talk about other categories. For example, the greatest uses presumably, which will be therapeutic uses, that -- we don't have a fourth category and probably can think of five or six. I had understood these three to be wonderful vehicles to help explore some of the key ethical questions about how it is we want to go about getting the kind of knowledge that would impact not just these three but more broadly. So I understood these as vehicles rather than we think these are the key applications that we need to understand.

DR. GUTMANN: So let me try to clarify what I think we can do here. First of all, they're not the key applications.

DR. WAGNER: I agree.

DR. GUTMANN: So we are not picking them because they are the key applications. And they are only part of our report. They are three cauldrons of controversy, if you will, which we can help shed light on and clarify. Some of them will -- all of them will have potentials for more research. We have already uncovered one here, which is what are the actual uses and risks and benefits in the way Nita - we should be clear - broadened the category of all of these cognitive enhancers and also really changed the way we think about that. But to get to your central point, this isn't all of what we have deliberated about or what we will discuss in the report. We are also going to discuss the important positive research areas that are not necessarily, and often aren't, the most controversial.

DR. WAGNER: Good. And I, again, appreciate the clarification. I do -- and correct me on this. The BRAIN project, though, as far as I know, all of the dollars now up to what, \$300 million, are being made available -- wasn't there just an announcement a couple weeks ago that the BRAIN was up to \$300 million? Are being made available for research. And so guiding how

those \$300 million go in an ethical way, I think is a role that I understood to be the key role that we are being asked to play.

DR. GUTMANN: I wish we had the power to guide the way. We will recommend.

DR. WAGNER: Well, I meant recommend. You know that.

DR. GUTMANN: But we will recommend, and that is important. But if that's all we do, we are writing a report to a group of funders who may or may not take our suggestions, may or may not even, you know, be -- and that's not -- and the reason it's really important that we deliberate about this now is that we need and we owe it publicly to have the deliberation about this, as well as our recommendations, which -- some of which we have already made and we will make some more about funding. I'm going to keep John -- John's next on the list. Dan? Sorry. You're right. Dan is next on the list.

DR. SULMASY: First, I actually am enjoying this conversation because I think that it is within our scope and I think that it's one of these issues that is controversial enough that we actually disagree with each other on certain parts of it, which is actually good for deliberation, and may be helpful because we can have this kind of conversation. And in the interest of trying to move it forward, I have been struck by Nita's question about, you know, is the term "enhancement" the wrong one. And maybe to sort of help clarify things, maybe we need to come up with some other better covering term. And one that comes to mind for me that might cover all of what Steve said, for instance, would be something like "functional neurological improvements," which would cover both therapy from less than two standard deviations below the mean into the normal range, but could cover these things that are beyond that, as well, which are typically what some people mean by "enhancements." It could cover motor things, et cetera. And part of what we could do is say this is what we're talking about. And within this --

under this covering term there's a range of different interventions, modalities, that might be undertaken, some of which raise different ethical questions than others. And that's maybe a better way to frame the conversation and the argument. Maybe there's a better -- this is not my area. Maybe there's a better term already out there in the literature. But if there isn't, something like this might be good.

DR. GUTMANN: John.

DR. ARRAS: Just a codicil to this conversation. I mean, I think that kind of linguistic substitution might work in a lot of cases, but I don't think it would work in the case of memory attenuation. That's not an improvement of memory. It's a kind of disabling of memory. But anyway –

DR. SULMASY: We could talk about a functional improvement by diminishment just as we treat anxiety, we decrease a certain pathology. These are considered improvement by decreasing certain –

DR. ARRAS: Improvement in terms of quality of life, yeah. Okay. A couple of small points, mostly for staff writing these reports up. One is I want to state my agreement with Nita on the question of long-term versus short-term. But just for those who are writing this up, there is a very robust literature out there on the ethics of, say, germline therapy versus somatic cell therapy. I can tell you firsthand from a rather unpleasant exchange that I had with George Annas -- actually, Elizabeth Fenton and I engaged in a debate with Annas on just that question. And people like Annas and Fukuyama are very clear that this is -- talk about Dolly moments. I mean, that -- they would say that any tinkering with the germline or anything that is going to be extended into future generations is really bad because it is going to undermine human nature.

DR. GUTMANN: That's important because we have talked about that in the synthetic

biology and it is not the line you –

DR. ARRAS: Yeah.

DR. GUTMANN: That actually is the less science fictiony -- it's not science fiction at all.

DR. ARRAS: No.

DR. GUTMANN: The answer to the question I threw out, and we have a position on that. And it's not that something that will make a difference down the line is inherently suspect.

DR. ARRAS: Yeah. Now, Amy, if you want a science fiction analog to Dolly –

DR. GUTMANN: No.

DR. ARRAS: -- I will give it to you, and that's the transhumanist manifesto, right?

DR. GUTMANN: Yeah. But I don't want it.

DR. ARRAS: Nick Bostrom. Okay. I'm just trying to be helpful here.

DR. GUTMANN: Thanks. Steve and then Nita.

DR. HAUSER: I would just like to say two things in response to Jim's comments which were, I think, very helpful to me. And the first is maybe -- the first is the concept about using neuroscience for therapy, which is so important. And the question is, is it obvious? And that's why we are focusing on enhancement. And just to go back for the younger people in the audience, the original Congressional charter to the NIH was not to carry out outstanding science but to relieve suffering and to extend the lifespan of healthy living, of healthy existence. And I think everything that -- or most things that I can imagine that neuroscience would contribute to relieving suffering, and someone with schizophrenia or someone with a clear disease would be front and center aligned with the original charge.

DR. GUTMANN: Yes.

DR. HAUSER: Now, the first question that we have discussed this morning, where is that boundary. And I think that -- we don't -- nobody has answers. But if we could frame that in a useful way for public debate, that would be really, I think, important for us. And then the second point that Jim made about the BRAIN Initiative specifically -- and this is a question to the Commission. The BRAIN Initiative is magnificent for its goals but it is not all neuroscience. It is a limited sector of neuroscience. It does not include many, for example, of the therapeutic opportunities that are at short hand for some of these terrible diseases. And there is concern that Walter Koroshetz raised, that others raised, that the focus on the BRAIN Initiative could actually decrease our momentum in some other areas. So the second question is, is this a statement that somehow we think is important enough to be in the report?

DR. GUTMANN: Yeah. We can talk about that some more. But I think it's a very compelling suggestion that you have. It is noon and we need to adjourn for lunch and we will come back. And since Steve began it, I think we will let him for now have the last word. But I do want to thank Steve and Anita for really getting us off to an excellent start. So thank you very, very much. And we will reconvene at one o'clock.