PROFESSOR: The topic for lecture for the next couple of days is going to be romantic love or mating behavior or the interaction thereof or something like that. And I just learned the Shakespeare Ensemble is doing *Taming of the Shrew*. When?

AUDIENCE: The nights of Friday, Saturday and [UNINTELLIGIBLE PHRASE]

PROFESSOR: Tonight, tomorrow night, and Saturday at?

AUDIENCE: 8 o'clock.

PROFESSOR: 8 o'clock. Where?

AUDIENCE: Little Kresge Theater.

PROFESSOR: Little Kresge Theater. We should probably assign it like as homework or something like that. But you can go after today's lecture. You can go and try to apply evolutionary psychological theory to *Taming of the Shrew* if you like. And you can tell Bianca how you liked it. All right, enough Shakespeare. Shakespeare shows up again maybe later today. Shhh. Let me tell you about Chris and Terry here who are having an argument. I realize this is sort of a working memory exercise, too. So you have to pay attention to the particular details here.

So Chris and Terry are having an argument. They've been going together for about a year. They don't live together, they do sleep together. Chris accuses Terry-- so Chris accuses Terry-- of seeing someone else on the side. Terry doesn't want to talk about it. Chris says that Terry never wants to talk about anything. Terry shouts that well, maybe there is somebody else on the side and says, well it's not like there's been much activity in this relationship lately anyway. And Chris snorts that there's more to a relationship than just sex. All right, you got that? And you will have noticed, even Kristen-- who stayed up all night cheering the Red Sox-- will have noticed that Chris and Terry are deliberately ambiguous as to the sex of who is who. They could of course be the same sex. And that reminds me to say ahead a time, I'm going to talk almost exclusively for the next two days, next two lectures about heterosexual relationships. Lots of fascinating stuff to say about same sex relationships, like so many topics

in introductory psych, it's just one I'm not going to get to. So if we assume that Chris and Terry are male and female, one of them is male and one of them is female. And I don't remember which side I was gestering too, so I don't remember-- was this Chris or Terry?

AUDIENCE: Terry.

PROFESSOR: That was Terry. This was Chris. OK, so how many people vote that Terry is the male person? How many vote that Chris is the male person? How many vote that I got lost in the details? I can't remember who's who anymore? All right, well quick review. Chris accuses Terry of seeing someone on the side. Terry doesn't want to talk about it. Chris says Terry never wants to talk. Terry shouts that there may be somebody on the side and there hasn't been much activity and Chris says there's more to a relationship than sex. How many vote Terry is male? How many vote Chris is male? Gee, there seems to be a fairly strong asymmetry there, which is capturing something of the cliche that man are just interested in sex and women are interested in commitment or something like that. This is sort of a cartoon version recognizing that-- actually, we sort of backed off what I was saying last time about talking about individual differences and now we're talking about on average. Again, recognizing that there's vast variations in relationships between men and women. Is there any truth to this sort of asymmetry? If there is, how in the world would you explain it? That's the job for today's lecture.

Well, I mean, there's lots of anecdotal evidence. How about a little bit of data evidence from one of my favorite experiments in the annals of experiments that you can't see how they ever got it passed-- oh, does it say IRB on the handout? IRB stands for Institutional Review Board. You don't have to worry about that bit of jargon, but those are the people who look at experimental protocols and decide whether it's permissible to do this. So if you volunteered to be a subject in our lab-- please do, we need subjects, talk to Kristen-- anyway, if you do we'll have you sign a 7 page consent form because they're really worried about the damage we can do to you looking at little red and green bars on a computer screen. So you have to imagine how this experiment ever got passed the IRB, though it does seem like a good one for reality TV perhaps.

Anyway, so here you are, you're wandering around on campus, and an attractive member of the opposite sex approaches you and asks you one of these 3 questions. I should note that I was explaining this to my wife this morning and she got confused and thought this was a multiple choice test. It's not a multiple choice test, which would be even weirder. So the

percentages don't need to add up to 100. That's important. But this person comes up to you and asks you either-- says something to the effect of, I've seen you around campus and you're really an attractive person. Would you go on a date with me? That's question 1. Would you come back to my apartment with me or would you have sex with me? What I can't find out is what happens after the subject gives an answer, right? This is a quite famous experiment, but the original experiment is published in a very obscure journal and I don't actually have a copy of the article. So we've got these 3 questions. There's the date question, the apartment question, and the sex question. And so we'll plot percent yes here.

OK, if you are a woman person, what do you think, what percentage of women said, yes, I'll go on a date with you would you think?

AUDIENCE: 50%.

PROFESSOR: What?

PROFESSOR: 50%

PROFESSOR: 50%. That sounded terribly authoritative. Is that because it's written down in the book or something?

AUDIENCE: I read it.

PROFESSOR: You read it. It's not in [? Blightman ?] is it?

AUDIENCE: No, it's on the website.

PROFESSOR: It's on the website. Oh, the articles on the website?

AUDIENCE: Yeah.

PROFESSOR: Wait a second. I thought I didn't find the original article.

AUDIENCE: [UNINTELLIGIBLE]

PROFESSOR: What?

AUDIENCE: An article [UNINTELLIGIBLE].

PROFESSOR: Oh, OK. Well 50%. Thank you. This-- whoops 50% doesn't go all the way up. OK, 50%. This kind of takes the guess work out of it a bit.

AUDIENCE: I won't answer anymore.

PROFESSOR: I thought we could find out if you memorized all the percentages. So all right, if you're not a good person who went and read everything on the website-- all right, how many women do you think were willing to go back to the guy's apartment?

[INTERPOSING VOICES]

PROFESSOR: 2, 9 sounds great. The average is about 6. So 50, 6. Number or percentage of women who said sure, I will have sex with you?

AUDIENCE: 1.

AUDIENCE: Zero.

PROFESSOR: Zero would be a good, kshht. Now the IRB or sort of the sequel issue here that you'd love to know the answer to is, how many times the guy got like punched or reported to the campus police or something. But now, look. Do I have any color chalk? No, we'll just have to go for hatched bars today. So that's the female data. Let's start at the other end here. What percentage of guys approached by a woman who said, I think you're attractive. Would you like to have sex, said yes?

AUDIENCE: 75.

PROFESSOR: She said she wasn't going to be answering anymore. Yeah, OK. It's 75%. It's also interesting to see what happens with the rest of the questions. If you ask, would you go back to the apartment with me that drops to about, I think, 67%. And if you ask, would you go on a date with me it drops to 50. So, now look the world is full of interesting asymmetries in data. Even sex differences in say mathematical ability or something like that. Sex differences in most stuff look like this. There's a data point with an error bar and there's another data point with an error bar and you say, oh yeah, look. There's a significant sex difference if we run 8.5 million subjects. You don't get data like this most of the time. This is like a huge asymmetry. So one interesting question is, why is this huge? And another interesting question is this apparently counter intuitive slope to the male data where you're more likely if you're a guy to say, oh sure. I'll have sex with you right now, but I don't actually want to go on a date with you. Which is on the face of it, perhaps a little odd. But we'll come back to try to explain that. There are multiple ways. So this is not some weird isolated data point where people just did a very odd-- it's an

odd experiment. Here, this is the one that you really wonder about what the next sentence was, you know, hi. You're very attractive, would you have sex with me? Oh yes, sure. Just kidding. It's a very odd experiment, but a very interesting one. Yes, Mara knows the answer to the rest of--

AUDIENCE: We have a question. Did they control for the attractiveness of the questioner? I mean, what if--

PROFESSOR: Well, the description-- my expert witness can probably tell me better because she's read this more recently apparently, the description I think is simply that the experimenter -- this experimenter's confederate is described as being attractive.

AUDIENCE: Well, I'm just saying--

pROFESSOR: But look. Do the intuition. You can only do the real intuition for the sex that you happen to belong to. But ask yourself, really attractive guy comes up and says, would you like to have sex with me right now, do you think the point moves a lot off zero? And short of-- I don't know-- nonhuman woman, it's not clear how much that point moves either. I don't know. And it's not one of these things. Also, by the way, I do not recommend you know when you go off into-- course 15 seems to be the place where they like to do survey experiments and stuff like that. I don't recommend this one as one to try because I really do think that it's hard to imagine how to do this without getting into serious trouble. Fascinating as the experiment is. Other efforts to get it the same point have been done in sort of more indirect fashion, so you can be your subject in this one, which was one where you were asked to rate a variety of events as being positive or negative-- effectively positive or negative-- if this happened. And the most salient one seems to me to be one where the description was you're on a crowded subway car, an attractive member of the sex to which you are attracted begins to surreptitiuosly touch you on the subway car. Is this a positive or a negative event? The answer in the data is women overwhelmingly say eww, that's kind of creepy and negative. This is not good.

And guys fairly overwhelmingly say, yeah. What's the problem here? Again, you get a hugely asymmetrical result and what we want to do is try to account for that asymmetry. Now assuming that you have not been entirely comatose for the first half of the course you will recognize that the broad classes of explanation are going to be nature nurture kinds of things and of course, it's always a combination. In particular, today what I'm going to talk about is a biological account and that's the account coming out of evolutionary psychology.

Evolutionary psychology, the application of evolutionary theory to the topics in psychology is very prevalent, very important these days. It gets applied to a huge range of topics, some of which it probably doesn't have much to say about. But if there's anything that it's got a lot to say about it's probably human mating behavior. And so that's why I'll talk about evolutionary psychology in this particular context. This is not to say it's the only way of accounting for mating behavior, but it's a particularly-- I think, it's very hard to argue that these sort of biological forces don't have some shaping influence on the way that we select mates and I want to try cashing out that argument today. If you want to read more about it there are several-- I put reference to several books on the handout. All of which I put on there because they talk about the topic, but they're all good reads. My current favorite actually is the [? Bowmeister ?] and [? Tyce ?] one. It's less of one of the ones that's sort of been on the bestseller list, but it's a beautifully written book on this topic if you're interested.

All right, so let's run down the basic evolutionary psych argument and then attempts to see how it might account for the sort of data that we see in this area. If you are operating within this sort of evolutionary framework your goal as an organism is to do what?

AUDIENCE: Pass on the genes.

PROFESSOR: Pass on your genes. You've got to propagate your genes in some fashion. You want to get that genetic material into future generations. And how you going to do that? Weren't you paying attention in high school? There are several ways, but sexual reproduction is considered perhaps the most direct of these. It's not the only one, by the way. It's important to point out that if you think that again, by the way, all of this stuff is presumably operating at a very unconscious implicit kind of level. Nobody assums that people are wandering around the dating scene saying, got to pass on my genes. How am I going to do that? But the forces, the forces that are shaping that behavior are within this viewpoint shaped by this drive to pass on genetic material into the next generation. You can also propagate your genes by taking care of your relations. So if you've got a brother or sister with kids, those kids are genetically related to you and if you nurture them, if you pay for their college education or something, they're not as genetically related to you as your own children, but they're genetically related to you. And so you can do the propagation thing indirectly rather than through just regular old-fashioned sexual reproduction.

This, by the way, is one of the arguments offered by evolutionary psychologists for the persistence of same sex relationships. Same sex relationships are a problem from this

evolutionary point of view because they don't lead to offspring, right? Whatever else is going on, they don't lead to offspring. I don't know if there's any data for it, perhaps because I haven't looked, but one of the arguments that has been put forward from time to time are things like oh, gay men make great uncles. They're not going to have kids of their own, but they take care of their sister's kids and that's why it's not selected out-- it's not selected against by evolution. In any case, sticking with this sort of mainline tail, you want to propagate your genes. Sexual reproduction is a good way to do it.

Now the thing about sex is you get pregnant. Actually only 1/2 of you get pregnant. It was sort of an ambiguous sentence. This is 1/2 of you, plural, get pregnant. Not 1/2 of you as an individual get pregnant. You never know what people learn in high school. In any case, it is that fact, that's the key fact this story that produces the asymmetry. Women get pregnant, men don't get pregnant. Why is that important? Well, that's important because being pregnant ties you up for 9 months, being pregnant for 9 months at a time greatly is a profound rate-limiting step on how many kids you can have. And then if you're a human and not a spider or something like that. Once the kid is born or hatched or whatever you still got a problem here. You want this little bundle of genes to do something for you in evolutionary terms, you got to keep it alive. So it's not just the 9 months. There's a long time, long term commitment to this little evolutionary project that you've gotten into. The same constraints do not necessarily apply to men.

Certainly the rate-limiting step does not apply because in principle guys can go off and have a gazillion babies-- that's a technical term-- as long as they can find the requisite gazillion women. The rate-limiting step for man is just how many women can you successfully impregnate? We're not talking in what is right in social, civilized world or something like that, right? But we're just talking about the biology of the situation here. The men don't get pregnant. If you get woman 1 pregnant today you can get woman 2 pregnant tomorrow in principle. That's not true for the woman. If you are a woman and you get pregnant today you don't get to get pregnant again tomorrow. That doesn't work. So fundamental difference, the evolutionary psych argument is that this should produce fundamental differences in behavior. In particular, if your goal is to get as many successful bundles of genes into the next generation as possible guys should be inclined to have sex early and often with as many partners as possible because that's going to produce lots and lots of babies. Women should be looking for something more like a commitment because it's a lot easier to take care of this little bundle of joy if somebody else's helping out. Either helping take care of the kid or at the

very least, providing resources for this. It's an expensive business raising a kid, not just an expensive business if your a nice middle class kid and you're expecting to go to MIT or something like that. It's an expensive business period. You gotta feed the kid, you gotta keep it warm, and so on. Resources are required. And it is in your interest as the woman to have guys around, at least a guy around who's going to provide resources.

Now, you can make up other stories. You could make up a story that says it would be in the woman's interest to have multiple mates who are kept in some doubts about who the father is so that they all provide resource. That sounds funny, but there's no reason why that story and there are species where that seems to-- you can almost always find an animal where it works out. If humans were a polyandrous species, a species where females had multiple mates at the same time that would require explanation and you could try explaining it the same terms. As it turns out across cultures the pattern is either one male, one female or one male, several females. That there are much rarer instances of one female, many males in human populations. So the mainline story is that the constraints of biology are going to incline the population to a population of males who are interested in frequent sex and whenever. And women who are going to be looking for a mate who's willing to make some sort of commitment. Now is there any evidence for evolutionary forces, biological constraints on mate selection in humans? Quite apart from these questions about who wants sex and when. Is there any evidence for this at all? The answer is yes. If I give some examples it's sort of surprising that this was ever controversial. Well, let's give an example.

For example, if you're looking for evidence that something has these sort of biological, evolutionary roots what you're looking for is something that is ubiquitous in human societies. You don't want something where it's deemed attractive in one population or desirable in one population and not in another population. That can be very culturally determined. So I don't know of much in the way of great evolutionary psych arguments in favor of which bits of your body should be pierced. That seems to be the sort of thing that some groups think this is attractive and some groups think that is attractive and yeah-- but across human cultures there is a consistent preference for mates who are young and healthy as opposed to mates who are old and sick. There is no place where the ideal of attractiveness is an old person with a disease. It just isn't the case. Now it almost sounds funny, but-- I got a house full of books. I like to collect books. It turns out that the books I like best are pretty old and diseased and that's not weird. That doesn't strike people as odd. You do need to explain, it doesn't take much work to explain why there's a preference for young, healthy mates over old diseased

mates. If you think that this has something to do with a drive towards reproduction you're much more likely to reproduce successfully with a young, healthy make.

The reason that these topics have been controversial has less to do with the science of the situation or it has had less to do with the science of the situation than with the politics of the situation. It is possible, as in the IQ case to go from uncontroversial or fairly straightforward bits of science to undesirable or at least controversial conclusions in a more political realm. So the sorts of things if you agree, if you are forced by the data to say look, there's a whopping asymmetry between males and females in this area. It is perhaps-- the concern is-- that it's a slippery slope from here to saying well, it's OK to pay women less than men. The actual causal chain between this particular factoid in paying women less than men is not immediately obvious to me as I'm saying it right here. But the reason that this is politically controversial is because anything that acknowledges a difference, some sort of biological difference between say men and women can in principle be used as a defense for social inequalities that you may not find desirable. But that's really a separate question. The scientific question or the psychological question is are there differences? There certainly seem to be data differences and where did they come from? There are other sort of universal preferences that seem to reflect this desire for a mate who is likely to be a good partner in reproduction. What is it that makes a face attractive? Well, one of the things that is attractive is facial symmetry. That all else being equal it's considered to be better-- you're consider to be more attractive-- a face is rated as more attractive if it's symmetrical than if it's asymmetrical. Why is that? Most of the things that are likely to produce noticeable asymmetries in the face are things that suggest either a genetic deformity of some sort or an accident. Neither of them are going to be great advertisements for reproductive success. Imagine somebody with half a face, you know intuitively that either you're watching a sci-fi movie or there's something fundamentally wrong here.

Oh, what is an attractive face in general is an interesting-- I didn't put all those references on the handout. There's an interesting literature on what makes an attractive face that is worth a little side note. You could have two theories. One theory would be attractive is one end of a scale that runs from ugly to gorgeous. That all those hollywood actors and actresses are pegged out here on the gorgeous end of some scale. The alternative theory is that it is average faces-- that an average face is what's normal, is what's deemed attractive. The original evidence for this comes from a photographic technique where what you did was you took a whole bunch of photographs and superimposed them to make a composite face and

you found that those were rated as more attractive than individual faces as a whole. And this was being done by clever techniques back-- oh, I think in early part of the 20th century. And it's gotten a lot easier now that we've got computers to do these sort of things. The difficulty, one of the things that made this research a little tricky is that one thing that averaging faces does is it does wonders for your complexion. Everybody's nose is in more or less the same place, but everybody's zit is not. And so if you average 100 faces you get people with gorgeous complexions and there's some part of that effect that just comes from the fact that they look like they had really healthy skin. It's a debate that jumps back and forth, if you turn out to be deeply interested in what makes a face attractive send me a note, I'll send you the reference since I see I didn't put them on the handout.

We can ask for a couple of other things that suggests these universals across human populations. What's more desirable in a mate? Richer or poorer?

AUDIENCE: Richer.

PROFESSOR: Richer, that's easy enough. Is that preference the same for men and women? Who's more interested in finding-- I'll tell you the answer-- it's not the same, how many vote that it's men who are more interested in finding a wealthy mate? How many vote that it's women? You got the right intuition and the evolutionary psych story there is the resource story. That what you're looking for is evidence of resource. Is this guy going to help me feed all those hundreds of babies that he thinks we're going to have? And this is also presumed to be-- why is it that driving, cruising around town in the fancy car, you know what's that about? That's a peacock tail effect. I think I already described the peacock tail effect earlier in the course. The idea is I'm showing off my resources, I've got so much money that I can buy this stupid car. My hubcaps cost more than your house, which is why you want to mate with me. This is presumed to be the way that they-- OK, how about age of spouse? Or age of mate?

On average, if you are a male, you want a-- and this is very importantly on average, because it's not to say, well, let's get the data point first. If you're a male, on average how many people vote that you were looking for a mate who is-- well, this is a 3 alternative forced choice, you got to vote for one of them: little older, exactly the same age, little younger. How many vote for little older? How many vote for just the same age? How many vote for a little younger? OK, got that intuition right. So males on average, in culture after culture seek mates who are a little younger. The amount varies culturally. In some cultures it's significantly younger. In some cultures it only a couple of years, but it is across cultures younger.

OK, so the point I was going to make before is you're sitting there saying, my girlfriend is like 2 years older than me. This does not mean that you are some sort of genetic misfit. It means that we're back to talking about the mean value and all of these things have a distribution around them. It would be considered odd if your choice in mates was, I only date women who are 60 years older than me. That would be considered unusual, but that should be way, way out on one tail of it. But typically, the mean of that distribution lies a little younger. OK, why is that the case? If you're following this evolutionary psych story, why do males seek females who are slightly younger?

AUDIENCE: They can have more babies.

PROFESSOR: More babies, right. The males may not be limited in principle by the same rate-limiting step, but if you're in a culture that's going to limit you to 1 woman you better get 1 woman who's going to produced the maximum number of babies. So you better start young. So, if you are a woman, same multiple choice. If you are a women, the average-- across cultures women prefer-- how many vote that women prefer males who are slightly older? Exactly the same age? Slightly younger? You got the right intuition. Again, it's very convenient that this is the way it works out. It's really bad news if everybody wants younger mates. That doesn't work well. But actually, we'll come back to that in the next lecture. I'll just put that out there as a problem to solve. Everybody does want to max out on the attractive, rich gorgeous thing, but most of us aren't going to get that. It's one male to one female roughly speaking. We can't all have that person, it just isn't going to work well. So we'll have to solve that next week.

OK, why do females want males who are slightly older?

AUDIENCE: Maturity.

PROFESSOR: Maturity-- good luck. The evolutionary psych argument is the resource argument. I'm sure maturity doesn't hurt either, but it's the resource argument. A guy has had a chance to accumulate more resource if he's a little older. And so you've got these endless-- sometimes, literally endless-- big, thick 19th century romance novels that you read in English lit at some point where he loves her but they can't get together for 800 pages because he's got to go out and collect resource in some fashion until he can come back and show daddy that he can support the daughter. The alternative version of the 19th century romance is the interview where daddy asks, how much money your daddy left you. Oh, yes, I have a thousand pounds. They're all English novels. A thousand pounds a year in the funds or something like that.

That's resource, that's good. Oh, there's one exception. There is a population of males who seeks slightly older women. Who is that population?

[? AUDIENCE: Teenagers. ?]

PROFESSOR: Exactly. There's this cruel sick chortle that we just got from-- all the answers given to that were by women. All of whom were snickering about it, which is harsh. But it's teenage males, particularly young teenage males who develop crushes on slightly older or maybe quite a bit older women. Why? What's that about?

AUDIENCE: [UNINTELLIGIBLE]

AUDIENCE: They're fertile.

PROFESSOR: They're fertile, exactly. Now, I mean, the kid doesn't know this. Oh, I think I'd better fall in love with somebody who's fertile. That's presumably not what's operating at any sort of conscious level here, but if evolutionary forces drive you to look for a mate who's going to be fertile and you're an early adolescent male, 9-year-old girls are not the population of choice. And you may notice that even the example gives you a sort of a eww kind of feeling. We have a sort of a gut, built in reaction that there are some relationships that are OK and some relationships that are odd. And so relationships and in particular, relationships-- guys can go and pursue fertile females. That's OK. That can be shown in the airline movie. Again, we don't have the airline movie, the headline comes up the search for the fertile woman, but ask yourself who it is-- who romantic comedies are about? You wouldn't put a movie on the airlines for family consumption about some guys unrequited passion for a 9-year-old girl. It would seem icky. That there's something wrong there. Why? Presumably this has something to do with the same sort of forces. OK, so let's move on a bit to this, elaborate on this issue a bit, who should be faithful in relations? Who should cheat?

So let's start with guys. Now recognize here, by the way, that we are talking again, within the context of this evolutionary psych viewpoint. We are not saying who should cheat in your relationship right now with the person sitting next to you or something like that. Or who does society say it's OK to cheat with. But in terms of this theory about evolutionary forces working on mate selection, who should have an evolutionary drive to cheat? Should guys?

AUDIENCE: Yeah.

PROFESSOR: Yeah, right. That's a pretty straightforward argument. That if you can get away with it, if you can have a few no cost babies somewhere-- great. You've done your evolutionary work. Look if we switched to a different context of cultural, civilized world kind of you may be a jerk, but you're an evolutionary successful jerk. OK, how about women? Should women be unfaithful and play around?

AUDIENCE: Yes.

PROFESSOR: OK, yes argument. What's the yes argument? Again, from an evolutionary point of view.

AUDIENCE: Like a stronger mate.

PROFESSOR: Yeah, you might get a stronger mate. You're hedging your genetic bets. If you are going to link up with this guy, maybe he turns out to be a genetic dud. If you just have your 18 babies with him you know, how good is that? But if you spread it around a bit, your genes are the same in all cases, who cares? You're always get your half of the package. And so you might as well mix it up a bit and so that's the yes argument. Any other yes arguments? Yep?

AUDIENCE: You could have sex with a guy with better genes, but remain more faithful to the guy with more resource.

PROFESSOR: Yes, OK. This is a particular version of the more general argument. There's a resource argument here. He's giving a particular version, which is go have sex with the guy with the good genes and snooker the guy with the good resources and convince him that it's his kid. So he devotes the resources to raise his genes. More generally, you might just play around, just shop around because you get more resources in general. Guys will give you stuff in some fashion or other. So there might be sort of a quasi economic-- go out and get the goodies kind of bargain. OK, those are good yes arguments. How about no arguments? Against the notion of-- yeah?

AUDIENCE: You could lose the resources.

PROFESSOR: You could lose the resources. Why would you lose the resources? What's the guy's problem?

AUDIENCE: Not his kid.

PROFESSOR: It's not his kid. And this is a crucial issue. Again, another part of this fundamental asymmetry. Because it's the woman who gets pres-- president right. The woman who gets pregnant, she

always knows who the mother is. Actually, he knows who the mother is, too. There's no doubt about who the mother is. The maternal genes are not an issue here, paternal genes are an issue. And doubts about paternity have a variety of consequences. Male sexual jealousy is a real and potentially dangerous phenomenon. In fact, I don't think there are any states where it's still the case-- there were states where it was the case that killing an unfaithful wife was not murder. I don't think it was ever the other way around. You couldn't kill your unfaithful husband, but killing the unfaithful wife wasn't necessarily a laudable act, but it wasn't murder in the way that killing somebody else was. I don't believe that-- anybody happen to know that they come from a state where you can still do that with impunity? I think Louisiana was the last.

Oh, and there are interesting wrinkles on this. When a baby is born the first question anybody asks is, is it a boy or girl? Which is an interesting factoid in its own right, but sort of the second topic of conversation is, who does the kid look like? And what's the answer? The answer is a bias towards saying that the kid looks like the father. Now why should that be the case? And it turns out that the bias is strong-- it depends who's giving the answer. The answer by the wife's family-- by the mother's family-- is more skewed towards saying it looks like the father. And there are at least two reasons why this is the case. One of them seems to be an effort-- again, quite unconscious to prove to the dad you don't have to say it looks like the mother, we know who the mother is. Saying it looks like the father is reassuring to the father who might otherwise deny resource to this kid or go out and kill the mother-- something inconvenient like that. So it's important to believe that this is your bundle of genes. The guy is in theoretical doubt, the woman is not in doubt.

The other reason why it may be true is there is some evidence that babies actually look more like their fathers when they're young and that this wears off with age. If this is true it would be an interesting argument for this evolutionary pressure because babies who looked clearly like dad probably had a little edge because dad looked at this little bundle of joy and said, it's mine. And if the kid looked like the milkman or something, the kid may not have-- actually, can you even use that as an example anymore? Are there still milkmen out there? It used to be. It's a sort of an anachronism, like talking about dialing the phone. This is a very mid 50s kind of anachronistic sort of cliche about the woman who would be at home, the milkman, who would be the man who delivered the milk since you didn't go to the supermarket to buy milk-- it came to your house and then various other things happened and anyway. So much for cultural enlightenment here. So in any case, there's a pressure for women to be faithful because of

basically, in some fashion because of the danger of alienating the male in some way or other.

There's a problem here, sort of a problem. There's a potential problem with this. If you think about it we've just come up with a theory that explains why women should be faithful and shouldn't be faithful. And in fact, we could elaborate on this and say that the evolutionary pressures should cause-- you could argue that the evolutionary pressures could push women to have less of a sex drive therefore, making them more likely to remain faithful or you could have it explain that they have just the same sex drive, but they're supposed to deny the existence. You can have a lot of different explanations. This is a problem with the theory, a theory that explains all possible outcomes isn't a great theory. On the other hand, in human mating behavior all the possible outcomes are out there. So you don't want to have a theory that just explains one thing because that wouldn't be an adequate theory here either. I think the fairer thing to say about evolutionary theory is that it hasn't reached a degree of sophistication where it can explain in detail when a woman should or should not be faithful. There are examples elsewhere of these sort of trade-off situations that evolutionary sorts of theories explain rather well.

So an example, sort of in the same ballpark, comes from cuckoos. You know about cuckoos? Cuckoos are nasty birds. Cuckoos like to lay their eggs in somebody else's nest because this business of raising kids is resource intensive and if you can get somebody else to do it, great. So cuckoos lay their eggs in somebody else's nest and it gets better from there because the cuckoo egg hatches early and the cuckoo chick has this lovely reflex where what it does is it arches its little cuckoo back and kicks the other eggs out. So it kills off its adopted siblings and then it sits there making I'm hungry noises and gets fed by genetically unrelated birds. There's an obvious problem here. It's in the cuckoos interest to do this, but you can't have too many cuckoos.

If cuckoos do this to every nest then there's no next generation because there's nobody left dumb enough to raise your kids in the next generation. So there's an equilibrium, you can write down equations for this that say a healthy population can tolerate this many cuckoos; this many cheaters. You might ask by the way, why the stupid bird-- the stupid sparrow or whatever who's got a cuckoo in her nest doesn't say, get out of here. And the problem seems to be that the cuckoo behaves as a sort of a supernormal baby stimulus. You as a mommy sparrow or daddy sparrow-- you are built to say, oh, look at that. It's cute, it's a baby, I want to feed it. And your success is whether this thing is growing. And here's this honking, huge

cuckoo baby. Wow, I hit the jackpot. I got the greatest baby in the world. Doesn't happen to be genetically related to me, but it's a great baby. And so I stuff it full of worms. Last year there was an article about a species of I don't remember what, but some other non cuckoo bird that has learned now how to recognize or has evolved the ability to recognize the cuckoos and you can't lay your cuckoo eggs in those nests because that species will get rid of you and preserve their own. But anyway, there's an equilibrium state here. You have a balance that tolerates a certain amount of cheating. The same thing happens in human relationships though the details are much more complicated to work out. But do people lie?

AUDIENCE: Yes.

PROFESSOR: Yeah, sure. Do people lie all the time? No, you can't do that. You can't have an arbitrary relationship between truth and udderances cannot have arbitrary truth value because then there wouldn't be any point to communication. So on average people as a whole have to tell the truth. Does everybody have to tell the same amount of truth? No, the population can tolerate some amount of real liars, right? Pathological, lying through their teeth all the time. Oh yes, I love you baby. I will devote all my resources to you. Liars, or whatever realm it is, but again, there's going to be an equilibrium equation there somewhere. Not as well worked out as with cuckoos that says, we can only tolerate so many liars.

So you could ask the question, is there motivation for guys to lie in relationships? Are you seeing anybody else? Oh no, not me. If everybody lies about that the game falls apart. If some people lie about it they get away with it. So the population as a whole will tolerate some subset of cheaters. One can have the hope-- the theoretical hope that another few generations of work in the area and you'd be able to write the equation. You'll be able to say, look, a population like an undergraduate population can tolerate 10% cheaters. If we've got 11% cheaters we have to invoke the dean's office or something and throw them out because the population will crash otherwise or something. Anyway, we're nowhere near that point. At this point we can't write the equations. But that seems to be the way you get to the solution to the problem. That the theory at the moment predicts kind of everything.

The theory also doesn't predict the full range of behavior. I see I've got these problems listed on the handout. In particular, it's explaining group behavior, explaining the behavior of individuals is something that I'll get to in the next lecture. Actually, I'll get to some of it later in the present lecture. And the third problem, let me say a bit about that before we take a break. Is that civilization may have changed the rules. One of the most striking-- there's several

examples of this. One of them is if you were operating in a sort of a purely Darwinian kind of a world that would be very difficult probably, but very different than operating in a world where you are being told explicitly what is and is not appropriate sexual behavior. You're being told explicitly that your genes, your evolutionary history if you're a male may be saying go off and mate with everybody under the sun. But there are societal strictures that say, not really. That's just not quite really right. So that complicates things, but a more interesting complication arises more recently in history with the advent of artificial contraception. If the fundamental route to these asymmetries is that women get pregnant-- that sex makes you pregnant and it's only women that get pregnant, what happens if you decouple sex from pregnancy? Does it change the game? Well, potentially yes. It has not made these asymmetries disappear. That's a topic that I will actually return to in a later lecture. It's not made these asymmetries disappear and that suggests that forces that shaped our brains, the evolutionary forces that shaped our brains over long periods of time still operate even though the rules of the game have changed somewhat. You can get an intuitive feeling for this-- let's return to the question of female fidelity. Should a woman cheat?

Well, part of the answer to why a female might be inclined not to cheat in a relationship was that the male might be jealous and that would have a variety of possible bad consequences; withdrawal of resources or potentially violence in some fashion, something bad might happen. OK, how much do you think that those bad consequences are ameliorated. If when she's confronted, you know, did you cheat on me? Yes, I cheated on you, but it's OK because we took precautions. Do you think that makes a difference in the argument?

AUDIENCE: No.

PROFESSOR: No, intuitively it doesn't seem likely that it makes a difference. Suggesting that the forces that are driving these questions of who should cheat and who shouldn't cheat are walled off from knowledge about modern contraception. In sort of the way that the forces that are driving taste aversions are walled off of what you know about what it is that made you sick. Remember from earlier in the course, you got sick because you got the flu, but you ate a tuna fish sandwich the day before you got the flu and now you can't eat tuna fish anymore because this little chunk of brain said, tuna fish poisoned us, we never eat it again. Same sort of story. Somewhere in the brain is a chunk of brain that is saying-- chunk of guy brain that is saying, need to know woman is faithful. Why? Well, because I need to know whose genes they are. Woman isn't pregnant. I don't care. I'm a very simple little chunk of brain, I just need to know woman is

faithful or I have unhappy things happen in me. So the persistence of these sorts of asymmetries and these sorts of behaviors is another argument that can be used to argue that these are deep seated behaviors with evolution. Oh, I should say, by the way, that these are explanations not excuses in any way shape or form. Coming home and flipping to the other side of this right? You're the guy this time. Did your cheat? Yes, but that's OK because I have deep seated evolutionary forces within me that make it necessary for me to cheat. That's an interesting explanation, but it's not an excuse in a relationship any more than it's an excuse. Yes, I hit my girlfriend because I was jealous. You know, great, lovely, we have these great evolutionary arguments for it. That's not an excuse. That's where you get into again, why these things are politically controversial, is the possibility of turning explanation into excuse. You can decide well, to use an example that I will probably use again, it's a little like saying, look gravity is a force. You can't thwart gravity, so I'm just going to lie here forever. Oops, lost the glasses. Where'd the glasses go? That's a really stupid argument and it's similarly stupid to say biology is a powerful force, therefore I had to do whatever. There are other powerful forces out there in civilization: morality, culture, whatever are powerful forces and if they say don't do it, it may be hard work not to do it, but that doesn't mean you shouldn't do it. Or you should do-- whatever, you got the basic idea. Well on that sentence with way too many double negatives in it, let us take a brief break and then I'll turn to the question of individual behavior.

[INTERPOSING VOICES]

PROFESSOR: Oh, thank you.

AUDIENCE: Should we do it before-- I mean, after they come back from the break maybe? Or would you prefer at the end?

PROFESSOR: We [UNINTELLIGIBLE]

AUDIENCE: Basically what it is we're doing the comedy passes, whoever wants one we just have to pass them out.

PROFESSOR: Oh no, if you're going to pass stuff out, be here at the end.

[INTERPOSING VOICES]

PROFESSOR: Yep, I'll do my best. Will it be funny? Quick, funny announcement. All right, so be here in about 20 minutes.

AUDIENCE: Yeah, no problem.

PROFESSOR: So, let me elaborate. I realized looking at the handout that I didn't elaborate particularly well on this problem 2 part about these evolutionary theories not explaining the full range of behavior well. So it explains perhaps-- the theory as elaborated thus far explains for instance, why you might be attracted to one person or another, but it doesn't explain what you do in any particular way. So you see an attractive, potential mate, if you're birds you might do some sort of weird mating dance or something like that. If you're a human you might do some weird mating dance or something like that. You can ask yourself about what do you do if there's an attractive mate possibility? You could dance, you could hang around, you could act pathetic, you could act non-pathetic. You could get person A to talk to person B and who knows C, who's the uncle of D or something like that. Just knowing that there was evolutionary pressure here isn't really a full story about human mating behavior by any stretch of the imagination. What's going to elaborate on it, you can probably get a good piece of mileage from asking about law of effect kinds of things. What you do in mating situations or courtship situations is going to be shaped, at least in part, by the schedule of reinforcement. You do a mating dance and the potential mate responds, you're going to be inclined to do that dance more-- it's not why birds do it. Birds are wired typically to do the dance, but if you go off and do some weird dance and he or she says, hey, this is good. You'll do it again. The whole ritual, I don't know what you want to call-- who touches who when, where, and how is also heavily shaped by law of effect sorts of things. If it's rewarded it happens again. If it's not rewarded it doesn't happen again. More on this later, but I did want to just say that there's nothing in these sort of evolutionary psych theory that really talks to that.

Now let me go onto try to say what does talk about individual behavior in romantic relationships. You know, to get beyond this notion of what average populations do in a world full of potential mates, why are you attracted to this one now? What can we say about that? There certainly seems to be something to explain. There are a variety of candidate sorts of theories out there. One of them is nicely encapsulated in shakes-- oh I realized I didn't put the most clear cut piece of citation on that quote at the bottom of page 3-- That's *Midsummer Night's Dream.* Shakespeare's *Midsummer Night's Dream* and Shakespeare has Theseus, Duke of Athens say, that lovers and madmen have such seething brains, such shaping fantasies that apprehend more than cool reason ever comprehends. The lunatic, the lover, and the poet are of imagination all compact. This is a theory of romantic behavior that says you're attracted to whom you're attracted to at the moment and you're doing what you're doing

in response to that now because you're nuts. I mean, basically it's a form of insanity, and not uncommon theory that shows up in literary circles. The place to get some intuitive feeling for that is to remember what it felt like if you were ever completely infatuated with somebody. Preferably somebody who didn't know you were infatuated with them. Some random other person across the crowded room kind of thing. That has the feeling of being more or less, out of your mind. But you don't realize at the time and reams of bad high school poetry are written unders those conditions. And if you're very lucky nobody else gets to see that stuff, mostly.

In my experience, back when I was in high school-- how many people have ever seen a book called *Jonathan Livingston Seagull*? Oh, it's still out there. It's very sappy. And it was this sort of thing you gave to somebody who you were deeply in love with, preferably in high school. And it turns out that both my wife and I have copies of this book given to us by people other than each other because we didn't know each other in high school-- both with inscriptions so florid that you just can't read them. One of these I mean, why haven't we destroyed them? Well, there's a certain nostalgia there of some sort and you gotta save these things for your children. One day one of my kids is going to be up in the attic and find this thing and read it and fall down dead laughing.

All right, the relevant question here is that's not a bad theory, why isn't this the abnormal psych part of the course? Why aren't we talking about love in the context of psychopathology? What's the answer? Nobody knows what the answer is. Yep?

AUDIENCE: Psychopathology generally deals with things that are [UNINTELLIGIBLE]

PROFESSOR: Yeah, there's a reason it's called abnormal psychology as a [UNINTELLIGIBLE]. Now look, I don't know quite what would happen if bad people found a way to put something in the water that made us floridly schizophrenic. If it became the majority state it would still be psychopathological probably, but by and large what we talk about in abnormal psychology is abnormal and being in love may be a sort of insanity, but it's a very-- well look, Shakespeare knew this too. So if we borrow from *As You Like It*, we have the explanation of this given in this case by Rosalind in *As You Like It* saying that love is merely madness, merely a madness and I tell you, deserves a dark house and a whip as madman do. Which tells you something about Elizabethan psychotherapy. The reason they are not so punished and cured, which also tells you something about Elizabethan psychotherapy; the notion was not that you were just being nasty to crazy people, but that being nasty was curative. The reason they are not so punished and cured is that the lunacy is so ordinary that the whippers are in love too. It doesn't make

any real sense, it's not a useful theory to say that being in love is a form of insanity because it's essentially a universal form of insanity.

You might think that there's nothing much to say in an intro psych class about this at all and that the whole topic is kind of best left to Shakespeare and other literary sources. That's actually not a bad argument, but I think there is something useful to be said in the context of psychology. We can switch back to Shakespeare and ask-- wait, first we have to check on how high school education is going these days. How many people have to read *Romeo and Juliet* in high school somewhere? OK, good. Just checking. Romeo is looking across a crowded dancehall here and he sees Juliet and he's supposed to be in love with?

AUDIENCE: Rosaline.

PROFESSOR: Rosaline. Good, you got that question right on the test. He's been mooning around about this woman Rosaline. He walks in, he sees Juliet and it's oh, she doth make the [UNINTELLIGIBLE PHRASE]. You can see why I'm not a Shakespearian actor. She doth teach the torches to burn bright and all that good stuff. Why? What can you say about it? There are a variety of things. Well, we can develop what we can call the chemical theory of love here. We passed through the insanity theory, let's work on the chemical theory a little bit. Chemical theory gets you a certain distance. Oh, I didn't put this on the handout yet because I wasn't convinced I was going to get here. I'll put a few of these terms on there next time, but you could write on the back of the handout. So chemical aspects. One thing that's related to chemical aspects is the proximity factor. You want to get two things to interact and make heat, you gotta bring them together. It sounds trivial, but the scary version of this is that a not insignificant number of you will meet your eventual mate here. Not here like in 10-250 right now, but during your undergraduate years at MIT.

So you know, somebody in this room may be that person or something like that. One of the reasons is it's a great deal easier to fall in love with somebody you actually interact with. There are lovely people at Cal Tech I'm told, but mostly-- no? Well, there are bitter, jealous, disappointed people at Cal Tech I'm told. All of whom actually wanted to go to MIT, but anyway, you see the point. So proximity helps. Now another chemical aspect of this romantic love business is that if you want a chemical reaction to speed up one of the things that's useful to do is to add heat, right? That works, too. And it works in not just like turning up the thermostat, but you are more likely to fall in love with somebody if your arousal level is up. That seems pretty obvious. The non-obvious piece of it is that you're pretty stupid about this

and you don't care too much where the arousal comes from. The Romeo and Juliet thing is not a bad example. Romeo is which family?

AUDIENCE: Montague.

PROFESSOR: Montague. That sounds right. OK, Romeo is at who's party?

AUDIENCE: [UNINTELLIGIBLE]

PROFESSOR: Do they want him at this party? What are they going to do if they find him?

AUDIENCE: Kill him.

PROFESSOR: So how does that make him feel?

AUDIENCE: Aroused.

PROFESSOR: His little heart is going pitter pat, right? There is some sense in which that contributes to-- that modulates how attractive you think somebody else is. The clearest pop culture example of this is ask yourself about the standard adventure movie paradigm. It's got a guy, it's got a girl, right? Do they like each other at the beginning of the movie?

AUDIENCE: No.

PROFESSOR: What do they do for the duration of the movie? They find themselves in disasterous situations after disasterous situation. Do they like each other during? No, no, they spend the whole movie sniping each other and double crosssing each other and stuff like that. The end of the movie they're both hanging by one fingernail from the helicopter over the volcano or something like that and what do they realize? We're in love. This is great. It sounds silly, but the fact that we have been willing to tolerate that plot line forever suggests that there's something to it. OK, I got enough time to tell you about what is arguably one of the great experiments in experimental psychology. Did I already tell you about the shaky bridge experiment? AUDIENCE: No.

PROFESSOR: No, good. This is an experiment so good that I did a pilgrimage to the place where it was done, which turns out to be in Vancouver. Vancouver has a park with a deep gorge and a *Raiders of the Lost Ark* style suspension bridge going across it. Or *Shrek,* you know with the donkey going across-- you know the bridge. No volcanoes or dragons and anything, but it's a shaky bridge. Here's what they did. You're a guy for this experiment. You're a guy and you are

walking across this shaky bridge and in the middle of the bridge you meet a woman. And she says, I'm doing a study for psychology, would you fill out my little questionnaire? Well, OK. As part of process says, there's [UNINTELLIGIBLE] if you want to know more about this experiment once we've collected the data, you can phone me at this number at the lab. My name is Sarah. OK, so that's group 1. Group 2 turns out round the corner from this shaky bridge, there's another bridge over the same river, it's a big concrete slab. It don't shake at all. You're a different white guy. White guy? I don't remember if you're a white guy. You're a guy. You're walking across the bridge and you meet a woman and same story. If you're interested in the results of this experiment phone this number and ask for Rebecca. Needless to say, Rebecca and Sarah are the same person. The only thing that differs is whether you met her on the shaky bridge on the nonshaky bridge. That data are, who calls? So your call up the number, some guy answers, you say is Rebecca there? And he says, no, no I'll take a message and hangs up the phone. Another one for Rebecca. It turns out that more guys who met Sarah on the shaky bridge phone in than who met Rebecca on the solid bridge. Why is that?

The argument-- this arousal heat argument is, it's known in the trade as misattribution of arousal. You walk across the bridge, you meet a woman person, you ask yourself, how do I feel? My heart is beating. My palms are sweaty. It must be love. And it's enough of an effect to change whether or not you'll phone up to get the results of the experiment. Look, you shouldn't overstress the result. Nobody's done this particular experiment, but if you meet a chicken in the middle of the bridge you don't say, my heart is beating. My palm's are sweaty. I love the chicken. But it does modulate things.