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Good afternoon. Now that all you turkeys are back from Thanksgiving. I shouldn't have said that. How was Thanksgiving? Good. As I'm wrapping up the sleep and dreams thing, I should look around and see whether people look like they're awake. How many people discharged a substantial amount of their sleep debt over the last few days? Good. The rest of you are still rolling around. I am going -- I'm going, but I'm coming back.

I think I'm going to depart a little from the organization of the lecture that's on the lecture notes, and I will trust on your talents to figure out where -- I might even point out where I've gone to -- but I'm going to re-organize things a bit, because it occurred to me that I can organize at least the first part of the lecture in the form of a sort of a summary statement about Freud, who I'm going to abandon fairly shortly here. And I can work two examples -- one of them about dreams and one of them about abnormal psych, where Freud or Freud's followers are wrong in both cases. But in one case, we can do this business that I've been doing for the last few lectures of saying look, we can salvage something important out of Freud's ideas, and in the other case, which will turn out to be the abnormal psych case, we'll say that, in this case, Freud's followers are simply wrong. And have been superceded by later work. So let me start by picking up in sleep and dreamland talking about dreams. Well, I won't ask if anybody had any good dreams over the course of their catching up on sleep over Thanksgiving. I know what I'll ask. I will ask how many people did sleep and dream stuff in recitation? Not many. OK. How many people can remember? Not many. Oh, good, good, that's encouraging.

All right, that allows me to ask one of the things that tends to surprise people sometimes is that there's a fair degree of commonality in at least some of the dreams that people have. They seem like such idiosyncratic personalized stories, that it's surprising to discover that some of the plot lines go across individuals. It's a weird state, right. I mean it's clear there are weird aspects of the sleeping state. The normal laws of physics seem to be suspendable -- you can fly sometimes, do things like that. You can fall for hours and hours and never hit the ground. The normal laws of reality testing or the awake state of reality testing seems to be up, because you can fly and it doesn't strike you as weird. When you wake up you say that was weird, but if you think about it, while you were flying around or doing whatever other video game kind of

thing you were doing in your dreams, yeah, that was just the way things were.

If you have the same problem with reality testing, when you're awake you end up in the part of the course on abnormal psych that we'll get to in a minute. It's diagnostic of having a variety of forms of mental illness if you cannot tell the difference between dream state and awake state, that's not healthy. When you're dreaming you can't tell, but you're not clinically insane. There was one other sense in which it was different from the awake state that I wanted to make sure that I mentioned, but now I don't remember what it is. Oh, yes, just to point out that the transfer from experience to episodic memory does not work well for dreaming. This is why you forget your dreams so readily is that you know when you wake up that dream is just sort of there sitting around in some sort of short-term buffer, and if you don't do something like write it down or repeat it yourself you discover that those normal mechanisms that take your experiences and transfer them into some sort of long-term memory, they're just not working.

So, that said, let's see if we can conjure up--yup?

**AUDIENCE:** Especially when people say they know they're dreaming.

**PROFESSOR:** All the stuff about different states of sleep and awakesness should be seen as not absolutely categorical. So there are these borderline states -- the sort of jargony term is liminal states where you're in between being asleep and awake. In the course of a normal night's sleep, you'd probably wake up out of REM sleep and different bits of you are coming online at different times, and you may be aware, still asleep, but I'm not quite asleep. How many people have had the experience of saying I'm waking up here and I want to know how the story comes out? Yeah, yeah. It's always cause you're waking up at the good parts. Or how many of you have the other experience, which I think maybe what you're getting to which is I'm asleep here and this dream is not a good dream and it's time to wake up out of this dream. I'm going to wake myself up. Fewer.

Now, are there people here who are experts at what's known as lucid dreaming? Lucid dreaming is a sort of a halfway state where people claim to be able to control the plot line of their dreams. There are books in the bookstore that will both claim that they can train you to do this, and maybe you can, I don't know. It sounds good. I mean all those people who said, oh man, I woke up and I wanted to hear out the thing came out. If you'd go and train yourself to be a lucid dreamer maybe you can go and keep it going. I have these extremely frustrating dreams that I'm sure a good analyst would have a field day with, but I choose to think that they

are basically nice, simple, transparent dreams. I like to ski, I dream about skiing, but in my dreams I spend a great deal of time getting up the mountain and I never get to ski. I get to the top and the snow melts or something like that. No, I don't want to hear your interpretation of what this is all really about or anything -- I can do that, too, and make up all those good stories. But in any case, I sometimes think I'm going to get one of these lucid dreaming books because dammit, before I die I'm going to get to ski down that mountain. The conditions are always a great, look a lot better than they do in the northeast when you actually go skiing.

So, let us consider a couple of plot lines. Some of the things, there's a sort of element that show up in people's dreams. How many people have had falling dreams? How many people have ever hit the ground? Usually you don't hit the ground, right -- you wake up just before you hit the ground. Oh, there's a whole raft of sort of pseudo-scientific nonsense about --. How many people have ever been killed in their dreams? A fair number. Well, that's presumably a counter examples to the theory that if you die you in your dreams you die for real. It's one of those great assertions. How would you know that was true? Right. What were you dreaming about? I don't know, I'm dead. But typically, typically people report that you wake up just before you get killed by the whatever it is that's going to kill you. But the plot lines get more elaborate than that. How many people have had dreams -- this is typically a dream of grade school, the grade school era where you show up in school inappropriately dressed in some fashion. All right, anybody care to describe one of those? Sorry, I heard a--. Somebody wave a hand if you want to actually tell us the -- you don't have to tell us your dream. It's fine. Nobody wants to-- How inappropriate was it? I mean it doesn't get much more inappropriate than I was buck naked, I suppose, which is the stand-- My version of it happened to be that -- I still vividly remember what must have been a kindergarten dream because I ended up in my kindergarten classroom of driving down the street from my house to my school in my crib, which presumably, by the time I was in kindergarten I was long out, and I ended up in school in my crib in my pj's. All right, so you don't have to tell us what you weren't wearing. There is a characteristic of this dream which is that once you get there, once you end up in class, what happens? Anybody got any intuition about the common plot line here?

**AUDIENCE:** People point and laugh.

**PROFESSOR:** Oh, people point and laugh. Do you believe it? Where's the inappropriately dressed crowd? Raise your hand if you were in the inappropriately dressed class. It's dropped, the numbers are dropping. OK, not inappropriately dressed right now, this is in your dreams. Inappropriately

dressed. How many people agreed that what happened was they pointed and laughed? No, it's only in Russia. The characteristic form of this dream is that nobody notices. I mean that's not to say that you're weird for having the variant -- either that or you're making it up, I don't know. But that you would think, I would think if I showed up, if I drove my crib in here, everybody's going to point and they're going to laugh. But they don't. This is assumed to be some sort of a school anxiety dream. School anxiety dreams of some sort are quite common. They also morph as you get older. So, how many people have had a dream of the form where -- well, all right, let's rephrase this. We'll get the form out of you. Has anybody had what they would consider to be an exam anxiety dream? Anybody willing to describe that? I don't think they mostly involve being grossly inappropriately dressed. Yeah, OK.

**AUDIENCE:** Before the psych mid-term I started [INAUDIBLE] psychological theories that don't actually exist.

**PROFESSOR:** Psychological -- that's a novel form of the dream. Any good ones? Well, I won't ask you that.  
**AUDIENCE:** [INAUDIBLE].

**AUDIENCE:** OK, so one version is the I overslept and you missed the exam. Variance thereon? Yeah.

**AUDIENCE:** I slept until about an hour before the exam. Woke up and didn't study [INAUDIBLE].

**PROFESSOR:** OK, I haven't studied enough for the exam, and perhaps because -- something is going to make it uh-oh. Yeah. They all pointed at you and laughed at you, right.

**AUDIENCE:** The exam was in some other language.

**PROFESSOR:** Yeah, well that happens. Yeah, the exam was in another language. How many people have had the version where you realize in your dream that you have an exam in this course and you've never been to the course? Medieval French -- I've got the Medieval French exam, I've never taken Medieval French. Or there are also versions of this where you get to the exam and you realize that there's something about the exam -- the different language thing is a good example of this where you look at the exam and you realize there's no way I'm passing this exam. Not because you didn't make up the right psych theory, but because I can't see the page in some weird way, or sometimes -- oh, somebody was telling me this morning of a great version where I realize I'm going to be late to the exam and it's down the other end of the infinite corridor, and the infinite corridor really is infinite. You're just going down it forever. Anyway, if you haven't had that dream don't worry, you will.

When I was an undergrad at Princeton, somebody did a study of this. 25% of the freshman class, 50% of the sophomore class, 75% of the junior class, and you can see where this goes. It's an extremely common college era type dream. And it doesn't get better after that. All that happens is that, if you stay in academia, is that the form moves. Any number of my colleagues have reported dreams where the -- this is the grad school version coming up here -- the dream where your thesis committee comes to you and says it was a big mistake, we're taking the PhD back, or that you have to take your oral exams over again -- the thing you crammed for months and then forgot all of it the next week, or something like that. And then if you end up in my position actually teaching, it just flips around the exam anxiety dream where you have dreams where you get up in front of the class and you realize Medieval French, I don't know anything about Medieval French, what do you mean I'm supposed to talk about Medieval French for the next hour?

Now you may think that having anxiety dreams about not knowing what you're talking about is not that far from reality in the case of some of us who -- I won't say more about that anymore. But there are these sort of common themes that run through dreams. People have known this forever, and people have attempted to interpret dreams forever. So there's dream interpretation in the Bible. I'm sure in whatever culture you or your ancestors came from there's a canon of dream interpretation. Have I mentioned Lucretius's great book *De Rerum Natura*, *On the Nature of Things*? Yeah. Maybe. Some people think so, some people don't think so. Oh well, what you gonna do? Roman author, and it really is about the nature of things. It's everything, you know, it's 1801 and 801 and 900, and it's all rolled in one great big book. But he's got a nice dream theory in there in which he says that lawyers dream of court cases and sailors are wrestling with the winds and things of that sort suggesting, as Freud would later suggest that every dream reflects something about the preceding day.

Oh, let me say something about that. I think I'm jumping ahead in my handout again. Oh well. This was always assumed anecdotally to be true. You may have had this experience. You do something all day and you dream about it all night. There wasn't much data on this. Bob Stickgold at Harvard Med has now gone off and collected some beautiful data on this. What he did was he got people to play Tetris, a lot Tetris. Then he sent them to bed with little wires on their head and when they went into REM sleep he kicked them -- pow -- what are you dreaming about? Oh man, bricks, they're falling, man. Nice clear evidence -- of course, there's a non-Tetris control group. You kick them, oh I'm flying down the infinite corridor. You know, something else. The Tetris group dreamed about Tetris. The coolest thing about Stickgold's

experiment is that he tested a population of amnesics -- patients with the same basic problem as HM. Remember HM, no new long-term memories. Learn how to play Tetris? Grr. What are you doing? I'm playing Tetris. Five minutes later. What were you doing? I don't know. Right, doesn't remember any of this. So he takes these amnesics, they play Tetris for a while, they're having a great time. You send them to bed, you kick them in the middle of the night. What are you dreaming about? Oh, bricks, bricks, the bricks are falling. They were dreaming about Tetris even though they didn't remember ever having played Tetris. That was pretty cool. Anyway, there's now experimental evidence for this notion that your dreams incorporate material from the preceding days. Freud asserted that all dreams incorporated something from the preceding day. Is that absolutely true? Well, that's one of those assertions like all snowflakes are different, that's kind of hard to prove. But certainly material from the preceding day gets incorporated. Is that a hand? That is a hand.

**AUDIENCE:** I was just wondering, so there an experiment done where they had these animals running through the [INAUDIBLE].

**PROFESSOR:** Oh, yes, thank you for reminding me.

**AUDIENCE:** I was just wondering that [INAUDIBLE], when they were in, when the [UNINTELLIGIBLE], their brains, I mean is a fMRI where it's showing activity--

**PROFESSOR:** Answer's pretty good, she's going to give the rest of the story here. None of you guys are from that lab, right? It's done here. So, if you look in the brain of, in the hippocampus of a rat, what you discover is the hippocampus not only is there encoding the rat's episodic memories in some sense maybe but, it's also serving as a spatial map. So when a rat learns a maze, it develops a map of that maze, in effect, in its hippocampus, and it develops cells that are so-called place -- it's got place cells and the place cells develop responses that are specific to a specific place. So, the rat's running around in a maze, and this cell goes off right here -- nananana -- go over here, different cell goes off -- nananana -- go over here, different cell goes off. And as the rat learns the maze, you, the experimenter, can watch the rat learning this because you can watch cells in the hippocampus lighting up in order, in effect. So now the rat does this all day -- nananana. OK, the rat goes to sleep, the rat goes into REM sleep. All mammalian species, except for the spiny anteater -- don't ask me why I know that -- all mammalian species have REM sleep. So you kick the rat, you ask the rat what he was dreaming about. Rat doesn't say nothing. But, if you're recording from his hippocampus while he's asleep, what you see is the same cells lighting up in order again. Who knows what the

rat's actually experiencing, but what the rat's hippocampus is doing is running the maze. This is, first of all, part of the argument for sleep having something to do with consolidation of memory and learning, and it's also an argument for the possibility at least that the rats are dreaming away there, too.

Well now, arguably Freud's greatest work is *Interpretation of Dreams* -- that's the name of the book -- big, fat book. Still kind of fun to read but it's kind of long -- from 1900. Remember that Freud was writing before we knew any of this stuff about REM sleep or anything of that sort. And what Freud thought was happening was that pressure was building up in your unconscious. So let's switch from sort of a dungeon model to sort of a plumbing model. Well, we've got the boiler down in the dungeon and it's building up pressure -- this repressed material that we've been talking about. It's building up pressure and it's going to blow the roof off the whole building unless we vent some of the pressure. And so you've got to be able to -- whoosh -- get some of that out of there. One of the ways to do it is dreams -- to release this while you're asleep. Now what Freud said was that dreams start when some hunk of the preceding day, that he called the day residue, some idea, some activity, some something made an association with something down in your repressed -- in your unconscious. And that allowed this unconscious prisoner to try and make a break for freedom. The form of that break would be an effort to fulfill this repressed wish, if you like -- that's why it was called wish fulfillment -- meant that you were going to try to fulfill one of these repressed wishes while you were asleep.

There's a problem with that, said Freud, which is if you take the materials out -- the repressed material to be this stuff that's repressed because it's unacceptable to you, to the conscious you, to the ego, what's going to happen if you start dreaming about it? Well, we've already gotten part of the answer here. Many people here have had dreams so awful that they've deliberately woken themselves up out of them. Now most of those dreams, I would imagine, were dreams where the monster's about to put the bite on you or something like that. What Freud said is that look, if you were going to start dreaming about, oh, let's dismember my little brother -- oh, look at his little guts. Stuff like that, that would be really gross and really disturbing and you would say to yourself, I don't want to be having this dream. And you would wake up. So what you need to do is to disguise the material in the dream.

So you've got, said Freud, the latent content of the dream that you don't know about. The latent content is the repressed material that's trying to be vented out. What you see is the

manifest content, which is the storyline of the dream. It's hidden material -- it is hiding the latent content from you so that you can sleep. Freud argued that the primary role of the sort of sleep mechanism was to protect the sleeper, to keep you asleep and allow you to sleep, and allow this sort of venting of repressed steam to take place. Were you to show up in analysis the reason your dreams would be, what Freud called the royal road to the unconscious, was if you could work back from the manifest content to the latent content, which was a job of analysis, not a job of picking up some supermarket guide to your dreams, but a job of working with you and an analyst. But if you could go back from the manifest content to the latent content, you'd know something about what it was that was bugging you. Now the fact that, like repression as a whole, the fact that you have these disguised dreams all the time doesn't mean that you're somehow sick and diseased. It means that's part, again, of what it means to be human for Freud. You're going to need repression, you're going to need to be able to bubble off some of this repressed energy, and dreams are a nice safe way to do it.

That's an interesting theory, but it runs into some major problems, which, of course, Freud didn't know about because he died in 1939 and REM wasn't discovered for another couple of decades or so. When REM is discovered it becomes a lot harder to believe that you are boiling up this little pool of repressed energy every ninety minutes like clockwork. That's a bit surprising. Well, that's a bit surprising. More surprising is if you look at babies, a one month old is REMing a great deal more than you're REMing. How much repressed stuff does a one month old baby have to deal with? Not much. How about a lion? Lions, they REM all the time. Apparently predators show more REM than prey, as I recall. So yeah, all the mammals are sitting there doing this REM thing, right, you know lions, except for like Scar in the Lion King and stuff like that. There's not a lot of repressed work that a lion presumably has to deal with. Or a cow -- cows don't REM that much, but you know, ah, I really wanted to hurt the grass. I feel bad about the -- I don't know.

So presumably, now what's going on when you dream and when you go into REM is that there are centers down in your brain stem that spray a vast amount of activity up into cortex and light it up as though you were awake -- that's what you end up seeing in REM. One of the senses in which Freud was right is the sense in which dreaming does protect the sleeper. If you light up -- you're trying to go to sleep, right, and I light up cortex by coming into your room, turning on all the lights and turning the stereo way up, you have trouble sleeping. Well your brain's doing the same kind of thing when you go into REM sleep, but you've got to do something with all that cortical activity or you're just going to wake up. So you turn it into this

storyline for who knows who to watch on the big wide screen TV in your brain. In that sense you do end up protecting your sleep by dreaming. In fact, many -- Freud wasn't thinking about alarm clocks, but an example of this would be how many of you have incorporated your alarm clock into a dream and managed to successfully stay asleep? Well that's sort of a non-Freudian sense in which the dream engine is protecting your sleep. I want to stay asleep here, there's a loud noise, well I don't know where this loud noise is coming from, my brain stem's making these loud noises all the time, so let's just pretend it's from the inside and not the outside and we can dream that we're getting up. Right, dream that we're getting up. We'll dream that we're going to class and taking the exam and then we wake up and it really is halfway through -- don't do this at the final, please. It's so lame. Particularly since the exam's at -- the 900 final's 1:30, right? Got plenty of time to wake up by 1:30. But every year somebody wanders in at like 2:30, 3:00 o'clock with the big bags under the eyes, right. So you do sort of believe them -- I just woke up. Well, good, sit down, see if you can see the exam.

Anyway, so there's that sense in which Freud had a point that sleep was protecting the dreamer. but is there any meaning to it? Is there any sense in which there there's meaning in your dreams. I mean after all you are dreaming because your brain stem decided to throw all the switches in your visual cortex or something and you're busy trying to stay asleep. I think there is a sense in which you might be able to argue that you could get something meaningful at a dream -- you're not just looking at static on the brain.

Actually, I thought of a way to demo this, but I didn't bring any of the props because I only saw it when I saw this thing. So, a piece of paper -- I've probably got a piece of paper. Who's got a coin on them? Somebody have a coin? Let's see if I can make this work. That looks pretty so far. And I also need a pencil. Somebody have a pencil -- it works better with a pencil than with a pen. Oh my goodness, it's coming all the way from the cheap seats. Visual search. Oh, you wanted to do this because -- he's got a fancy coin. This is very cool here. All right, pencil, got a pencil? Here we go. OK, this is my brain. Thank you. Didn't you have something else you needed to do today? Well actually, it's just my cortex -- it can just be my cortex. Well that's my cortex under there. This is my brain stem. So now I will spray activity across my cortex here, and let's see if this sort of works. It looks like squat, doesn't it? Well you know what? That's a really boring dorkey demo. It's a fidelity issue. I can see what-- Use a different pencil? A wooden pencil. No, no, no, no. It looks just fine from here. Here, we'll try the other side up, see if that works any better but I don't think it will. Do it at more of an angle? Hold the pencil up more of an angle. All right, we'll try this one more time. Oh look, maybe we're getting -- I don't

know, what are we getting? We're getting nothing. We're getting nothing that you're going to see. Oh yeah, no, you can sort of see something but it's really boring. Well that was lovely. Here we go.

Here's what I was doing that didn't work but makes a brilliant model anyway. You can try this for yourself. If you stick a coin under a piece of paper and rub a pencil over it, you can actually see the shape of the pattern on the coin. Anybody here ever done brass rubbing or greystone rubbing or any of that sort of--? No. A few people. All right. Look, the point is that by spraying random noise across a structured object, in effect, I can see something of the structure. Boy, this took more minutes than it should have. By spraying random noise from your brain stem, across your particular brain, the particular dreams that you get are going to say something about that underlying structure. So, Attila the Hun, when he was dreaming was not dreaming about trains going into tunnels or stuff like that, because Attila the Hun didn't know anything about trains. You dream about trains, they may or may not -- trains going into tunnels, you know it's sort of a classic supermarket dream analysis image of a sexual dream or something like that. It may or may not be a sexual dream, but the content of that dream, that set of imagery, is a function of your particular brain. If your dream about Tetris after playing Tetris all day, it's because you were playing the Tetris, not because somebody else was playing Tetris.

So it could well be if you thought you had a process for going back from the storyline that's there to protect you from waking up with all that noise in your head to the underlying structure of your mind, if you had a process that you thought worked, then it follows that you might actually get some sort of interesting meaning out of your dreams. Now it's quite a leap to decide that you actually know how to do this. Analysts think they do. People who write guides to dream interpretation think they do. I think I'll just leave it at that as an exercise for the reader to go and decide whether or not they've got deep meaning in their dreams. So that's an example where Freud didn't know the subsequent hundred years of sleep research, so if you actually read *Interpretation of Dreams*, a lot of it would sound kind of odd at this point. But the core ideas that sleep needs to protect you, keep you asleep and that it's sort of a re-packaging of this activity of your mind, those seem to be core ideas that can still do a certain amount of work for us.

Now a place where the effort to apply Freudian ideas did not pan out is in the treatment of schizophrenia. So I'm going to jump to talking about that, and I may or may not manage to jump back to the other things that I claimed I was going to jump back to. But I might. So, in the

middle part of 20th century, mental hospitals in the U.S. were filled with chronic schizophrenics. Schizophrenia is an extremely disabling disease when it's in its florid state. So, schizophrenia, the word comes from split mind. As it says on the handout, for five points free on the final exam probably, not the same thing as a multiple personality disorder. The split in the mind is a split that 19th century psychiatry saw between emotional life and cognitive life. It is, in fact, sort of an unfortunate term because it does make people think that it's the same thing as multiple personality disorder. It's not. Multiple personality patients can actually function at least somewhat in the world reasonably well. Floridly schizophrenic patients do not work well out there in the world, that's why they end up hospitalized. The sorts of symptoms that you get are hallucinations, hearing voices, paranoid delusions often of vast conspiracies to control your mind. You can see this as sort of an adaptive response, right. If your mind, if some chunk of you, in a sense, knows that your mind is out of control, it's not an unreasonable irrational thought to believe that somebody else is doing this to you.

So it may, in some sense, be reasonable to think, to imagine how people could come to believe that their mind is being controlled by somebody else. The sorts of things that led to the notion of a dissociation -- I shouldn't say dissociation -- of a split between cognition and emotion, another characteristic of schizophrenia is so-called inappropriate affect. That's just jargon for showing the wrong emotions at the wrong time. The sort of classic symptom is laughing at the funeral. You know, if you're just yucking it up at graveside or something like that, people will think that that is not normal, and it is, in fact, one of the characteristics of schizophrenia. And that schizophrenia's sort of a messy diagnosis -- not every schizophrenic has every one of these symptoms. But you can imagine that by the time you're gripped by fantastical thoughts and conspiracy theories and you're hearing voices and seeing things that aren't there, that this is pretty disabling stuff. It's not so disabling that you can't be out there in the world, by the way. When I was a graduate student, the MIT Department was called psychology.

One of the reasons, though perhaps not one of the more serious reasons, for changing the name was that my doctoral advisor who was chair of the department got tired of getting phone calls from people who wanted to know about stuff like abnormal psychology, which nobody at the MIT Department ever did anything with. So he would always get the phone call or his secretary would get the phone call and she was instructed to say, don't call us, they do that stuff at Harvard. I remember one time when I was a grad student that rather than phoning up, one of these people came to the lab and he wandered into the lab and said that he knew that

we were controlling his mind with microwaves beamed from this location and he wanted us to stop right now. I'm there sort of uh-oh. But my advisor with great presence of mind I thought, walked over to the biggest rack of equipment in the lab, threw the biggest switch he could find, said there, does that feel better? The guy said yes and left. I'm not sure I recommend this as a treatment for delusional patients, but it worked in this -- and then we changed the name of the department. In any case, it can be very disabling and it often can lead to hospitalization.

What would Freud have said about it? What Freud said about it was these are not patients that I want to deal with, basically. He doesn't write extensively about schizophrenia and says in various places that look, if you're going to do psychoanalysis, the first thing you need is a patient that you can at least talk to. Anna O. With her collection of hysterical symptoms may have been in psychiatric trouble some variety, but you could talk to her about it. You could engage in this dialogue. If you've got a patient who is delusional and hallucinating there's not much Freud thought you could do with them. However, his followers thought you could and developed a theory growing out of Freudian psychodynamic ideas of where schizophrenia came from.

So in the mid-20th century, psychiatric hospitals were filled with schizophrenics and filled with good Freudianly trained analysts attempting to treat them. What they thought the cause was the so-called schizophrenogenic parent, typically Mother. Schizophrenogenic is a great word. It's somebody who generates schizophrenia. Anyway, a schizophrenogenic mother, what was the problem here, the problem was what the therapists perceived as a double-bind situation that the mother was somehow putting the child in. The mother was saying come here, come here, come here, go away, go away, go away, I love you, I love you, I love you, get away, get away, get away. Somehow both saying come near me and get away from me at one and the same time, and that this was literally driving the child mad. Now why would they have come up with such a theory? One of the reasons was that onset of schizophrenia is quite typically late adolescence, early adulthood.

Oh, that reminds me to reiterate or iterate for the first time, if I haven't mentioned it yet -- no, I think I did mention it. Remember what I was saying about psychiatric hypochondria -- the notion that if I sit around and lecture about psychiatric disorders, you shouldn't go and be feeling your brain for the rest of the term saying oh man, I'm going to wake up with a dissociative disorder tomorrow and that's going to progress to schizophrenia and dementia and I'm going to be dead. The fact that schizophrenia has a typical onset in a population of about

your age doesn't mean that tomorrow we're going to have 300 schizophrenic students in this class. It does happen. What convinced me -- a small aside. When you're discussing abnormal behavior, which we are now, there are two senses of that. One sense of that is all behaviors that you care to measure have some variability in them. You can simply assert that everybody above two standard deviations or something is abnormal. We'll see as we go along that there are times when that is not an unreasonable thing to do.

There are other times when it's a whacky thing to do. All right, for a wacky example, virtually everybody here is abnormal in that sense, but then the axis is SAT score, right. Most of you are up here in the upper tail of the distribution. Sure it's abnormal but we don't consider it as pathological, right? At least not in this community. So the other possibility is that sure, the normal population is distributed like this, but there is a disease state of some sort that looks like this that's essentially discontinuous with the normal state. Arguments have been made, notably by a psychiatrist in the '60s whose name is probably pronounced something like Shosh -- a Hungarian name. Anybody happen to know the right answer? Anyway, Thomas Szasz will do or Shosh or something. In any case, he made the argument that in a book entitled *Being Sane in an Insane World*, that schizophrenia was simply a way to adapt to the fact that the Russians had lots of bombs and we had lots of bombs and we were all going to blow each other up, and that it was just one position on this normal curve. It's an interesting argument. But if you actually see somebody in the midst of a florid schizophrenic break from reality, it's hard to believe.

I had, when I was an undergraduate, the roommate of a close friend of mine had such a break. It's unmistakable -- it's at once fascinating and deeply frightening. This was a friend of ours who became delusional -- she was hallucinating, she absolutely couldn't function, and was scaring the heck out of her roommate and she eventually -- actually, she eventually did fine. We caught up with her like twenty years later, and people do recover from schizophrenia and she was doing quite well, thank you. But in any case, she was the data point, that at least for me, argued strongly for the notion that this is a different state, not just a position on a continuum. In any case, the psychiatrists were busy trying to treat this with sort of Freudian psychotherapeutic techniques. It wasn't working. This wasn't because they were bad people -- these were well-intentioned people doing the best by their lights that they could, it just wasn't working. It was a case where the theory was just wrong.

Oh, one of the engines that moved theory away from this, by the way, were parent advocacy

groups. You've got to imagine that having a seriously ill child, whether that's a physical illness or a mental illness, is very traumatic for parents, period. But imagine how you would feel if the leading theory was that this was your fault, that you had done this to your child. Not intentionally, of course, but it was you who had done it. Parents simply didn't believe it. And as science started to emerge suggesting that in schizophrenia's case it was much more like a brain disease than like the product of bad mothering, that groups, funding groups -- you know, the guys who send you lots of mail at this time of year saying send us your check and we'll support good research on this disease or whatever, a number of these groups powered by parents of schizophrenics were helping to move the research away from the notion of a schizophrenogenic mother. But what really did it was it just didn't work. Nobody could make this story work.

The psychiatric hospitals are no longer filled with schizophrenic patients, and that's not because of a great breakthrough in Freudian psychotherapy, it's because of drugs. In the '50s drugs like Thorazine, Chlorpromazine is the technical name, came on the market. In this particular case these are drugs that block dopamine receptors -- dopamine's a neurotransmitter, the receptor on the other side of the synapse. Thorazine decreased the uptake of dopamine, and that served to ameliorate the florid symptoms of schizophrenia, in particular. You put somebody on Thorazine and they didn't hallucinate anymore, and their paranoid delusions slipped away.

Oh, let me tell you another anecdote about schizophrenics. Schizophrenics I have known. We had a very interesting woman who was the librarian in the department here some years ago -- PhD Classicist and also, she was schizophrenic and successfully medicated and functioned well as the psych department librarian when on medication. Anytime I tell you the root of something like schizophrenia, the Latin and Greek roots of these words, it's because I'm remembering what she taught me. But she would slip off of her medication. You could tell when she was slipping off her medication because her handwriting, her handwritten notes would start getting smaller and smaller and longer and longer. She developed this micro-writing and very extensive writing, and then the content would start to slip, too. And she would also start -- if it got dim in the library you knew you were in for trouble because she became photophobic. One of the interesting problems here and one of the problems in treatment was that as she fell off her medicine she became paranoid. What was the nature of her paranoia? The nature of her paranoia was that people wanted to control her brain using chemicals. Well that was exactly true. But if we would tell her, you gotta start taking your medicine, that was

just evidence for her that we were trying to control her brain, which was true. So it wasn't even really -- it's very tricky stuff. I mean it's funny and sad at the same time. Eventually, she was no longer able to control this and was no longer able to hold the job, which was sad. But it's also a real issue, a real medical ethics issue.

When the hospitals were emptied by these drugs, the promise was that supports would be placed in the community that would make it possible for medicated schizophrenics to function. It's not a cure because the medicines are imperfect. For instance, it's not the case that dopamine -- the problem in schizophrenia isn't that dopamine is bad stuff and if you have lots of it you're in trouble. It is clear that in schizophrenia, bits of the brain are awash in too much dopamine, but if you wipe out -- if you just blanket, push down dopamine, other bits of the brain which really like dopamine are starved for it. The sorts of symptoms that you get when dopamine is removed from these chunks of the brain are the symptoms of Parkinson's disease -- muscle tremors, an inability to initiate voluntary activity. So a patient overmedicated on Thorazine isn't hallucinating anymore, but is also sort of inert. So it's not trivial to just say take this pill, great you're cured. It was clear that management was going to be needed. It was clear in many cases that people were going to need housing that was like sort of halfway housing, not complete independence, but you could be out in the world and you wouldn't need to be hospitalized anymore but you'd need some sort of continuing care.

The problem is that we've systematically not given enough, basically money and resources to that. The result is there are numbers of imperfectly -- perfect medication isn't out there yet -- but inadequately medicated, unsuccessfully medicated patients who ought to be cared for, but who are not being cared for by the system. Schizophrenics are over-represented in the homeless population because if you are not successfully medicated it's hard to hold a job, it's hard to keep an apartment or something like that and you end up on the street. That loops back to this issue about your paranoid delusion about somebody trying to control your mind. When is it OK then, now that you're on the street, now that you're floridly schizophrenic again, when is it OK for us as a society to come in and say guess what, we don't care that you think we're trying to control your mind, we're going to medicate you whether you want to or not because it's for your own good.

You can argue yeah, it's for your own good, but there's lots of things that -- you know, I might decide it's for your own good that you should sleep eight hours a night. Do I get to enforce that? No, I don't. If I decide that it's good for you to take a drug that is going to, in fact, control

your mind, when do I get to do that, and this ends up in court regularly, and it ends up on talk radio all the time, right, because it's a sort of thing that yakking head talk radio loves to get excited about. You know some judge declares that some clearly schizophrenic individual has a constitutional right to live under a bridge yelling obscenities at you, and talk radio goes nuts. It's an interesting question. It's not a question with an easy answer. When do you get to decide that you're allowed to take control over somebody else's mental life? At the present, the view of schizophrenia is, as I say, much more that it's a distinct state of brain disease of some sort. What might cause it? Well, the fact that a pill that reduces the effects of dopamine does something tends to suggest to people that there's a biological cause there. In the case of schizophrenia that well maybe true, but it's important to note that that doesn't need to be true. Things that are cured or symptoms that are cured by pills aren't necessarily symptoms that are caused by bad genes or bacteria or some biological story like that.

A perfectly nice example is motion sickness. You go on an airplane, you get bounced around, you throw up. What are you going to do about this? Well, you can take scopolamine or meclizine that's Bonine -- Bonine is meclizine and dramamine is scopolamine -- two perfectly nice drugs that affect your vestibular system, and they will keep you from getting motion sick. That's not because you've got bad motion sickness genes or you got the motion sickness bacteria. It's a biological treatment, if you like, for an environmentally caused disorder. I point that out only to make the point that what cures or treats a disorder doesn't necessarily tell you what the cause is. There's not one-to-one mapping there -- that's important to keep in mind. But the drugs certainly do help with the symptoms. What psychopharmacologists work on a lot now is getting drugs that work better. All right, we want to reduce dopamine here but not here. Well it turns out that there's a bunch of different dopamine receptors -- let's make a drug that only acts at this location and not at this location. That's a sort of project that psychopharmacology works on at the present time. But I want to go back and talk about the possible causes of mental illness, but I'll do that after we take a brief break here.

OK. What I want to do with the remaining portion, probably all of the remaining portion, of today's lecture is to make two points, which I have already alluded to. One of them is that there are multiple roots into mental illness, not just any sort of single root, and you're going to need to work this out on a case-by-case basis. The other related point is that the border between normal and abnormal is not necessarily a sharp clearly marked one. Oh, by the way, if you're interested in this latter point, there's an article in today's *New York Times* science section about really exactly this point in the context of eating disorders -- a topic that I hope to

get to before the end of the course -- where it's very important to be able to give a label to psychiatric conditions. Why is that important? In part it's important because third party payers will pay if you have a disorder, but they won't pay if you're just feeling a little screwed up, right. So you gotta have a labeled disorder.

So, there's been a big movement within the American Psychiatric establishment to come up with clear diagnostic criteria. The nice thing about, you know you go into your pediatrician and getting a throat culture for strep is that I can grow it in the lab, and if you got strep you got strep, and I'd give you something for strep. Mental illness is almost never like that. You got some collection of symptoms, are they adequate to get you the definition of this disease? The *Times* article is pointing out that therapists are having a real problems with people who any idiot can see has, let's say, an eating disorder, but the official criteria for anorexia nervosa, the eating disorder of self-starvation, are you have to have boom, boom, boom, boom and boom. Well, if you're missing that boom, you can't make the diagnosis. What do you call them now? Anyway, so today's *New York Times* science section, go check it out.

In the meantime, let us return to 1900 to talk a bit about possible causes of mental illness. In 1900 half the patients in American mental hospitals had a disorder known as dementia paralytica. This is the bad stuff. It's a disorder that starts with mania and grandiosity as its symptoms. If you think that you are Jesus and that you can turn water into wine and stuff like that, except in the rare case where that turns out to be true or something, it's a psychiatric symptom and it would be a manic symptom of some sort. If you think you're the reincarnation of Napoleon and this time you're going to get the invasion of Russia right or something like that, you know, that's the sort of thing that gets you into psychiatric care. In the case of dementia paralytica, it then proceeded to the other two bits of the name. Dementia, people became demented, they then became paralyzed, lost control their muscles and then they died. This is not a good disorder. It has disappeared essentially. Why? Does anybody happen to know the answer? Yes. Which person? What are you looking behind you for? How many people are wearing witchy hats? How long have you thought you were a witch? Anyway, you were saying.

**AUDIENCE:** This is caused by bacteria I think, or something that they like [INAUDIBLE].

**PROFESSOR:** Well, all right. The problem is people know too much around here. You can fish around for all sorts of interesting answers, like one of the possible reasons for a diagnosis to disappear is you fractionate the disorder into a bunch of other stuff and we've now renamed it and this is

now called Alzheimers and a few other things. But no, in fact, this is an outside pathogen. In this case, dementia paralytica was the result of tertiary third stage syphilis. The reason you don't see it anymore is that nobody gets to third stage syphilis anymore. If you show up with symptoms of syphilis somebody treats you. This was the result, by the time the organism had gotten to your brain and chewed up your brain. So it disappeared with treatment. But it points out is that one of the roots to mental illness is an assault, a biological assault from the outside. So there are theories, unproven theories that a rise in autism, that's been seen in this country over the last couple of generations, is due to some sort of external insult to the nervous system, not clear what it is, but there are proposals out there that something that we're doing to the environment is causing more autism, for example. But this is an example of a clearly biologically rooted mental illness.

Perhaps the extreme other end of the scale would be -- well, it's more like a triangle. We could have biology, we could have an environmental disorder, and we could have what you might consider to be a societally defined disorder. The distinction here is this is a case where the environment somehow really does make you insane, and this is a case where we take the normal distribution and declare the upper tail of the distribution to be a psychopathology of some sort. So let's look for examples of both of these. A perfectly nice example -- not nice -- an example of an environmental disorder would be what was called shell-shock in World War I and would now probably be more generally lumped under the category of traumatic stress disorder. Exposure to extreme stress and being shot at can produce a range of disabling psychiatric symptoms.

So, in World War I when people were fighting this insane warfare of having vast numbers of people in entrenched positions shelling each other and just charging at each other, some fraction of the population of soldiers cracked up. They just couldn't function. They would cry hysterically, they would just lie there and not do anything. The first reaction of the military to such things is to decide that this is insubordination and to shoot you or something of that sort for failing to obey orders. But it became clear to medical folks during World War I that this was not a voluntary act, this was a psychiatric problem. They went and pulled people back behind the lines, worked very hard to treat them so that they could return them to the war in a sort of a sick irony. But this is a disorder that is clearly environmental. Now there's probably some -- not everybody who's placed under stress produces a post traumatic stress disorder, so it's clear that there's some underlying variation of unknown nature that makes some people vulnerable to it and some people not. But the precipitating cause here is environmental.

Now this is something that's a topic of a lot of current interest in psychiatry and in clinical psychology. Because as it's been appreciated that this sort of trauma does produce psychiatric symptoms, efforts are made to prevent this when it's clear it's going to happen. So, first responders, the police and firemen who are going to be the first guys that crash scenes or into burning buildings, are going to see really terrible stuff, and it's known that that's going to produce a collection of psychiatric symptoms. So, an interesting question is well if you know that, what could you do perhaps to ameliorate the situation? One very popular idea has been that after a crisis -- I mean you hear this all the time when something really bad happens like a school shooting or something, one of the things you do is you immediately pour in a bunch of therapists, and the idea is is you get people together to talk about it.

One particular modality of therapy is you basically get all your firefighters who were at this scene into a room together to talk it through, and that this has been proposed as a mechanism for preventing these stress disorders. Unfortunately, a big study came out last year suggesting sounds lovely, doesn't work. Not that it does anything particularly bad or anything, it just doesn't work. What it points out is that the state of the art is a little like the problem I was talking about with Freudian attempts to explain schizophrenia. These are difficult problems where good well-meaning clinicians try stuff out that doesn't necessarily work. Very hard to get a clear feeling from this, from reading the popular press where you get one miracle cure after the other and then the miracle cure fades away, but it fades away in the literature somewhere -- you don't get to see this very clearly if you just sit there reading the science section of *Time* magazine or something of that sort.

Anyway, so third stage syphilis munches up your mind, trench warfare munches up your mind. Are there diseases that are defined purely by society and what does that mean? Are those legitimate? Well, let's talk about one that's not terribly legitimate. I don't think anybody here is deeply familiar with the disorder called drapetomania. Any drapetomania experts? No. OK. Any Greek scholars? No. So we're not going to get anybody to tell us what the root is. So, it's not a manic desire to put up drapes. It's drapeto comes from a Greek root having to do with wandering off, and the mania's the mania part. So it's an insane desire to wander away. All right, that sounds like it could be insane. This is a disorder discovered by a doctor named Cartwright in Louisiana in the 1840s. He writes about it in a book endearingly titled, *Peculiarities of the Negro Race*. So you need to think -- all right, time to review your AP American history. Right, 1840s, Louisiana. If you are a member of the negro race you are

what? A slave. If you are a slave you might do what? Well you might wander off or run away. It wasn't that Cartwright discovered this. People knew that slaves ran away. But rather like earlier attitudes towards people cracking up on the battlefield, the standard attitude towards the slave that ran away was that's a bad slave. Right, he's just bad, and what we should do is catch him and beat him and put him back to work.

Cartwright was an odd sort of liberal from the sound of it in the sense that he said, no, no, no, no, no -- they're not bad, they're sick. Because after all, as he understood it, the proper place for a slave for an African American was to be a slave, right? So if you wandered off, you weren't being a healthy, normal slave. You'd gone up here somewhere and you were being abnormal. He also, by the way, had a lovely biological theory about the cause of this, which was decarbonized blood. I don't know, it sounds like it would do something bad to me. And he had a treatment regimen. Remember that the standard treatment for a slave who ran away was catch him, beat him and put him back to work. Cartwright said, when you catch him, what you need to do is slap some oil in with a broad leather strap and put him to work. All right, so the treatment didn't sound all that different. In any case, it's a pretty clear case of a disorder defined entirely by society. There's not a -- I don't know, decarbonized blood notwithstanding. There's not an organism there. There's not -- well, you can think of the environment as causing the slave to run away, but not in the sense of causing a disorder. We would consider this to be essentially a normal -- we'd be with Thomas Szasz on that, that's a sane reaction to an insane world, perhaps, to be a slave and to run away.

Now, you might argue that we don't do that anymore, but if you were to, say, OK, what this is, is weight. Let's make this normal distribution weight. The Surgeon General is perfectly happy and all sorts of outfits are perfectly happy to declare that if you're above this level whatever it is, you're abnormal, you're overweight. And there are plenty of theories, folks psychological and otherwise, that basically give a psychiatric spin to what's going on there, right. If you've heard theories of obesity being -- there are pop theories that oh, they're overcompensating -- that they're eating to substitute for the lack of love in their life, or it's a lack of self-control, or it's because they have gene for fatness. All of this might be true at some level. I'm not casting any doubt on the particular theory, that's a separate topic. But you gotta realize that what you're doing is taking an essentially normal distribution with the exception of some very few -- there are a small number of clear pathologies of weight regulation. Mostly what you're doing is taking one tail of the distribution, declaring it to be abnormal, and putting an explanation on it. How you understand that is culturally dependent. How we talk about obesity is in part defined

by how we talk about beauty. In cultures where obesity is considered beautiful, you don't get theories that say it's an abnormality, right? So in some fashion we do this all the time.

In the remaining time, what I want to do, and then I'll loop back to this point, is look on your handout on page three. Let's do a little bit of armchair diagnosis here. We don't have much time. Quickly read these three vignettes and quickly decide where they lie on the scale from fine to very weird. I'm deliberately using very casual language there in order to suggest that you not think deeply about whether or not you're giving them a psychiatric diagnosis here, I just want to know whether they're nuts. We'll collect a little data. How are we going to collect this data? Don't cheat off your neighbors, please, and [? wavel ?] in when you're done. How many people are done? Most people are done. OK, good enough.

In the interest of getting some data relatively quickly, let's group between -- let's do aluminum hat boy, Jim. How many people gave him a sort of 1-3, he's fine? 4-7 he's a little weird. I take it we got a lot of population-- All right. So Jim's here. How about Jack there at the bottom -- we'll come back to Sam. How many people thought Jack was in the 1-3 he's fine category? A bunch of people. How many people thought he's in the 4-7 category? A bunch more people. Let's give him some hash marks here so we can tell the difference. So this is -- what is his name? Jack. How many people thought he was very weird? So only a very few. So, you can, in fact -- so Jim is sort of the guy who came to my lab all those years ago, and Jack can be found in Harvard Square any time selling some far left newspaper and yelling at you about the fact that we're all controlled by something, and we just consider them to be sort of weird but kind of -- this is in the realm of free speech.

All right, let's take a look at Sam. How many people thought Sam's just fine? OK. How many thought Sam was just in the middle? OK. How many thought that Sam was pretty weird? All right, so that looks-- I need some space here. Well actually, lots of fines, a few less in the middles, and almost as many weird. Pretty wide distribution, right. The other two are very heavily skewed. Could somebody in the fine department explain why he's fine? Yes, find person.

**AUDIENCE:** I think he's weird, I just don't think he's disabled.

**PROFESSOR:** I need somebody who thinks he's fine, fine. Yes. Yes, you pink person.

**AUDIENCE:** He's just a stamp collector -- he sounds fine.

**PROFESSOR:** A stamp collector. All right. The trick here is there is a two-word variation between what half of you have and what the other half of you have. Let's see if that makes a difference. The people who don't have the stamp collector one know the difference, which is that one half of you have his major passion is collecting stamps, and the other have his major passion is collecting women's undergarments. Right. That is the only difference here. Yes?

**AUDIENCE:** [INAUDIBLE]

**PROFESSOR:** You know, actually that's lovely because I could probably expand the description. If I said he used to write all of his relatives and asked them to send him used stamps, nobody would think that was weird. If I said he used to write to all his relatives and asked them to send used underwear, that's really weird, right? If I changed it a little more to say -- what is his name? Sam was a shy, withdrawn man, the president of the Haines underwear company and at the corporate headquarters he had the big underwear exhibit or something, then he becomes less weird.

Given the time, let me just reiterate the point that what this is intended to illustrate is that the border between what makes you weird and what makes you just a little different is not clear. It's not something that we can define nice and sharply. See you Thursday.