

phil 2267 philosophy of science

podcast course:

the case of abstractions

Dr. Ada Jaarsma
Mount Royal University
ajaarsma@mtroyal.ca

course overview

This course explores “abstractions” as lively phenomena in the world. What makes an abstraction *philosophically* or *scientifically* convincing, or authoritative? We’ll examine specific ways in which theorists invent abstractions, as well as the kinds of practices that abstractions require and give rise to. Isabelle Stengers maintains, for example, “**Deduction will never replace discovery**” (2011, 249), a claim that points to two different modes of abstraction-creation. Stengers will be our philosophical guide throughout the semester. What *is* the difference she’s drawing between deduction and discovery? In part what’s at stake in this distinction is the possibility of new, more emancipatory abstractions. Angela Willey asks, “What resources might we cull for thinking *beyond the nature/culture binary*? What modes of conceptualization might enable new forms we cannot yet imagine” (2016, 3)? We’ll join Willey in thinking through these two questions, paying attention to the limitations, force and implications of the so-called nature/nurture binary. And we’ll follow the cue of her choice of verb—*imagine*—by reading science studies and creative writing that solicits our imaginations, as well as our critical understanding of the deployment of abstractions.

After all, while abstractions provide us with a way to theorize “the world,” they also bear directly upon the world, sometimes in marvelous and sometimes in egregious ways. Moreover, **the world itself kicks back**, enabling and challenging abstractions; as Stengers puts it, “it is not [humans] but the material that ‘asks the questions,’ that has a story to tell which one has to learn to unravel” (1997, 126). The world also kicks back through the resistance of research participants, as Vinciane Despret explains (2004)—as well as through the recalcitrance of what Aimi Hamraie (2016) calls non-conforming users who interact with the products of science. We will be fascinated, together, by this interplay of material, resistance and abstractions.

And we’ll track abstractions that we, ourselves, find especially persuasive or problematic or simply full of potential. Lively abstractions do not remain within the bounds of laboratories or classrooms. During the term, we’ll work collaboratively to create “audio essays” that examine the traffic of abstractions—and, through a creative commons license, we’ll add our own traffic to the growing world of open educational resources.

course texts

1. Angela Willey, *Undoing Monogamy: The Politics of Science & the Possibilities of Biology*. Duke UP, 2016.

2. Isabelle Stengers, *Power & Invention: Situating Science*. U of Minnesota P, 1997.
3. Brian Blanchfield, *Proxies: Essays Near Knowing*, Nightboat Books, 2016.
4. *Ideas: On the Nature of Science*, ed. David Cayley. Goose Lane, 2009.

Audio essays

We'll be listening to episodes of podcasts throughout the semester, learning from their design elements and drawing out resonances with our assigned readings. It's an excellent idea to consider subscribing to these podcasts so that they are easily accessible on your phones or other devices; streaming links to each episode are posted on Blackboard.

course policies & assignments

Accessibility

This course is committed to the principles of universal design in learning, which include flexibility, equitability, tolerance for error, and productive feedback loops. You are invited to comment at any time during the semester (in person or by email) about the ways in which the space, assignments, curriculum and other key elements of the course are contributing to or impeding inclusion and accessibility. In addition, in order to access institutionalized forms of academic accommodation, you can contact Accessibility Services at 403-440-6868 to discuss academic accommodations for disability; you can also contact Diversity & Human Rights Services at 403-440-5956 if you require academic accommodations for other reasons.

One thing to know about our particular classroom space is that it will contain audio recorders. We'll talk a lot together about sound, recordings, and the consensual use of audio-clips, but this course will ask everyone to find some degree of comfort with the presence of audio-recording.

Reading Responses

Philosophy involves a lot of reading; reading, in fact, is one of the main sources *of* philosophical learning. And so there will be assigned readings for every week's seminar. Remember, though, that this is a 2000-level course. This means that, while you're expected to do the reading, you're not expected to have landed on an interpretation of the "argument" or problems being elaborated in the assigned text. You can rest confident that I will be introducing and explaining the key ideas in class.

That said, however, since *reading* is such an important task of this course—along with seminar discussions—it seems right that at various points in the semester you will hand in thoughtful reading responses about the assigned readings. (These are the weeks, in other words, when you'll read the assigned texts more carefully and slowly). These reading responses should be *two* pages in length, and they are **due in class on the day of the assigned readings** (put the word count on the top of the first page! You should aim for around 600 words).

A reading response is a rigorous, subjective engagement with the assigned reading: illuminating crucial ideas, elaborating important concepts, adjudicating and weighing in on questions. Ultimately, this is a chance for you to render transparent (laying it out clearly in your own writing) what you think might be most significant about the reading. You're always welcome to use first-person to develop these two-page reflections. It's an *excellent* idea **to include direct quotations** from the assigned text in your response. We always want our work to feed our own interests, and so do be sure to choose to do

reading responses on the assigned readings that you intuit will be *most* useful or illuminating for your audio essay project.

Collaborative Podcast Project

For this collaborative project, we'll work in groups of two or three (this is negotiable; you may want to work on your own). Each group will develop, create, produce and share an audio-essay (between six and ten minutes long, but you are free to play with this constraint). While our common themes are “the case of abstractions” and “beyond nature/nurture”, there will be an enormous range of possibilities for the focus and formal design choices of your audio essays. There will be two research assistants to help with the conceptual and the technical aspects of this project.

Your audio essays will be shared, under a creative commons license, as part of a podcast called *The Learning Gene*, and so one of the guiding questions for all of us will be: what are important questions or insights or affective experiences, gained in our course, that we want to frame and share with the public? Given how persuasive scientific and philosophical abstractions can be, this is a real chance to develop your own voice and contribute your own abstractions.

Two-thirds through the semester, you'll share your work with the class: a two-minute audio clip, an image, and the abstraction that you've chosen to focus on. You'll submit a progress report on your audio essay that provides a partial transcript or a vision for a transcript; it'll be especially important for this report for you to lay out the significance of the abstraction you're exploring as well as key references for the audio essay. And you'll explain, in your progress report, which *mode* of abstraction you have chosen for your audio essay: which genre you'd like to emulate or explore.

The final audio essay will be due in exam week. You'll also submit a list of references and suggested readings, and any links that, on your assessment, would help listeners engage with your creation; you'll also submit an image to accompany your audio essay, and a full transcript. There'll be an option of sharing your final version with the class at the end of the semester.

Final Exam

We'll have an open-book final exam, during exam week, that asks you to reflect on the material from our course, especially in relation to your audio essay project. The questions will combine first-person reflections on the process of creating your audio essay with questions about key concepts and arguments that we explored during the semester.

course assessment

Two 2-page responses: 15% each

Participation: 20%

Podcast Project: Progress Report: 10%; Final audio essay: 20%

Final Exam: 20%

reading schedule

date	assigned readings	assigned audio	deadlines
Jan 6	Introduction		
Jan 13	<p>Stephen Jay Gould, “The Median Isn’t the Message”;</p> <p>Ian Hacking, “If you can spray them, then they’re real,” <i>Ideas</i> (71-80);</p> <p>Brian Blanchfield, “A Note” and “On Propositionizing” <i>Proxies</i> (vii-viii; 19-22)</p>	<p><i>Benjamin Walker’s Theory of Everything</i>, “The fairest of them all?”</p> <p>(homework for next class: write down your favourite “abstraction” from this episode to share briefly in class as part of our introductions to each other)</p>	
Jan 20	<p>Isabelle Stengers, “Is There a Women’s Science?” <i>Power & Invention</i> (123-132)</p> <p>Angela Willey, “Making the Monogamous Human: Mating, Measurement and the New Science of Bonding,” <i>Undoing Monogamy</i> (45-72);</p> <p>Brian Blanchfield, “On Abstraction,” <i>Proxies</i> (81-86)</p>	<p><i>Transistor</i>, “Science’s Blind Spots” (note: apologies for the ableist episode title)</p>	
Jan 27	<p>Isabelle Stengers, “Who is the Author?” <i>Power & Invention</i> (153-174);</p> <p>Angela Willey, “Making our Poly Nature: Monogamy’s Inversion & the Reproduction of Difference,” <i>Undoing Monogamy</i> (73-93)</p>	<p>REAPER tutorials via prezi</p>	
Feb 3	<p>Isabelle Stengers, “Breaking the Circle of Sufficient Reason,” <i>Power & Invention</i> (21-32);</p> <p>David Abram, “Everything Speaks,” <i>Ideas</i> (223-237);</p>	<p><i>Radiolab</i>, “Loops”</p>	
Feb 10	<p>Nikolas Rose, “Reading the Human Brain: How the Mind</p>	<p><i>Science Versus</i>, “Antidepressants”</p>	

	became Legible” (2016); Aimi Hamraie, “Universal Design and the Problem of ‘Post-Disability’ Ideology” (2016); Melanie Yergeau, “Clinically Significant Disturbance: On Theorists who Theorize Theory of Mind” (2013)		
Feb 17	Brian Blanchfield, “On Tumbleweed,” <i>Proxies</i> (37-41); Blanchfield, “On Frottage,” <i>Proxies</i> (109-119); Eunjung Kim, “How much sex is healthy? The pleasures of Asexuality” (2010)	<i>The Heart</i> , “Lovemaps”; <i>Tape</i> interview with Kaitlin Prest (episode 20)	
Feb 24	<i>Reading week</i>		
March 3	Progress Report: groups have 7 minutes each to share their work	<i>HowSound</i> , “My Kingdom for some Structure” <i>HowSound</i> , “Writing Out of Tape,” <i>HowSound</i> , “How not to write for radio” Read: Rob Rosenthal, “Imagining the Story” (<i>Transom.org</i>)	Progress Report on Audio Project due
March 10	Bruno Latour, Foreward to <i>Power & Invention</i> (vii-xx); Vinciane Despret, “The Body We Care For” (2004)	Film, <i>Experimenter</i> (2015; available on Netflix)	
March 17	Isabelle Stengers, “Complexity: A Fad?” <i>Power & Invention</i> (3-20); Richard Lewontin, “The Price of Metaphor,” <i>Ideas</i> (276-297); Barbara Duden, “What Genes Say,” <i>Ideas</i> (257-265)	<i>The Story Collider</i> , Rachel Yehuda: “Cause & Effect”	

March 24	Kim Tallbear, “Genomic Articulations of Indigeneity” (2013); Zoe Todd, “An Indigenous Feminist’s Take on the Ontological Turn: ‘Ontology’ is just another word for Colonialism” (2016)	<i>The Get</i> , “Thoughts, Guts & Feelings”
March 31	"Danger, Crime and Rights: A Conversation between Michel Foucault and Jonathan Simon"; Robert McRuer, "Disability (Inc); Nirmala Erveles, "Crippin' Jim Crow"	<i>Think Again</i> , “Jelani Cobb” (especially the first 20 minutes)
April 7	Robert Sapolsky, "Testosterone Rules"; "Ingenious: Robert Sapolsky"; Robert Sapolsky, "Dude where's my Frontal Cortex?"	<i>RadioLab</i> , "The Scratch"
exam week		Audio essays due; open-book final exam

- Make groups: Feb 10
- Progress Report: March 3
- Audio-essays due: exam week

Audio Essay assignment

The Drama of Abstractions

“There is power in abstraction... Who can fight with ‘empirical fact’?”

–Melanie Yergeau, “Clinically Significant Disturbance: On Theorists who Theorize Theory of Mind”

Our audio essays will explore the drama of “abstractions”:

1. **Choose an abstraction** as the focus for your audio essay. “Abstractions”: the creations of scientists to make sense of the world. Abstractions are lively phenomena—they make some things possible, and they block other things from happening. Science, in this way, shapes the reality of the world around us (Ian Hacking). Make sure you choose an abstraction whose *liveliness* you can track and explore. (Since we’re using audio, it’ll be important to choose an abstraction that you can capture—in one way or another—through sound and sound design!)
2. **Explore, in one way or another, the practices** by which scientists devise or deploy this abstraction. A “fact” is not, in and of itself, so talkative (Stengers, 165). This is why scientists invent ways to listen to and work with “facts.” In the case of your abstraction: Is there an experiment, an experimental design, or a proxy that enables scientists to produce (and make use of) this abstraction? Is there a scale, a statistical method, or an engine of visualization that conjures into being the abstraction? (Here too it’s helpful to remember that our medium is audio: are there immediate sounds that come to mind that will help you dramatize this practice via audio? You might conduct an interview, or gather tape within a particular site, or find free sounds online to grab and use, or simulate your own sounds via proxies).
3. Because of or in spite of this abstraction: how do “the facts” themselves testify? **How does the world kick back?** For example: Is there recalcitrance on the part of the objects of inquiry? And does this recalcitrance open up the possibility of new or other abstractions? Is there a controversy among scientists that opens up the limits and dramatic effects of the abstraction? (Your own audio essay can be an example of kicking back! Or you can find a recalcitrant object-of-research. Or you can solicit participation from a non-conforming user—which might be you or your group mates

It’ll be important for you to think deliberately about why this drama of abstraction *matters*, and to think of ways to invite others to experience its significance.

Project Overview

- Your 8-10 minute audio essays will be shared, under a creative commons license, as part of an audio project called *The Learning Gene*, which explores the philosophy, science and drama of the classroom. Given how persuasive and “lively” abstractions can be, this is a real chance for you to develop your own voice and contribute your own analysis to public inquiry. The one criterion is that your essay stages a drama of abstraction. (You can decide whether the *drama* takes place more ‘dramatically’ in 1, 2, or 3 described above).

- It's an *excellent* idea to put your own first-person perspective into play in your audio essay: why did you choose *this* abstraction? What is especially gripping or disturbing or wonderful about this drama of abstraction? What do you hope to achieve in and through your own drama of abstraction?
- **In exam week, you'll submit your audio essay** in two formats (as a WAV or mp3 file and as a REAPER project). You'll also submit: an image for your project; a title for your audio essay; a full transcript; the model release forms, signed by everyone you interview; and show notes (references or suggested references, any thank yous or attributions you'd like to make). *You'll decide* the details of your own attributions (would you like to have your name listed, or a pseudonym, or would you like to be anonymous?)
- Here are the insights from audio-makers that underlie our project:
 - We only really *learn* about abstractions by creating them ourselves: "The number one thing about learning is to do: you have to do, you have to make. You have to do the thing." (Jessica Abel, *Tape* podcast, episode 30).
 - We stage our own claims to authority when we create audio: "Radio is a peculiarly didactic medium" (Ira Glass from *This American Life* podcast).
 - We learn so much more about our own abstractions when we try to convey them to others using sound: "Every sound you bring into your story is working together to create not just a story experience, but a musical experience, and the 'music' you're making can either serve or undermine the meaning of your story....Whenever I have a hard time deciding what music to use or where to put it, usually that means I don't really understand why I'm putting music there in the first place. **But a good reason tells me so much:** where it should be placed, what style it should be, what mood it needs to convey." (Jonathan Mitchell, "Using Music," *Transom.org*)
- Progress Report (due March 3 in class): you'll have 5 to 7 minutes to give the class a progress report. Consider it a pitch to the class, one in which you explain how you are *imagining the story* that you think you'd like to tell.... and you provide us with a sense of the tape (the audio) you plan to gather... and you give us a sense of the *drama of abstraction* that you'll be animating in your audio essay. It's an excellent idea to have a *super-short* audio clip to play for us (less than a minute), though this isn't required. You might give us a flavor of the sounds or the voices you intend to include. I'll be crafting the content of our last two weeks in class, based on the abstractions and dramas you are exploring in your audio essays.

To prepare for your progress reports:

Listen: *HowSound* podcast, "My Kingdom for some Structure" episode; *HowSound* podcast, "Writing Out of Tape" and "How not to write for radio" episodes

Read: Rob Rosenthal, "Imagining the Story," *Transom.org*

Technical Details & Resources

- There is a *lot* of support for this project.
- **Technical help:**
 - **START lab:** Bree Smith offers drop-in help every day (T115).
 - **DIY help:** There are recommended tutorials on REAPER on Blackboard. REAPER is the software we're using (download at Reaper.fm).
- **Conceptual help:**
 - **Student learning services:** Make an appointment with a "learning & writing strategist" online at MyMRU (academic success tab), or in person at T123, or by phone at 403-440-6452. The strategists are familiar with this assignment and are ready to help you brainstorm or finesse your audio essay.
 - **Office hours:** you're welcome to come to Ada's office hours to discuss your project.

- To get going: start experimenting with very basic audio-editing! (Recording; deleting sections of tape; mixing sounds with vocals). Make sure to take notes when you recording! (where you are, the ambient sounds). And make double-sure to save your audio files before you start editing it. Tips for recording: always **record as WAV files** (not mp3) to preserve sound quality. **Record at 16-bit, 44.1 kHz**. If possible, record in **mono, not in stereo**. Tips about sharing equipment: instead of removing the soundcard, use the USB connector to upload your audio files (and remove your files before you give the recorder to someone else).
- Make sure that you ask anyone you interview to fill out the “model release form.”
- Google drive: we’ll be using MRU’s google drive for this project. You and your group members should make a folder and share it with everyone in the group. You’ll save your project and all of your audio files into this shared google drive folder.
 - Within your project folder, make at least one sub-folder for your “media” (this is where you’ll upload all of your own original audio from your phones or your recorders)
- Some REAPER tips from our in-class workshop: 1. In REAPER, under *options—preferences—“Project”*: check the box “prompt to save on new project” and check the box “open properties on new project” and check the box “time stamp backup” (hit “apply” and “okay”).

When you are prompted to “Save as,” make sure that you save your project into your main (shared) Project folder on Google drive!

 - 2. In REAPER, under *Project settings—media*: find “path to save media files” -- browse and find your own audio sub-folder on Google Drive;
 - 3. Save these both as default project settings.
- Start looking for open access/ royalty-free sounds to incorporate! (Make a sound database for yourself or for your group). Remember that you’ll need to save all audio files that you might or will incorporate into your audio essay in a *shared Google-drive folder that everyone in your group has access to*. Here are sites for finding music and usable sounds:
 - <https://search.creativecommons.org>
 - <http://freemusicarchive.org/>
 - <http://opsound.org/>
 - <http://www.freesound.org/>
 - <http://www.soundsnap.com/>
 - Royalty-free music: <http://incompetech.com/music/>

Script writing & recording tips

Script writing tips:

- always have a script - write to your own voice - makes it sound more natural.

- don't use heavy academic language- your audio essay should be interesting and informative to people, the audience shouldn't have to work hard to understand. Think of it as a conversation.

- use short sentences in the active tense (this is how we actually speak in real life).

- assume your listener knows very little or nothing at all about your 'abstraction', explain things that aren't common knowledge, even if it seems a bit tedious.

- decide "who" you are as a narrator: are you an observer? Are you a participant in the unfolding drama?

- listen to your own script, once you've recorded it; it's likely that you'll want to rewrite some portions of it, now that you can hear which parts seem a bit clunky or unsmooth. This is a great way to work on editing your own writing!

- write to your tape: keep careful track of all of the recordings that you are making. Once you transcribe your tape, you'll begin to identify short segments that you will definitely want to include in your audio essay. Write your script *around* these bits of tape, providing context or commentary or simply setting it up.

Transcription options

- it can be extremely useful to transcribe your own tape: as you listen to it, you'll tune into moments that are unexpectedly great or that hold real potential for your story. But here are some options if you're interested in finding help for transcribing your tape: *Pop Up Archive*; *VoiceBase*

Interviewing tips:

- set up your interview using good professional habits. Lay out your expectations ("we'll talk about this, or that"), describe what the project is ("I'm producing an audio essay for my Philosophy of Science course"), and be very clear ("Just to confirm, we are meeting at *this* time, and I will not take up more than half an hour of your time").

- make sure there is as little noise as possible!!! Working in areas that are heavily ventilated, have a radio playing in the background, fridges that make noise, etc. Sometimes you can edit out the noise, but it just makes it so much harder to piece together. Audio can be so simple to edit if you have strong sound quality!

- always, always record around 1.5 minutes of sound from the space where you're interviewing. You'll use this later as a "soundbed" in your audio essay: if you need to edit out bits from your interview, you can use this soundbed tape to fill in the space. This is invaluable tape to have! Make sure you already remember to get it.

- also, if there are specific sounds in the location where you're recording, record them too! This might be great to incorporate as a sound effect in your audio essay. Also, have everyone in your group say their names into the mic, and listen back. You can test the quality of the recording in that space, that way.

Audio Essay Ingredients

1. Episode title & image
2. A drama of abstraction!
3. Sounds that help draw out the drama: --the effects of the abstraction
-- the ways in which the abstraction comes "alive"
-- the disobedience of users or objects of research who demand new or better abstractions
4. References (for in the essay and for in the show notes)

- make sure that one person in your group is on 'line out,' listening to the recording through headphones! This way you can really evaluate the sound quality of your tape, as it's being recorded.

--get your subject to introduce themselves in a full sentence. You may not end up using this tape, but it might end up being really useful.

- if your interviewee is nervous, get them to think of it as just a conversation between two people, because it really is! Ask them anecdotes like, "Think of a story when....." Ask questions like, "How did it feel? How did you react?"

- come with a list of questions to ask- makes you look and sound more prepared, of course if they tell you something and it's interesting you can follow up with an answer!

- it can be really easy to incorporate movement into your tape by asking them, "Can you describe where we are? What does it smell or feel like?" Especially if you're recording a kind of "action" scene, ask your subject to describe the scene.

- it's a great idea to conclude by asking, "Is there anything else you'd like to mention?" Subjects can provide all kinds of surprising, wonderful tape in response to this open-ended question.

- be aware that your voice is recording too. Try not to talk over the person, "um" and "ah", instead you can nod to show that you are really listening (unless that is the style you're going for then completely ignore this!)

- Also note! Don't touch any cords attached to your recording device when it's on because often times it can pick those sounds up. (If you're using a handheld mic, it's a *great* idea to wrap the cord around your wrist twice: this will help you keep it nice and still and silent, minimizing cord noise). -ALSO keep your phone on do not disturb !!! Recorders always manage to catch the dings and vibrate sounds of your phone

Recording your voice:

- stick your pinky and thumb out , pinky should be resting on the mic and your thumb should be at your lips - this is how far away from the mic you should be for the best audio.

-hold your mic a bit to the side in order to avoid "p"-pops

- bring lots of water! Try to avoid dairy products. Apple juice is excellent for improving your voice quality.

- even if you are by yourself it could take multiple takes to get your voice right (this is totally normal!)

- Speak slowly, usually people tend to speak really quickly when the mic is on them, but just take a deep breath and go again.

Keeping Track of Files:

- make a list of all of your recordings. Perhaps rename the files so that they're really easy to find later. Make sure that you have saved *all of your tape and sound effects and music* in one folder: this will be essential for when you are mixing and editing your project (especially if you're collaborating with others).

Framing your story:

- every good audio essay has a structure, and there are endless kinds of structures to use. Consider one of the most popular structures in radio storytelling:

1. the set up: explain to your listener what's at stake and a bit about what's coming
2. the point of no return: the journey has begun, and there's no turning back
3. destabilization: something *happens* that changes how the listener understands everything!
4. climax: the tension is resolved in some way
5. denouement: there's a reflection on the moral of the story

Mixing, Editing & Sound Design:

- Set your scene through sound! Make sure you're using tape from the soundbed of the locations where you've interviewed; search creative commons for sound effects that might dramatize your story scenes.

- Research has shown that it's the *first 18 words* or the *first two minutes* that are key for listeners (they tend to stop listening after that point if they've lost interest). Do your best to use those first two minutes effectively!

--Consider the pace and rhythm of your audio essay. (You might want to remove silences, or add in space, depending on how it is working).

- It might be really fun to explore the impact of voice processing on your tape. This is easy to experiment with in REAPER: add a high pass (at 80hz), and a compressor, and an EQ.

Sound Quality:

- It's really important to "level" out the sound of your audio essay, once you've finished mixing and editing. Here's an excellent program to use, once you've rendered your essay (into an mp3): Auphonic (<https://auphonic.com>). You'll be able to upload your mp3 and have it leveled (it's free for 2 hours every month, so you'll be able to use it for free).

Readings for today:

Stephen Jay Gould, "The Median isn't the Message";
 Ian Hacking, "If you can spray them, then they're real" *Ideas: On the Nature of Science*;
 Ian Blanchfield, "A Note" & "On Propositionizing," *Proxies: Essays Near Knowing*

Audio essay:
Benjamin Walker's Theory of Everything, "The Fairest of them All?"

Abstractions as lively phenomena in the world

Ian Hacking: "**Making up people**; "how science not only observes, but shapes the reality in which we live" (*Ideas*, 76).

Brian Blanchfield: "Susceptibility to error is a hazard inherent to *Proxies*.... I decided on a total suppression of recourse to other authoritative sources. I wrote these essays with the internet off.... I was almost immediately drawn to a second constraint—or, better, invitation: to stay with the subject until it gives onto an area of personal uneasiness, a site of vulnerability, and keep unpacking from there.... *Proxies* changed as I changed. The uniformity of this repeatable experiment, as described, ended up providing **a frame for variation, expansion over time**.... A proxy in one sense is a position: a stand-in, an agent, an avatar, a functionary, and I am acquainted with the office. I have been stepson, house sitter, replacement faculty, liaison, trustee, interim director, secretary, adjunct, sub, temp, warm body.... In sciences I think *proxy* additionally expresses **a kind of concession to imprecision, a failure**. It's the word for a subject you choose to study to produce data that can *approximate* the data you'd get from the actual, desired subject, if it were not prohibitively hard to apprehend. If that's not entirely accurate, it's close" ("A Note," *Proxies*, vii-viii)

Science as a creative activity

- "A new generation of historians and philosophers have made the practice, inventive side [of science] their focus. They've pointed out that science doesn't just think about the world, **it makes the world and then remakes it**" (David Cayley, *Ideas* 72)
- This is why Ian Hacking *talks* to scientists: "most of whom are dying to talk to you—and nervous—and are delighted if somebody understands what they're doing and has questions and wants to know about it. I continue doing that to this day" (73).

Benjamin Walker's *Theory of Everything*: "The Fairest of them all"

- "The Glass Room" in Soho, Dec 2016, an art project by Berlin-based Tactical Technology Collective & Mozilla: an "investigation & intervention into our online lives"
 - "Some of the products and exhibits were real and some were made up. And it wasn't that easy to tell the difference." Some of the "ingenius" or fake products have even been tested in the actual marketplace. They were exhibited as things that "help," not things that "spy on us." And there were artistic *interventions*.
 - [From a New York Times review of the exhibit] "One piece, "Unfitbit," by Surya Mattu & Tega Brain, finds ways to trick the FitBit device into thinking you're active when you're not—this was dreamed up after the artists realized health insurers could use FitBit data to determine how much to insure you for, and that employers who give their employees FitBits can see when their workers are at their desks, and for how long."

- The exhibit included real apps available on the market:
 - “Sickweather, in which people who have colds or feel unwell can mark their locations to warn others walking by. There’s a tracker people can attach to their aging parents’ medication bottles to make sure they’re taking their pills each day. And there’s a section on the very controversial predictive policing, where visitors can play with algorithms that police departments all over the country use to proactively determine where crimes might take place.”
 - “Invisible,” by Heather Dewey-Hagborg. [From the artist’s site] “Invisible is a tactical kit for protection against new forms of biological surveillance.”
- Benjamen’s examples of products: Smell-dating; you wear a t-shirt for 3 days and then rate the sample of others’ sweaty t-shirts; you then go on dates based on mutual smell judgements. Algorithms & DNA: facial portrait. Social metric-badge that registers social interactions: a social graph of the company.
- Examples of artistic interventions: a reconstruction of Mark Zuckerberg’s house; blocks that represent Apple’s unpaid taxes; a small-scale model of a data analytics company (including beer pong & the game “Risk”) that now advises Trump on data & surveillance; the alphabet empire (all companies Google invested in or acquired)
- In another glass room, the Google pop-up store: Henrik was unironically curious about the new google phone. “We were ushered into a dark room” to look at the shiny gadget. “Visiting the Google Room after the Glass Room was both extremely illuminating and disorienting. Do we really need black mirrors in order to see the dark side of filling our homes with devices that listen to our every word and track our every gesture? Do we really need black mirrors to see that our data is being used to build powerful surveillance and advertising—based systems of control? And if we do, how do we compete? That’s the question I struggle with.”

What kind of an abstraction is a “statistic”?

- In the 19th century, “Western Europe was suddenly inundated by what [Ian Hacking] calls an ‘avalanche of printed numbers’” (*Ideas*, 75). David Cayley explains, “in the years around 1650, the word [probable] took on the meaning familiar to us today: the degree of belief warranted by evidence or the way in which chance events fall into predictable patterns.... This was a radical break, a move from the world in which the standard demanded of knowledge was absolute certainty **into a world where mere likelihood was the best that could be expected**” (74).
- Ian Hacking: “People start realizing that there are a large number of regularities in social phenomena and gradually come to think of things that happen in the world in a probabilistic way.... They thought, gawd, here we have something which is totally aleatory, something that is totally random, yet which is covered by laws.... Chance is something utterly undetermined, and yet **it’s subject to very general laws of a social or physical character**. That really made people feel and experience the world in which they lived in a totally different way, and today it’s institutionalized in every aspect of our lives” (75).
- “Making up people: “how science not only observes, but also shapes the reality in which we live” (76).

What is an abstraction?

- According to Stephen Jay Gould, what is an abstraction? And what is the mistake that *forgets* or *refutes* this definition?
 - “The literature couldn’t have been more brutally clear: mesothelioma is incurable, with a median mortality of only eight months after discovery.”
 - “The problem may be briefly stated. What does ‘median mortality of eight months’ signify in our vernacular?”

- We often “view statistical measures of central tendency wrongly, indeed opposite to the appropriate interpretation in our actual world of variation, shadings and continua. In short, we view means and medians as the hard ‘realities,’ and the variation that permits their calculation as a set of transient and imperfect measurements of this hidden essence.”
- “But all evolutionary biologists know that variation itself is nature’s only irreducible essence. Variation is the hard reality, not a set of imperfect measures for a central tendency. **Means and medians are the abstractions.**”
- “I know that variation itself is the reality. I had to place myself amidst the variation.”

How do abstractions “make up people”?

Is “abstracting” synonymous with “propositionizing”? “It’s structural: **the opposite of apposition in speech, I think:** a proposition says *something about something*” (Blanchfield 20). (His boyfriend asks whether he actually means “proposition”).

“On Propositionizing” describes how some make sense of Helen Keller’s purported epiphany [but let’s remember the epistemic constraints that underlie this essay in *Proxies: Essays near Knowing!*]

“An imputed relation was hers to make. had been an animal, became a human being. Had been an organism whose responses to stimuli could be observed; became an autocratic, creative, complex person **capable of abstract thought**, capable, in language, of propositionizing. The key component of language acquisition” (19).

“She [Helen Keller] says that the knowledge attained that day was discovery, but felt more like remembering, recapturing something that had been in oblivion before.... What do we mean when we say she ‘**comes into her own?**’ How is it we each understand exactly what that means?” (21)

“This may be what explains the relatively rapid major increase in brain size and neural demand in early hominids two million years ago.... This is what Aristotle mistrusted in poets, makers; we cannot leave things alone. We say what we like. There is a given world and then most of us graduate into a second given, **an abstract realm where all of the entities of the given world are players that we can bring into transactive arrangements** in sentences, by their names. Standing to reason is only one position. That was a proposition” (21).

Blanchfield’s own pedagogical choices, like Roland Barthes (the pleasure of choosing a word because of its readiness to be “‘put into play’ with others”) or Thomas Traherne (“‘The thought of the world whereby it is experienced is better than the world’”): “I suppose I am setting the stage for poetry to happen. Laying the propitious conditions for others **to come into their own as though it were a return**” (22).

And his own epiphany of propositionizing: Brian reads a new draft of a poem by John and, in that exact moment, falls in love. He remembers that moment and asks: “Was that propositionizing? It was like remembering what I needed to live, admitting what I wanted: to share the joy of remaking the world. Had been a reader; became an addressee. Coming into myself, what could I do? It was already happening. I was learning everything mine already to know” (22).

Readings for today:

“On Abstraction,” *Proxies*, Brian Blanchfield;
 “Is There a Women’s Science?” *Power and Invention*, Isabelle Stengers;
 “Making the Monogamous Human,” *Undoing Monogamy*, Angela Willey

Audio essay:
 “Science’s Blind Spots [sic],” *Transistor*

Proxies, Experiments & the Powers of Abstraction

“Even to say ‘abstraction,’ to behold it as a quality, involves an essentializing act of abstraction: the nomination of a categorical type to which *an abstraction* belongs.... Like places or people, anything that can be isolated in its nominal state **can thereby be made a player**”—Brian Blanchfield, “On Abstraction” *Proxies*, 81.

“Is a god substantially different from its summons?... Calling what’s there by the name of **what obtains there**”—Brian Blanchfield, “On Abstraction,” 83, 85.

“One of the things that interested me most over the course of my fieldwork was the tension surrounding **what the research was really about**”—Angela Willey, “Making the Monogamous Human,” 53.

Today’s Questions (with recap from last week)

1. What is the proxy? What is the proxy seeking to measure or otherwise make sense of?

“But all evolutionary biologists know that variation itself is nature’s only irreducible essence. Variation is the hard reality, not a set of imperfect measures for a central tendency. **Means and medians are the abstractions**”—Stephen Jay Gould, “The Median isn’t the Message”.

Scientific proxy is “the basis of animal modeling for translational research. **Proxy here is the substitution of one behavior or problem for another in a scientific model.** Research on genetic links to behavior is based on **the substitution of other behaviours** as models for ones that are difficult or impossible to measure. Translational research is considered directly relevant to humans, as opposed to ‘basic research,’ which may have long-term potential to become clinically relevant but has no direct or immediate implications for human health”—Angela Willey, “Making the Monogamous Human,” 58.

“In sciences I think *proxy* additionally expresses a kind of concession to imprecision, a failure. It’s the word for a subject you choose to study to produce data that can *approximate* the data you’d get from the actual, desired subject, if it were not prohibitively hard to apprehend. If that’s not entirely accurate, it’s close”—Brian Blanchfield, “A Note,” *Proxies*, vii-viii)

“What are reported are statistical results that highlight group averages and ignore individual variability. This is one of the very powerful ways variation gets written out of science and ‘normal’ becomes naturalized”—Willey, 65.

2. How, exactly, is the proxy created by scientists? What is the experimental model, and what are its most significant design features? In Isabelle Stengers’ words, what are the “social practices” of the scientists?

Stengers admires the scientist Barbara McClintock because McClintock distrusts the kinds of models “on the basis of which one tries to explain *everything* while hanging on to what one thinks one knows” (124). But there are other ways to design and deploy models!

The *most common* scientific approach solicits objects of research that are **forced to speak**. (in this approach, scientists write up publications that state “we have made this hypothesis, to test it we have devised this experiment, which produced these results, QED” [128]).

In this prevailing approach to science, the researchers are ideally interchangeable: they “create an object accessible to ‘intersubjective’ knowledge” (129). (It doesn’t matter, the particular variation of a scientist’s own desires, interests or designs).

And therefore, these experiments are designed in order to interest “anyone,” “to compel recognition because they are ‘worthwhile’ for every colleague and for every sponsor. They constitute **a genuine currency within the scientific community**, whose circulation is essential to everyone, enabling the evaluation and organization into a hierarchy of those who pose the problems” (129).

In contrast, there’s another way of approaching scientific practice: this way **learns from the objects of research “which questions to ask it”** (127), rather than “forcing” the object to speak (128). The only way to practice science in this way is to become *interested* and immersed in one’s object of research: to learn *with* something, instead of making use of it (130).

McClintock is an example of this second approach: she used practices that addressed “**a reality that is intrinsically endowed with meaning**, that needs to be fathomed rather than reduced to the status of a particular illustration of a general truth” (127).

This is how Stengers describes this kind of approach: “you do not allow things to be isolated, you do not allow judgements to be constructed from them that enable generalization, extrapolation, the oblivion of the thing for the comprehensible rule that can be used by anyone. In brief, you block the circulation” (129). This is “science in the singular” (30).

3. What are the key findings of this experiment according to *public* uptake? How generalizing are these findings in the context of public conversation? What specific variations are at risk of being ignored all together?

4. Is there an opening for “the world” to kick back? Can the material speak?

“Two great theses have split epistemology since Hume and Kant. Does the ideal of rational knowledge designate a knowledge completely stripped of judgment, **the collection of ‘pure facts’** on the basis of which empirical regularities can be located and valid, logical generalizations constructed? Or rather, must it be recognized that **there are no ‘scientific facts’** without ‘man’ who poses the questions, who always already interprets; that the facts, the moment they are distinguished, are therefore always already ‘impregnated by theory’? **Neutral facts or actively constructed facts.** Man of science: tabula rasa or judge, as Kant said, forcing the witness to reply to the questions he asks them.

“A third term escapes this never-ending alternative.... ‘If only we were content **to let the material speak!**’.... [This would mean] the possibility that it is not man but the material that ‘asks the questions,’ that has a story to tell, which one has to learn how to unravel” (Stengers 126).

Case study no. 1: Emily Martin & the science of sex

- Valiant sperm and eggs in need of rescue; fertilization as a romantic courtship; in a textbook, a chapter on female monogamy is titled “Be My Baby”; the chapter on male monogamy is titled “Be My Territory” (Willey 70).
- “The language of pregnancy was so startlingly gendered and stereotypical and often denigrated of women’s bodies and reproductive policies.” How could textbooks get the “agency” of eggs and sperm so wrong? Is there evidence that sperm “drill in”? why doesn’t the egg play a role? What is the force of the forward-thrust of the sperm? (often depicted as a torpedo) The scientific answer is: embarrassingly slow. (Sperm try to get away from the egg

and keep swimming...). The egg ultimately engulfs the sperm and transports its head to the egg's nucleus.

Case study no. 2: Helen Fisher, Lucy Brown & the science of love

"The Science of Love," TRBQ *The Really Big Questions* podcast (listen to 6.29 minutes) Lucy Brown, neurologist: "The brain behaves differently if you look at your sweetheart's face.... We were built to experience magic.... Our hypothesis was; romantic love is a developed form of a mammalian drive to pursue preferred mates." <http://trbq.org/trbq-podcast-1-the-science-of-love/>

Case study no. 3: Prairie Voles & the science of mating

"With the ongoing development of molecular, genetic and genomic tools for this species, prairie voles will likely maintain their current trajectory becoming **an unprecedented model organism** for basic and translational research focusing on the biology of the social brain." (Lisa McGraw & Larry Young, "The Prairie Vole: an emerging model organism for understanding the social brain," *Trends in Neuroscience* 33 2010).

(3 minute interview) ["Learning about Love from Prairie Vole Bonding," NPR Radio Feb 9, 2014](#)

"The pile of cotton and hamster bedding rises and falls steadily, as though the two prairie voles snuggled beneath are breathing in unison. In the wild, these "potato chips of the prairie" would be lucky to enjoy a few months of a partner's company: Their snackable size makes them popular with weasels, hawks and snakes. But here in the breeding cages at Atlanta's Yerkes National Primate Research Center, the voles can expect **two or three years of blissful cohabitation**, cranking out litters at the rate of one a month. 'Life is good,' says Larry Young, a researcher who has been studying voles for nearly two decades. 'They've got a mate. Nesting materials. No parasites. All the rabbit food they could want.'" (Abigail Tucker, *Smithsonian Magazine*, February 2014)

▪ Proxies as players?

- "Sexuality": mating, via 18 hours together in a cage. "'Without sex, the link to human biology becomes difficult to understand'" (cited 68). Mating is a proxy for bonding. (Sometimes the voles need to be resexed; their external genitalia is indistinguishable and sometimes the sex-segregated voles have pups).
- "Monogamy" (social monogamy/ sexual monogamy)
"Monogamy is the proxy for mental health based on the lab's interpretation of coupling as fundamental to healthy humanness" (58). Family models, created by scientists, presumed sexuality exclusivity between couples until DNA testing demonstrated that "the offspring these parents were feeding and protecting were often not genetically related to their fathers and that these fathers had genetic offspring elsewhere. Thus **sexual and social monogamy** became necessarily biologically distinct categories" (47).

But "extrapair copulations are increasingly **assimilated** within scientific definitions of monogamy" (49). Monogamy, as a proxy, includes *both* pair bonding and extrapair copulation or sexual infidelity (50).

- "Asociality": the lab is using social monogamy as a model for studying "disorders" like autism. "**The failure to pair bond** is the

behavioral proxy for the lab's adoption of definitions of autism as social deficit" (58).

- "gene": genetic biomarkers are understood "as more or less causally linked to behaviours, in ways that matter despite in-group variation" (57). The prairie vole's genome was sequenced in 2012 because it is "perhaps the preeminent animal model for elucidating the genetic and neurobiological mechanisms governing complex behavior in vertebrates" (cited 59). "The lab uses **this monogamy gene** as a model for the study of the social brain, because it appears to demonstrate a concrete connection between bonding behavior and neurochemical reward.... The ability to alter the neurochemical process that affects monogamous behavior and to make promiscuous voles monogamous is the basis for treatment of autism and other 'asocial' behaviours (56-7).
 - "love": the release of hormones, every time a vole or human sees the partner with whom they've bonded (57)
 - "human": voles are used as animal models "as proxies for human difference" (60). "the behavior of the animal serves as a proxy for the human behavior in question" (61).
 - "health": "In this model, monogamy in voles is compared to social health in humans and promiscuity in voles to autism in humans" (57).
- Experimental designs & scientific practice?
 - "the animals who are held and, most often, bred in captivity are physically manipulated (eg. by gene manipulation, drug injections, cutting out parts of their brains, breeding, rearing in isolation) in a way that causes them to exhibit a set of symptoms or behaviours that are associated with a human disease or disorder.... Scientists then figure out **how to standardize** that effect and further manipulate the subjects **to try to alter** the behavior or 'treat' the 'symptom.' This is how translational research works" (61). An analogue for pathologized behavior is altered—as a potential for treatment for "asocial" human behavior. For eg: administering oxytocin injections increases partner preference in some voles.
 - Animals perform "tests" that can be quantified, like *the partner preference test*. 18 hours in a cage (with presumption of mating!); partner & stranger are tethered in a cage, as male moves without a tether: "If the male spends more than 1/3rd of the time with the 'familiar' female, **then the animal is said to show a partner preference and thus to be 'monogamous'**" (63). "The experiment is about counting, plain and simple. Whom does the free vole spend more time with—the tethered vole on the right or on the left?" (64). Note that data on extreme outliers or "noise" is disposed of.

- The voles are fitted with zip ties as collars, or a plastic shunt is inserted through the top of the skull into the brain “so that the drug that may or may not encourage bonding can easily be administered” (65).
- Popular uptake?
 - “since sexual fidelity is not part of the laboratory’s definition of monogamy but remains part of the popular definition, announcements about the monogamy gene have led to misunderstandings that a genetic basis for sexual fidelity have been found” (51).
 - Autism is recouped “from a history as a disorder of affect that situates its subjects as incapable of love, by making an idealized autistic subject a figure of bonding *potential*” (55).
- Does the material speak or kick back?
 - “The voles were “systematic, determined and creative,” fantastically cooperative in their interactions (66-7).

Nature & the authority of “science”

“policing what counts as science has become increasingly problematic” (Angela Willey, 74).

“‘Abstraction’ is **the creation** of a concrete being, an intertwining of references, **capable of silencing the rivals** of the person who conceives it.... [S]cientific texts have to be read as strategic works, addressed to potential or already identified adversaries, foreseeing and diverting their attacks, and not as the transparent depiction of an ‘objective’ approach.... [After all], **in most cases, a ‘fact’ is not in and of itself so talkative**” (Isabelle Stengers, 158, 160, 165).

“Experimental creation has to gain the recognition that it is nothing but a **legitimate purification** [or proxy!] that gives a natural phenomenon the power of **testifying** in favour of the experimenter” (Stengers, 164).

Recap from last week: beyond the “philosophical” debate

Modern science: presumes that “reason is on their side, that the proposed interpretation must be recognized as rational because it responds to the criteria of a healthy scientific method” (Stengers 156).

Empiricism versus Rationalism.... with a Third Way (“science in the singular”)

“Does the ideal of rational knowledge designate a knowledge completely stripped of judgment, **the collection of ‘pure facts’** on the basis of which empirical regularities can be located and valid, logical generalizations constructed? Or rather, must it be recognized that **there are no ‘scientific facts’** without ‘man’ who poses the questions, who always already interprets; that the facts, the moment they are distinguished, are therefore always already ‘impregnated by theory’? **Neutral facts or actively constructed facts.** Man of science: tabula rasa or judge, as Kant said, forcing the witness to reply to the questions he asks them.” (Stengers 126)

Empiricism: watch 4-minute video ([Sherlock Holmes](#))

“The truth that Galileo announces needs to do more than simply impose itself on another truth that it would refute. It must first and foremost impose itself against the idea that all general knowledge is essentially a fiction, and that **it is not up to the power of human reason** to discover the reason for things” (Stengers 155).

Rationalism: watch 2-minute video ([shared dreaming](#))

“A third term escapes this never-ending alternative.... ‘If only we were content **to let the material speak!**’.... [This would mean] the possibility that it is not man but the material that ‘asks the questions,’ that has a story to tell, which one has to learn how to unravel” (Stengers 126). The world **becomes a reliable witness**, a guarantor for the one who speaks in its name (161).

Each scientist needs to convince other scientists that, while “he” is “author” of “his” work, “they cannot turn this title of author into an argument against him, that they cannot localize the flaw

Readings for today:

“Who is the Author?” *Power and Invention*,
Isabelle Stengers;
“Making our Poly Nature,” *Undoing
Monogamy*, Angela Willey

background reading:

Michel Foucault, *History of Sexuality* vol. 1

that would allow them to affirm that the one who claims 'to have made nature speak' has in fact spoken in its place" (160).

"The sciences do not depend on the possibility of representing; they invent possibilities of representing, of constituting a fiction as a legitimate representation of a phenomenon. **Scientific 'representation' has here a meaning nearer to that which representation has in politics** than in a theory of knowledge" (158). The experimenter invents the means by which things speak in their name --- and gains the power of authoritative science when the thing seems "to speak for itself" (165). "However, in most cases, a 'fact' is not in and of itself so talkative" (165).

Scientific practices

How do scientists do this? "by foreseeing the rival fictions and inventing the apparatus.... by the production, always local, selective, and limited, **of ways of discriminating between fictions**" (159). The scientist therefore bears a burden: "*He must invent the means of conquering the skepticism that is always a priori the 'normal response'; he must invent the means of having his fiction recognized as not just one fiction among others*" (157). The question to know is: "**what has been abstracted, what singularizes this fiction**" (157).

Each scientist takes up this task, "involving mainly costly methods, mobilizing laboratories, particle accelerators, observatories, studies, collections, expeditions—**to invent ways according to which this 'reality' will be recognized as having the power to intervene among human authors**, to 'make a difference' between their arguments" (163).

And other scientists, then, will be *either* independent rivals or disciples who are "subjected to the unanimity of an idea" (161). If it's the latter, then an author's fiction has succeeded in being taken as authoritative (in other words, the fiction becomes a proposition that's recognized as "scientific").

Scientific rivalries

During controversies, *methodological* discourses seek **to ground** a proposed fiction against its rivals. "Methodological discourse identifies in what way the rival fictions are recognizable by their errors, prejudices and naivete, in short, why they are only fictions" (159). After the controversy is over, methodology will tell us **why it was rational and normal** that the winning proposition was victorious. The *winner* will be seen as "scientific," and the rival interpretations mere "fictions." "Methodological discourse is the account **of a type of victory** that has the singularity of wishing to silence the event that constitutes the victory, the fact that a fiction has found the means of making the difference against rival fictions" (159).

"However, it is not a matter of 'ridding oneself of,' or of 'purifying oneself from,' but of integrating within one's own approach the perspective of the polemic that will decide the 'scientific' character of the proposition" (160).

Why not turn to science for emancipatory approaches to sexuality?

"If the scientific naturalization of monogamy is heir to a history that produced sexuality as the truth of the self, so too is the naturalizing rhetoric surrounding polyamory" (Willey 73).

Willey's central project: "I want to challenge the epistemic status accorded the natural and, more specifically, recourse to a nature imagined as something categorically distinct from culture—either its determinative origin or the object of its betrayal" (76).

"the rebiologization of sexuality always has implications for how we understand difference more generally and specific 'differences' in particular" (79).

Minoritizing approach to "polyamory" as scientific: this approach follows the model of liberal pluralism, advocating the individual rights of the polyamorous. (This approach assumes that *polyamory* and *monogamy* are analogous). There's often a metaphoric discourse of home and pair bonding, one "that presumes both the subject's autonomy and a chaotic 'outside' that threatens its stability and well-being" (80). "That is to say, while the unit's size may grow, **the intimate bonds of a presumptively sexual 'home'** remain the privileged site for understanding human relating and biology, thus naturalizing the inside/outside, domestic/public, affective/nonaffective dualisms that have tended to structure understandings of human evolution" (82).

When polyamory is rendered scientific, it's often with reference to its *likeness* to monogamy. And in such scientific research, the definition of polyamory remains contested: "partners multipoint bonds may or may not lead them to identify as polygamous or identify their relationship as a polyamorous one" (81).

Willey's conclusion: "The minoritizing naturalization of polyamory, recentering love as the basis of social belonging, is ill equipped to intervene in the violence of a monogamy-centric culture that hinges on forsaking all others" (83).

Universalising approach to "polyamory" as scientific: this approach challenges the law and pervasiveness of monogamy; it calls out monogamy as an *imposition* on our true nature (This approach assumes that *polyamory* and *monogamy* are opposites).

"Claims about **the naturalness of nonmonogamy** in terms of drives or, more generally, as an inherently and universally desirable way of relating, being, or living reinforce the notion of sexuality as natural, inevitable and vitally important.... To suppress or deny desire is to be untrue to one's self" (85).

And it evokes "a racial economy that was foundational to turn-of-the-century sexology and is alive and well in contemporary science and culture"—such as the "National Geographic aesthetic" (86), where the implication "is that the intruded-on 'culture' was waiting in a state of nature, sexually freer and innately simpler than our own" (90) and where there are close ties between "aboriginal cultures existing today," "early humans" and "bonobos" (91).

Essential backdrop here: Michel Foucault, *History of Sexuality* vol. 1 "We must *not* think that by saying yes to sex, one says no to power; on the contrary, one tracks along the course laid out by **the general deployment of sexuality** (157). Power/knowledge convinces us that sex is something to say: to say exhaustively, and to say compellingly (155-6; 32). We talk more about sex than anything else because we never run out of more truths to confess or more truths to pursue (33). Sex is medicalized, pathologized, and managed. Power penetrates and controls everyday pleasures, permeating discourses "in order to reach the most tenuous and individual modes of behavior" (11): what we eat, how we exercise, how we see ourselves.

Readings for today:

“Reading the Human Brain: How the Mind became Legible,” Nikolas Rose;

“Universal Design and the Problem of ‘Post-Disability’ Ideology,” Aimi Hamraie;

“Clinically Significant Disturbance: On Theorists who Theorize Theory of Mind,” Melanie Yergeau

Audio for today:

“Antidepressants,” *Science Versus*

Finding the Dramas of Abstraction

“There is power in abstraction.”

—Melanie Yergeau

1. **Abstractions:** formulas, statistics, diagnoses, concepts, words, definitions, theories, even material design features

Examples from our reading & listening:

“Malintent” or “deception” or “intentions” or simply “thoughts”: “this materialization of the readable, knowable, transparent mind” (Rose 140)

Depression

Serotonin

Health

Theory of Mind (ToM): “‘A theory of mind remains one of the quintessential abilities that makes us human...’” ‘mindreaders’: ie. those individuals “whom we know to be human precisely because they possess a ToM” (Yergeau)

Ableism: “‘the ideology of ability’ that dictates that “life without disability is preferable to life with disability” (Hamraie 288). According to this ideology, eliminating disability is understood as common sense, authorizing “compulsory able-bodiedness.”

Architectural features

2. **Scientific practices:** proxies; inventions, fictions, the creation of abstractions, design principles, created by experts who deploy specific practices and invoke specific principles of scientificity.

When medicine is the abstraction:

“Drug companies don’t need to release all of their data. Or disclose details about side effects,” *Science Versus*.

When a symptom (or set of symptoms) is the abstraction:

The Hamilton Rating Scale for Depression

When architectural features are the abstraction:

Non-universal design requires biocertification and other formal diagnoses in order to address barriers and accommodations. “When architects and designers claim to eliminate disability through better design, their presumption is that a life with disability is begging for correction” (Hamraie 301). “Curative” design principles: to help people become “normal by design” (Hamraie 290), become productive workers and citizens through rehabilitative features.

In universal design practices, architects draw in interdisciplinary insights from engineers, product designers, builders, manufacturers and disabled people to approach accessibility for all users. “If Universal Design is ‘thoughtful design,’ disability access becomes characteristic of *bad design*—thoughtless compliance with checklist-style standards. Design that thoughtfully values

or preserves disability becomes unthinkable in this logic, while eliminating functional or apparent disabilities becomes a priority" (Hamraie 301).

When "readable thoughts" are the abstraction:

Programs like FAST (The Future Attribute Screening Programme) that assess physiological indicators (measures of heart rates or steadiness of the gaze)

Detecting "the living brain in action" by correlating brain activation with changes in blood oxygenation in the brain (Rose 146): creating a proxy measure of function (ie. changes in blood oxygenation) and *localizing* mental functions in the brain through fMRI imaging (147). "It became widely accepted that here, at last, was a technique to render the activities of the working mind visible in the living brain" (148).

When a theory is the abstraction (like 'Theory of Mind' or ToM):

"an autistic person cannot experience systemic violence *unless a non-autistic person validates those claims....* ToM is defined by a negative; it relies on a fallacious, circular construction. We know that autistic peoples lack a ToM because non-autistic people have a ToM.... Put directly: Would we have a theory of theory of mind *without autism?*" (Yergeau).

3. **The world kicks back:** non-conforming users; what Isabelle Stengers calls "science in the singular"; feedback loops that make new scientific insights and practices possible; material and conceptual consequences of an abstraction that provide the conditions of possibility for new or changed abstractions; controversies between scientists that prompt rethinking of abstractions

When the kick-back is from activists and non-conforming users:

"When disabled people created culture and community, they challenged the association of disability with tragedy, pain, and decreased quality of life" (Hamraie 291). And on this basis, they redefined "good design" as "accessibility and social inclusion for all disabled people, regardless of their productivity or conformity to dominant standards of citizenship" (292).

When the kick-back is from autistic writers:

"During my second week as a new faculty member, I was involuntarily committed to the psych ward at the university hospital. I would say that I make this statement against my better judgement, but such a sentiment presupposes that I *have* better judgement. (Which, according to my ex-doctors, I don't)" (Yergeau).

When the kick-back is from neuroscientists:

"I want to suggest that this new capacity to 'read' mental events in the tissues of the brain may have consequences for our very understanding of who we are as humans—that is to say, it is, potentially, **an event in historical ontology**.... And if we are witnessing the glimmering of a mutation in ontology, it will undoubtedly have implications for our philosophies and for our ethics, for the ways we are governed by others and for the ways we understand and govern ourselves" (Rose 143).

When the kick-back arises from scientific controversy:

How can researchers draw the exact opposite conclusions from the same data? What magic are they using to get their results? "There's lots of *prescriptions*... and then there's *science*. Do the drugs work better than a placebo?" ("Anti-depressants," *Science Versus*)

It starts with measuring "how sick" someone is. Researchers have yet to found an objective test for depression. They therefore have to rank their patients on a scale, after treatment, using "abstractions" like *the Hamilton* scale. (Patients respond to questions like: "do you think that life is not worth living?" "do you have heavy feelings in your abdomen?" "have you lost your

appetite?") Researchers measure the different effects of placebos and the drugs, but they employ differing statistical methods.

Statistical significance: measures whether the results of your clinical trials were not simply random chance. Peter Kramer, Dr. Prozac: "People looked like blue-period Picassos, and they were treated by psychotherapy. You give these medicines, and people start feeling powerfully better in weeks. To debunk this is just 'bad science.'"

Clinical significance: tries to make sense of the meaning of patient experience, and whether patients *feel* better. Irving Kirsch, Dr. Placebo: "a core feature of depression is a sense of hopelessness. One of the things they're hopeless about is ever getting better. There's a new kind of drug coming out—it's being tested in a new clinical trial—and maybe it will work. This installs a new kind of hope." People got better when they were taking the drug *and* when they were taking the placebo; there was a very small difference between these results... meaning that the treatment is barely better than the placebo.

Watch in class Rebecca Saxe, "[How we Read Each Other's Minds](#)" (16 minutes)

List every "abstraction" that you can identify: _____

1. Note *which* different experimental techniques are used by scientists to create abstractions:

2. Are there any "world kicking back" possibilities that you can imagine or point to? (We might think here of our assigned readings by Rose, Yergeau and Hamraie)

"And at each moment, as I tried and tried to prove my sanity and humanity and rhetoricity, I found myself deeper within **a narrative of neurological determinism**.... Regardless of what I said, it was my autism saying it. My body became site for ventriloquist rhetoric, words that never were. While conversing with the EMTs, desperate to appear sociable and 'normal,' I found myself narrating every anxious action with, 'That was a pre-programmed response. That was a pre-programmed response'. . . In many respects, to be autistic is to be conditioned—conditioned into believing that your words are idiosyncratic, self-focused, ephemeral. There exist entire anthologies dedicated to this idea.... I am the ultimate unreliable narrator." (Yergeau)

Readings for today:

Brian Blanchfield, "On Tumbleweed," *Proxies* (37-41);

Blanchfield, "On Frottage," *Proxies* (109-119);

Eunjung Kim, "How much sex is healthy? The pleasures of Asexuality" (2010)

Audio essay:

Sexuality & "Health"

Mapping Desire, Sex & other Abstractions

Brian Blanchfield: Sex is "repeatable, singular" (111)

"How little the rest of the world knew!: ever the cry of the lover" (111).

1. Sex & the Medical Model

- One of the questions that we're exploring in our course is: *how exactly do scientific practices give rise to abstractions?* (What are the specific methods that enable scientific researchers to produce new abstractions? What experiments do they propose? What measurements do they employ?) We pose this question about scientific practices because we want to be able to think critically about the power, as well as the limitations, of abstractions. After all, when an abstraction is presented as *scientific* and *factual* (based on sound and valid scientific methods), this abstraction often yields tremendous influence on how we live and how we understand ourselves and others.

One set of scientific practices has to do with what Eunjung Kim calls "**the medical model.**" The medical model *turns individual bodies* into "medical facts." Such facts are abstractions. For example, Kim writes, medical facts include what is a "'normal' frequency and level of desire" (158).

Medical facts are never neutral: if there is a lack of desire, for example, this lack is understood as a problem in need of medicalized treatment. Indeed, Kim points out, the medical model is based upon "the premise that sexual desire is universally and constantly present in adult life and that its absence reflects pathology or causes harm" (159). And medical facts suggest that there is a baseline of natural or normal behaviour—a baseline that lets scientists discern who is, in fact, not normal.

Small Group discussion:

Choose one "medical fact" that you encountered in one of the readings or audio essays. See if you can test Eunjung Kim's argument that **individual bodies turn into "medical facts" through medical science**: is there an example that helps us understand *how* someone became "a fact"? Think about the implications of this transformation into a fact: what was the impact of this "fact" on this person's self-understanding?

Facts in the context of medicine tend to be "good" or "bad," "healthy" or "unhealthy." (And when we find ourselves diagnosed as "bad" or "unhealthy," of course the implication is that we are in need of treatment in order to overcome this pathology).

And so here's another question to consider for this discussion: **What medical treatment does the "fact" lead to?** What do we learn about the specific kinds of scientific practices that produce "abstractions" from your example?

2. Sexuality as Abstraction

- Eunjung Kim's argument flags the limitations of abstractions for us, immediately: after all, each of us is a complex individual, *not* a "fact." Kim dramatizes this point by looking at sex and sexuality. Along these lines, sex is actually "composed of unpredictable and diverse practices,

emotions and reasons" (160). Similarly, in his essay "On Frottage," Brian Blanchfield sums up sex as "**repeatable, singular**" (111).

Kim and Blanchfield share a sense that sex is an aspect of human life that *both* lends itself to abstractions *and also* undermines any attempt to delimit it through abstractions. (If something is *singular* as well as repeatable, it will be different every time it is repeated!).

This is why Blanchfield writes: "How little the rest of the world knew!: ever the cry of the lover" (111). This is a helpful sentiment for flagging the limitations of abstractions: after all, abstractions tend to generalize from the repetition of experiences. (This is what makes abstractions so useful for science, mathematics, philosophy and other knowledge-activities). Notice that Blanchfield is situating this "cry of the lover" in the subjective, first-person experiences of sex. Next to the singularity of one's own, first-person experience, "how little the rest of the world knows," cries the lover.

As another example, Kim looks at asexuality as a way to think through the limits of abstractions: "Labelling all kinds of asexuality as ill-health **obscures the diverse and ordinary aspects** of asexual experience" (159). Kim points out that people who experience themselves as "asexual" do *not* actually share the same experiences: "Many narratives of individuals demonstrate that asexuality escapes monolithic definition, simple behavior patterns, bodily characteristics, and identities, despite some researchers' efforts to draw a clear boundary for the 'condition'" (158).

Our thinkers for today's lesson, in other words, share a commitment to the *kickback* of individual stories and subjective experiences. Eunjung Kim's essay concludes: "By refusing to think about sexuality as a matter of health, I have argued that asexuality brings new ways of experiencing and understanding pleasure" (167). This is why Kim is interested in those who understand asexuality as a *difference*, rather than as a problem.

Small Group Discussion:

For this discussion, let's think about how lived experience holds a possibility of "kicking back" to scientific experts, medical knowledge, or even social norms. Here is Kim's key question: "**Can one be asexual and claim asexuality as a positive identity** within a society that understands asexuality not only as a sign of contempt but also as a naturalized trait for some people?" (161).

Kim finds a positive answer to this question in the movie *Snow Cake*, set in Wawa, Ontario in 2005. Watch this [short trailer for the movie](#). **Do you find examples** of "kick back" depicted here? **Do you share the hope** that Blanchfield and Kim both express—namely, that first-person stories about lived experience hold real power for resisting or even transforming abstractions about health or sex?

3. Audio Smut

- This week, we listened to the short piece, *Lovemaps*, from the podcast "Audio Smut," by Kaitlin Prest. This piece *Lovemaps* investigates some of the abstractions that we create in our daily lives: abstractions like "maps" of what we like, our romantic tendencies, habits and patterns. The audio essay demonstrates *how* abstractions can play significant roles in our everyday lives.
- One of the interviewees surveys her lived experience and concludes, "26% of the people I've kissed have turned into boyfriends." She begins to interview some of her past boyfriends in order to map out her own patterns and tendencies. And Brian Blanchfield does something similar in his essay "On Tumbleweed," as he surveys his past relationships and diagnoses his own tendencies. Blanchfield concludes, "I had thought then that commitment was what I needed to try; but, it was and has always been *honesty* about my own emotions that I owed to him, and others before him" (41).

Small Group Discussion:

The narrator of *Lovemaps* says: “We at *Audio Smut* want to know what your love map would be like if you **didn't really fit** into social norms.” Of course, some maps do fit squarely within social norms. **Choose an example** from among the characters in Brian Blanchfield's essays, the audio essay *Lovemaps* or Eunjung Kim's essays, and explain how this character or individual creates an abstraction about sex, sexuality or some other aspect of lived experience. Describe the example, and explain whether this abstraction fits within social norms... or whether it challenges social norms in some dramatic way.

4. Sexuality and “Health”

- In his essay “On Frottage,” Brian Blanchfield relates a tale about his own sexual development in the context of New York City in the 1980s and early 90s. This is a context in which health and sexuality collide in horrifying ways, as the AIDS crisis is affecting the entire gay community. This is why Brian writes: “I never had a sex life without having a status. The two were inextricable” (114). On Brian's account, his very connection to lovers and to his broader community is tied to the phenomenon of AIDS: being haunted by the deaths of others, living under the fear of diagnosis, having no older mentors who are untouched by AIDS.

Here's an [8-minute scene](#) from the HBO production of *Angels in America*. The scene takes place in the early years of the AIDS epidemic in New York City, the same context that Brian Blanchfield is describing in his essay. In this scene, Al Pacino plays an infamous right-wing lawyer Roy Cohn, and his doctor is attempting to diagnose him, based on a set of symptoms that line up exactly with AIDS. But—and here's the key point—Roy Cohn *understands* the power of abstractions. And he refuses to accept this diagnosis.

Small Group Discussion:

Think about the tension between Cohn's character and the doctor. *On what basis* does Roy Cohn object to being diagnosed with AIDS? He refuses to speak the language of the medical model. Can you discern what *other* language he is speaking? Put differently, what competing abstraction does Roy Cohn offer to his doctor?

We might have quite *different* interpretations of what's taking place in this scene. See if you can make a decision, yourself, about the battle between competing abstractions that is taking place between Roy Cohn and his doctor. Are you more sympathetic to one of these characters than the other? Why?

“Science”, social science and the import of resistance

Lesson 6: “Science”

Assigned readings:

Vinciane Despret, “The Body We Care For: Figures of Anthro-zoo-genesis,” *Body & Society* 10(2-3) 2004: 111-134;

Bruno Latour, “Foreword: Stenger’s Shibboleth,” *Power & Invention*

Assigned viewing:

Experimenter: The Story of Stanley Milgram (2015)

How to distinguish good science from bad? Three suggestions: look to the world, rather than the word; find an “ontological touchstone” (asking questions like whether science takes into account “the arrow of time”); allow one’s words to be modified by the world – Bruno Latour (ix, x, xvii)

“You could say we are puppets. But I believe that we are puppets with perception, with awareness. Sometimes we can see the strings. And perhaps our awareness is the first step in our liberation”—Stanley Milgram, *Experimenter* film

“How can we give reality its due?” – Vinciane Despret (119)

1. Rethinking the nature of “science” via three philosophical claims

- 1. Agency is distributed: Scientific practice enables things to become, and beliefs can be defined **by “what they make”**, articulated within sites “full of active entities that articulate differently” (Despret 122). And therefore agency can be distributed across all of the participants in an experiment (and it becomes hard to decide, too quickly, what is “cause” and what is “effect”) (125).
 - In contrast to “science” (or the conventional understanding of science) which presumes that scientists study **pre-existing reality**. On this view, science doesn’t *alter* the world or actually solicit new identities or relations or qualities. As Latour sums up this view: “first, a world outside untouched by human hands and impervious to human history; second, a mind isolated inside its own mind striving to gain an access to an absolute certainty about the laws of the world outside; third, a political world down there, clearly distinct from the world outside and from the mind inside...; and fourth, a sort of position ‘up there’ that serves as a warrant for the clear separation of the three spheres above, a view from nowhere [occupied by God or by the physicist-God]” (xii).
 - In contrast to “science,” which states that influence is an eternal source of error (Despret 121), a menace that needs to be eradicated (117).
- 2. Everyone’s interest matters: In fact, interest is essential for productive scientific inquiry. On this account, then, a scientist can be seen as a “care-taker,” designing experiments in which the research subjects can articulate themselves. Scientists need to run as much risk as their subjects (Latour xv).
 - In contrast to “science,” which studies automatons, not agents, and which presumes that an animal is *always* an automaton (showing how it obeys laws). In this view, the scientist is a judge or master (rather than a care-taker) (Despret 124).
- 3. Resistance is essential: resistance can be witnessed in the articulate expressions of research subjects. Sometimes animals resist their scientists, and this is incredibly productive for scientific

inquiry. **Resistance means to behave differently than expected**, to show the researcher that his/her question isn't all that interesting to you, to express your own point of view. This is crucial for science because it enables new questions, new ways of collecting data, new competence and new ways of carrying out scientific practice (Despret 130). "**Learning how to address the creatures being studied** is not the *result* of scientific theoretical understanding, it **is the condition of this understanding**" (131). "One should be ready to demonstrate...that the **questions raised by one's experiment are at risk of being redefined** by the phenomena mobilized by the laboratory or by the theory" (Latour xvi).

- In contrast to "science," which states that it's permissible (even necessary) to create docile objects of research. (Docility is the total absence of resistance). The rhesus monkeys, rendered utterly "docile" by Harlow's research into the absence of mother love, were incapable of resistance. "How can a rhesus monkey resist Harlow's experiment? By showing despair? Of course not, that is exactly what is expected of it. By becoming happy? I would not bet on it" (Despret 124).
- In contrast to the authority we grant to "science" in which "humans are incredibly complacent, behaving too easily as if they had been mastered by the scientist's aims and goals" (Latour xv).

2. The case study of Hans the Horse

- There was a scientific predicament in 1904: was Hans the horse a genius? Or was this scientific research based on a fraud? There needed to be a solution to the enigma of Hans's ability to answer questions correctly by tapping his right foot on the floor! But how to find evidence for a solution?
 - "If the questioner does not know the answer, the horse cannot find it.... The body is involved: Hans can read human bodies... Unintentional minimal movements (so minimal that they had not been perceived until now) are performed by each of the humans for whom Hans had successfully answered the questions.... And no one among them knew that they were doing so, no one among them noticed that **their bodies were talking to the horse**, telling him to begin and when to stop. Each of them, except the horse, was ignorant of this astonishing phenomenon: their bodies were talking and moving against their will, outside the frame of their consciousness" (Despret 113).
 - "the horse has taught the humans, without their knowledge, the right gestures to (involuntarily) perform" (115). "Hans taught them the gestures he needed." The researchers "had to learn to which cues Hans was sensitive, without knowing that they were learning" (116).
 - The horse could not count, "**but he could do something more interesting**: not only could he read bodies, but he could make human bodies be moved and be affected.... Hans, in other words, could become a device that enabled humans to learn more about their bodies and their affects. . . . **Trust and interest** [were essential] because the ones who succeeded with Hans did so as long as they were confident of success: 'when they did not anticipate success, they failed.'... Hans wouldn't have done so well if he had not been interested in the game.... [H]e attempted to align his action with what was expected of him" (113-114; 116).

- “Who influences and who is influenced, in this story, are questions that can no longer receive a clear answer. **Both, human and horse, are cause and effect** of each other’s movements” (115).

Questions: why are *trust* and *interest* so essential here? Why do all participants, including Hans himself, need to be *interested* in the experiment? What do we learn about distributed agency in this story about a famous research project? What do we miss about *science* when we neglect the very role played by Hans in these experiments?

3. The case study of Rosenthal’s students

- In 1966, Rosenthal designed an experiment in which he *told* his students that they would receive inbred “good” or “bad” rats. To an enormous degree, the students concluded that their good rats behaved wonderfully and their bad rats behaved poorly. Of course, as a psychology experiment, Rosenthal was actually studying his own students; he’d deceived them about the nature of the rats (in Despret’s words, they were naïve rats, neither good nor bad).
 - “The students tested the rats, and confirmed the effects of selection: the bright ones produced good performances in learning while the dull ones performed rather poorly” (Despret 117).
 - “how did the students obtain results that confirmed their expectations, or, in Rosenthal’s words, how did all these differences end up producing biased results?” (118).
 - “The students had to fill in a questionnaire, after the test, and they had to characterize their relation with their rats, and how they felt about the experiment. The experimenters who worked with bright rats **judged their rats to be more likable and more pleasant** than did the experimenters running dull rats” (118).
 - “we may ask what would happen to a student whose results contradicted what he was supposed to find” according to what their professor, Rosenthal, had explained to them.... Students did everything possible, everything they could, to make what Rosenthal said be true, **because it mattered for them that it was...** Rosenthal is a famous professor, he is an authority” (118-119).
 - Even after the experiment, the students “continued to believe in their rat.... How could they simultaneously trust their rats *and* their professor if science is defined as a process of revealing pre-existing reality instead of creating a becoming? How could they give faith to both?” (121). [This is a real predicament for these students]
 - “It is because the students could (in the best cases, of course) trust their rats, because **they had faith in what the rats were able to perform**, and in turn, because they **could trust that the rats were going to enable them** to be good experimenters, that the experience worked....We may also consider that it is because the students had faith in Rosenthal’s propositions that they could fulfill his expectations, and take these expectations as their own” (121).
 - One student comments on the joy of working with their “dull” rat who wasn’t actually all that dull: “this may have kept our spirits up because of the interest... in our rat” (123). The rat was available for some of the expectations, but it resisted others rather nicely (ie. it was one of the best of the dull rats).

Questions: Why did the students seem to confirm precisely what Rosenthal had hypothesized? Why did they “produce” results that confirmed the biases that they initially held? What do we learn from these students about how significant “interest” and engagement is to scientific inquiry? Do you share Despret’s intuition that the students—while seemingly confirming Rosenthal’s initial hypothesis—actually demonstrated something that really undercut his assumptions about “bias”? Especially if we take their sensitivity to Rosenthal’s own authority in this experiment, what do we learn about the role of influence in science?

4. The case study of Rosenthal’ rats

- Most of the rats behave precisely as expected by their students: their behavior as good or dull rats corresponded to the labels that Rosenthal assigned to them. Of course, these labels were contrived, by Rosenthal, as a way to expose the biases that the students would bring to their experiments. Nonetheless, the good rats behaved very well. And there was one dissident rat who was supposed to be dull but performed quite beautifully.
 - The rats “became” intelligent when their handlers asked them to. They became competent in response to the expectations of their student-researchers. The rats were “available” to the experiment (Despret 122).
 - “If Rosenthal authorized his students to become fine experimenters, able to bring into existence intelligent rats, shouldn’t we then acknowledge the same role for the rat? Does it, in fulfilling the expectations of his student-experimenter, **authorize the latter to become a competent experimenter** able to create an intelligent rat?” (120). Shouldn’t we **redistribute** the influence more fairly between rats, students and professor? Isn’t the rat also authorizing the student? We can give an active role to the rat. “It allows us to give words back to the rat!” (120).
 - Despite Rosenthal’s own assumptions, even he seems to notice that the rats are influencing events. He asks: “Should we, then, regard the experimenter’s behavior toward his subject as antecedents or as consequents of the subject’s performance? Perhaps it makes most sense to regard experimenters’ behavior as both” (cited 120). In this way, he gives a chance to the rat (but then changes his mind about their potential for agency).
 - “Students who succeeded in trusting their rats into bright rats won their trust; **as much as these bright rats were winning the students’ trust**” (121).
 - “The students... put their trust in their rats, emotional trust, trust that is conveyed in gestures, in students’ bodies, in all these rats’ bodies that were manipulated, caressed, handled, fed and encouraged; the students succeeded in attuning their rats to their beliefs...**these beliefs brought into existence** new identities for the students and for the rats” (122).
 - “Of course, the students ‘expect’ something from their rats; but each of these rats may always resist what is said about him/her; what is expected from him/her. To fulfill expectations, to be available to others’ belief or concern is **not to obey** these expectations or beliefs” (123).

Questions: what do we learn about the potential of rats themselves to have agency, to manifest interest in research, and even to *enable* scientific knowledge to be produced? Why was it key to the research itself for the rats to be interested and be able to express their interest and trust

in their students? Do you think it's possible for scientists to design experiments in ways that acknowledge and solicit the input of all participants, including the animals themselves?

5. The case study of Rosenthal himself

- Rosenthal created this study in order to confirm his own assumptions about bias and influence. But experiment demonstrated a very different relationship between “bias” and “effect” than the one that he'd presumed he would verify through this study. At one point, he even admits his own recognition of this fact, but then he denies it in favour of his own original hypothesis.
 - “Rosenthal, in fact, had only one aim (which he had at first hidden from his students): he explains later that he had sought to find in the experiment **the little things that produce differences**—the little things that ‘affect the subjects to respond differently than they would if the experimenter had been **literally an automaton**’” (117).
 - “What does the idea of an automaton mean for Rosenthal? . . . it is the one who will not be affected, and therefore who will not affect, his object of study: an indifferent autonomous experimenter collecting indifferent data” (118). Rosenthal's original idea was to “**mark [influence] off** as parasitic supplements that seriously contaminate the purity of the experiment” (118).
 - “Rosenthal split reality and distinguished between what was real and what was the effect of influence, interest, affects: over there, that is Reality per se, the collection of data by enthusiastic (and ‘automated’) scientists; here, this is subjectivity, construction, expectations, illusions” (119). He wants us to choose between “scientific truth and interest” (127).
 - “What does Rosenthal do with his authority?... he not only allows, but he also *authorizes*” (120).
 - “Rosenthal would not have set the whole thing up **if he had not trusted the capacity of the students** to fulfill his expectations, that is, their capacity to make rats exist differently” (122).

Questions: How is Rosenthal an excellent example of the conventional understanding of science? Why did he want to study his objects of research as if they were “automatons”? Why is any good scientist, on this view, also acting as an automaton? How did his experiment seek to identify the difference between reality and influence? Do you have a sense of why this research goal was so important to him? Once we think about the agency of the various participants, do you agree that the study actually dramatized decidedly *different* truths about how scientific knowledge emerges through experiments like this one?

6. The case study of Stanley Milgram

Stanley Milgram “puts to the test the wild hypothesis of **an innate obedience to authority** among American students. What could be more scientific than this most famous experiment in psychology? Has Milgram not all the controls required? Has it not included all the blind tests?” (Latour xvi)

- In the film *Experimenter*, we hear Milgram describe his own research: “I decided to make the lab coat grey; white would be too medical.... The only real shock was the one you received early on. What we’re really interested in is having to inflict pain on someone you don’t know. **The real experiment was on you. It’s about obeying orders.** The man in the other room works with us, he’s part of the team. We weren’t trying to fool you, we were just interested in studying your reactions.... We wanted to get true reactions from people, you see.... “

- “That’s really what’s behind the obedience experiments, the inkling I was chasing, the thing that troubled me. How do civilized people participate in destructive, inhuman acts? How was genocide implemented so systematically, so efficiently? and how do perpetrators of these murders live with themselves? ... The results are terrifying and depressing. They suggest that the kind of character produced in American society can’t be counted on to insulate its citizens from brutality and inhumane treatment in response to a malevolent authority.”
- Milgram sums up his work: “There certainly is a kind of Kafkaesque quality to the experiments. They taught me something about the plasticity of human nature—not the evil, not the aggressiveness, but a certain kind of malleability. 65 percent of volunteers were obedient. That left 35 percent who recognized a moral breach, took responsibility for their actions, and resisted. But obedience, compliance, was more common.”
- “I like to think of it **as illusion, not deception**; illusion, you know, has a revelatory function, as in a play. Illusion can set the stage for revelation, to reveal certain difficult-to-get-at truths.” In response to this description, Milgram’s student challenges him: “But still, when you go to see a play, you pay for a ticket, you know you’re seeing a play. These people didn’t know it wasn’t real: you tricked them. If you think of it, really, you were delivering shocks to your subjects.”
- According to Bruno Latour, Milgram exemplifies the “science” of social science: “the inability to allow the people one deals with any chance to redefine the situation in their own terms.... If Milgram is taken as the emblematic bad experimenter, not giving the students he is torturing a chance to become torturers... [he] reproduce[s] exactly at the outcome that was expected from the beginning” (xviii).
- “Milgram does not even learn **the only lesson he could draw** from this disastrous experiment: that he is the only torturer in town whose mad power over subjects should be interrogated. Oh, yes, there is a blind test indeed, but the blind is not the one you would think! This lesson can be drawn on an indefinite number of experiments published in excellent journals, all equipped with referees and fact finders” (Latour xvi).

Questions: To what extent does Milgram exemplify the conventional understanding of “science”? What are the key methodological assumptions that Milgram upholds *in the name* of “science”? Be as specific as you can: think about the various practices that creates and deploys, and then draw out the logic or rationale behind those practices. If we think about how “science” itself is at stake, how does Milgram secure the “scientific” nature of his experiments? Does he miss anything crucial, in his commitments to conventional “science”, about the importance of interest, agency or resistance? Why is Latour so scathing in his account of Milgram, do you think?

7. Conclusion

- “To ‘de-passion’ knowledge does not give us a more objective world, it just gives us a world ‘without us’; and therefore, without ‘them’—lines are traced so fast. And as long as this world appears as a world ‘we don’t care for,’ it also becomes an impoverished world, a world of minds without bodies, of bodies without minds, bodies without hearts, expectations, interests, a world of enthusiastic automata observing strange and mute creatures; in other words, **a poorly articulated (and poorly articulating) world**” (131).

- Science is possible because of the passions of interest, invested questions and resistant participants. If we consider the actual *practices* of scientists themselves, the productive and creative aspects of science become more recognizable. Perhaps the world itself becomes more "articulate," more full of expressions that enable many more scientific projects and insights, because of scientific passions.

taking “time” into account

repetition,
learning,
experimentation

Lesson 7 “Time” Assigned readings:

Isabelle Stengers, “Complexity: A Fad?” *Power & Invention: Situating Science*;

Richard Lewontin, “The Price of Metaphor”;

Barbara Duden, “What Genes Say”

Assigned audio:

“Loops” by RadioLab
or “Rachel Yehuda: Cause & Effect” by Story Collider

Isabelle Stengers’ challenge to us: “understanding nature in such a way that there is no absurdity in affirming that it produced us” (44)

Rachel Yehuda’s challenge to researchers: “You can’t do human research if people don’t trust you to be dedicated to the truth, and I knew that I had to earn that trust.”

1. Repetition over time

- RadioLab, Loops episode: <http://www.radiolab.org/story/161744-loops/> (listen to first 7 minutes) What is a ‘loop’? What’s the significance of repetition?
- We learn, in the episode’s following segment, about a biomedical diagnosis called “intermittent amnesia,” in which everyone asks, “Where am I & when am I?” And everyone gets into an absolutely unvarying loop. The researcher concludes, “It almost seems like the patient has no free will.” But is there another logic to loops?

2. “The Learning Gene” audio project

- “Of course, there is no ‘learning gene’, but....
 - ... there is such vested interest that such a mechanism exists.”
 - ... our genes are always learning.”
 - ... professors don’t know that.”
 - ... evolutionary science tells us that development is emergent, open-ended and caught up in ‘learning to learn.’”
 - ... we ‘learn to learn’ in part by resisting & kicking back to the false promises of ‘learning genes.’”
 - **“No one has ever claimed to be capable** of predicting the trajectories of a complex dynamic system (40).... analysis can lead to the conclusion that **we do not know what a being is capable of**” (Stengers 7)
 - Ethnologists, who speak of the temptation to ‘go native,’ have always known this risk of **experiencing the emptiness of the project of ‘reporting’ what has been learned** to those who are, from then on, no longer ‘colleagues.’” (Stengers 173)

- Richard Lewontin: "'The price of metaphor is eternal vigilance' The trouble with most metaphors in biology is that the people using them don't know what to import and what to leave out.... A recipe doesn't make a cake." (278-280). Even if all ingredients and environmental factors are the same, there is still "developmental noise" (281).
- And "development" itself is a metaphor! (282)

3. The Drama of Abstraction

- Abstractions... via specific & embodied scientific practices... and the kickback from "the world"
- What is learning?
 - Is it deterministic, such that we can measure it through "the lawful rules of reversible trajectories" (Stengers 44) that depend upon delineating "cause" and "effect"? Time, in this case, is *reversible*. And repetition is *monotonous*. Simple machines have nothing to learn!
 - or is it dynamic, not reducible to causal principles or mechanisms? Time, in this case, is *irreversible*: the arrow of time breaks the symmetry between before & after (Stengers 29). And repetition is always *open* to differentiation.
 - "the very definition of a measuring device, or the preparation of an experiment, necessitates the distinction between 'before' and 'after,' and it is because we know **the irreversibility of becoming** that we are able to recognize the reversible movement, the simple change, reducible to a reversible equivalence between cause and effect" (Stengers 44).

How hard is it to actually take "time" into account? Watch Video, "Evolution from Bacteria to Humans": <https://www.youtube.com/watch?v=Ew-6WuTo1Is> (10 min)

Take note of the range of abstractions, and any temporal or metaphysical or taxonomical detail that surprises you!

Isabelle Stengers points out, in "Complexity: A Fad?", that it is a real challenge to take "time" into evolutionary account. A persistent account of evolution invokes a "*temporality of a repetitive type*: the living organism repeats the 'species'" (16). Put otherwise: ontogeny recapitulates phylogeny.

But, Stengers continues, what about the sensitivity of *ontogeny* to circumstances and "the possibility of an innovative and eventually interesting response to a modification of the surroundings" (16)? (Richard Lewontin calls this "developmental noise"). In other words, how should we take *learning* into account?

"The behavior of the individual [human, bird or chimpanzee] **does not repeat the species** since each one constitutes a singular construction that integrates genetic constraints and the circumstances of a life" (16).

Can we rethink our lesson's epigraph and understand "nature in such a way that there is no absurdity in affirming that it produced us" (44)

4. "Time" & Scientific Inquiry

- ... there is one necessary (but not sufficient) condition for any experimental relation to nature: namely, **the distinction between past and future** (44). The only thing that is required, for an observer, is an activity orientated in time: "the very definition of a measuring device, or the preparation of an experiment, necessitates the distinction between "before" and "after," and

it is because we know the **irreversibility of becoming** that we are able to recognize the *reversible* movement, the simple change, reducible to a reversible equivalence between cause and effect" (44).

- Listen to another story from RadioLab "Loops":. (57.30 to 1.03) "You see your brain in real time.... There are many parts of the brain that respond to pain, but this one is thought to give pain its emotional valence, its negativity.... You aren't *looking* at your brain, but you see an image of fire. Melanie is watching her own "pain flames," and she is asked to imagine that she's in a soothing bath... or a beautiful beach... but her thoughts keep slipping out of her control.... The flames are rising which makes them rise even more... [she starts thinking about martyrs] and as she added and revised details, the flames went down... and there was zero pain. Wow, I am watching my brain, thinking my thoughts, and I am changing my thoughts by thinking and watching myself do this. So you are looking at yourself, looking at yourself.... I am watching my brain thinking my thoughts, and I am thinking my thoughts and changing my thoughts by watching my thoughts... Could you address your pain better? No. somehow the sensation isn't quite direct enough that you could do it without the visual feedback."

- We are actually a "sheaf of linked temporalities" (16):
 - The species memory—our phylogenetic past
 - The memories of our individual experiences
 - The in-time experimentation with memories, development, formative experiences
 - The feedback loop of such experiments with learning

Genomics & Indigeneity

science, recognition, “race”

“We do science and we use science **within and not despite** our histories and politics”—Kimberly TallBear (526).

But scientific activities are often granted “exclusive jurisdiction over knowledge production” (510).
“Indigeneity recast as genetic becomes a discourse of scarcity and death, rather than what it is an indigenous social movement, **a discourse of survival**” (516).
“It is ‘race’ and ‘population,’ respectively, that matter in the minds of the public and of scientists, not indigenous citizenship” (525).

Lesson 8: “Race” & Genomics
Assigned readings:

Kimberly TallBear, “Genomic Articulations of Indigeneity”;

Zoe Todd, “An Indigenous Feminist’s Take on the Ontological Turn: ‘Ontology’ is Just Another Word for Colonialism.”

Assigned audio:
The Get, “Thoughts, Guts & Feelings”

1. thinking ahead to next week

- Next week, bring with you to class *one* editing question that you are currently wrestling with: music; sound design; script; editing tape; recording; research. Also try to bring an example of sound/tape from a podcast episode you’ve listened to that you’d like to try to replicate or play with in your own project.
- *The Get* “Thoughts, Guts & Feelings”: discussion about Rachel Dolezal (play excerpt from episode in class, from 6.07 to 7.11 : “Could you imagine? ... We thought it was ‘Black Lives Matter’ but I just had a baby, so now I care.” Critical relationality

“Open Letter from Indigenous Women Scholars Regarding Discussions of Andrea Smith”
<https://indiancountrymedianetwork.com/news/opinions/open-letter-from-indigenous-women-scholars-regarding-discussions-of-andrea-smith/> (July 7, 2015) co-signed by Kimberly TallBear

“We write to respond to widespread public discussion of well-known scholar-activist Andrea Smith’s history of contradictory claims to Cherokee identity through both enrollment and lineal descent. ... Presenting herself as generically indigenous, and allowing others to represent her as Cherokee, Andrea Smith allows herself to stand in as the representative of collectivities to which she has demonstrated no accountability, and undermines the integrity and vibrancy of Cherokee cultural and political survival.... Smith’s self-acknowledged false claims and lack of clarity on her own identity perpetuate **deeply ingrained notions of race—black, white, and Indian—that run counter to indigenous modes of kinship, family, and community connection**. When she and others continue to produce her as Cherokee, indigenous, and/or as a woman of color by default, they reinforce a history in which settlers have sought **to appropriate every aspect of indigenous life and absolve themselves of their own complicity** with continued dispossession of both indigenous territory and existence.

2. scientific racism & abstractions of “time”

- Evolutionary time & “race”:
 - demonstrating identity through populations & “lineal biological descent”
 - “the increasing tribal practice of DNA testing across *the entire membership* (as opposed to a case-by-case basis

risks re-racializing Native Americans by promoting the idea that the tribe is a genetic population" (525).

- demonstrating cultural & political "continuity" over time, as if "culture is static" (515).
- "Yet the ideas that we are all one and that we share the same ancient genetic heritage continue to rely on representing living African bodies and living indigenous bodies **as primordial, as a genetic window to the past, as the source of 'all of us.'** But 'us' cannot then include living Africans who stand in for modern humanity's ancestors, nor can it include the vanishing indigene" (520).
- Scientific technologies & "race":
 - Human Genome Diversity Project (HGDP): "Genetically defined, indigenous peoples are seen to be vanishing in an increasingly global world" (510)... scientific articulations, "predicated on the imminent vanishing of indigenous peoples" (513).
 - "Genomic ideas of indigeneity are founded in the expectation of inevitable disappearance. In other words, indigenous characteristics are valuable precisely because indigenous peoples are seen as disappearing" (516)... an "impending loss of biological purity" (517).

3. indigenous articulations of identity & membership

- "In short, indigenous peoples' 'ancestry' is not simply genetic ancestry evidenced in 'populations' but biological, cultural, and political groupings constituted in **dynamic, long-standing relationships** with each other and with **living landscapes** that define their people-specific identities and, more broadly, their indigeneity" (510). They arose "as peoples, as humans in relationships with particular places" (514).
- "This is an important difference between the way that indigenous peoples wield the idea of 'origins' and the way that human genetics does; in the latter case, landscapes are places *through* which humans and their molecules move and *settle*. An environment/ human divide is presumed in the genomic narrative that is absent from the indigenous narrative. Indigenous notions of *peoplehood* as emerging *in relation with* particular lands and waters and their nonhuman actors differ from the concept of a genetic *population*, defined as moving *upon or through* landscapes" (514-15).
- "neither genomics nor indigeneity is simply locked into particular contexts or formations. Both may have 'roots' in particular places, but as they travel, they get translated to do work in new contexts" (511). "Who has the institutional, legal and intellectual authority to determine who or what counts as 'indigenous'? Not every articulation will be accepted as legitimate" (513).

Biopower

science, disability, incarceration

"Vinyl always smells like the absence of sweat....
There's a need to flag the difference between being a thing and looking like a thing.... This reminds me of Foucault, who explains that power finds insidious new forms and goes underground...
'Let's wait to see **what new form this old snake takes**'
[quoting Frederick Douglass]" – Jelani Cobb, *Think Again* podcast

Lesson 9 Disability & Biopower
Assigned readings:

Robert McRuer, "Epilogue: Disability, Inc"

Nirmala Erevelles, "Crippin' Jim Crow: Disability, Dis-Location, and the School-to-Prison Pipeline"

Michel Foucault, "Danger, Crime & Rights: A Conversation with Jonathan Simon"

Assigned Audio:
Think Again podcast, "Jelani Cobb"

"... the multilayered and noninnocent ways in which disability is caught up in **contemporary biopower**.... Neoliberal forms of 'disability' have emerged that obscure the myriad ways in which **other bodies and minds** (also understood or materialized as impaired or disabled) are now caught up in what Michel Foucault famously called the global 'carceral archipelago'" – Robert McRuer, 274.

1. thinking back to last week

- "We do science and we use science within and not despite our histories and politics"—Kimberly TallBear (526).

2. today's theme

- Biopower gives rise to a **normalizing** society: this power effects distributions around the norm, "distributing the living in the domain of value and utility" (Foucault, *History of Sexuality* Vol 1, 144).
- Nirmala Erevelles shares an anecdote, which takes place in a public school, in which a parent accuses a student of lying: "she was—as the act of pathologizing demands—marking the origins, causes, developments, consequences, and manifestations of **deviation from some imagined norm**. This is what Foucault called 'bio-power'—'an explosion of numerous and diverse techniques for achieving the subjugations of bodies and the control of populations'" (84). She argues that "disability serves as an '**outlaw ontology**' used to justify the exclusion of individuals in the postcolonial ghettos of public schooling" (94).
- Incarceration is directly linked to the ongoing legacies of colonialism and neocolonialism (McRuer 273).
- "normalizing" themes that might be at play in our audio projects: health; criminality; particular diagnoses; risk factors; legal status; racializing or gendered or sexed metrics; measurements about ability; measurements about efficacy

disciplinarity: centres on the individual body as a machine: "its disciplining, the optimization of its capabilities, the extortion of its forces, the parallel increase of its **usefulness** and its **docility**, its integration into systems of efficient and economic controls" (Foucault 139). Anatomic technologies: truth, truth experts, & practices

(... how we express our truths through our bodies: how our bodies are positioned in time and in space; how we become self-policing subjects and how we discipline others such that bodies that fall outside the bounds of normal face sanctions)

governmentality: centres on the species body on a population level: "the body imbued with the mechanics of life and serving as the basis of the biological processes: propagation, births and mortality, the level of health, life expectancy and longevity, with all the conditions that can cause these to vary" (139). Biological technologies: truth, truth experts, and practices

(... how we express our truths as part of populations: how we confess our truths to 'experts' like insurance agencies; through a census; to public health officials, to immigration agents, to doctors or other medical professionals, to teachers, parents, religious leaders)

Today: Audio Editing Workshop

- Jessica Abel says this about the task of audio-writing: "taking a bunch of unconnected anecdotes—or ideas—or bits of tape—and forming them into an arc is a very complex and difficult job. Even if you've got a focus sentence all worked out, **how do you get from here to there**" (*Out on the Wire*, 112)? The answer to this question is *structure*: finding structure for the tape; discerning the right order that will link recordings together with ideas. This is also what philosophy entails: drawing out the structure of sound, critical, rigorous and productive lines of thought.
- Which aspect of editing are you most interested in wrestling with philosophically? music; sound design; script; editing tape; recording; research.
- Is there an example of sound/tape from a podcast episode you've listened to that you'd like to try to replicate or play with in your own project?

Testosterone

causation, biology, behaviour

Lesson 10 Assigned readings:

Robert Sapolsky, "Ingenious";
"Testosterone Rules";
"Dude, Where's my Frontal Cortex?"

Assigned Audio:
RadioLab podcast, "The Scratch"

“ Maybe *Toxo* is changing **who we are** in some basic way... one of thousands of parasites inside us, **pulling our strings from the inside...**

maybe 'free will' starts to feel a bit suspect.” (“The Scratch”)

The four overarching themes of our Philosophy of Science course:

1. abstractions

- What are the key abstractions in “The Scratch”? in “Testosterone Rules”? Robert Sapolsky is a neuroscientist and biologist whose early research included years of fieldwork with baboons: he studies behaviour, as well as the biological dynamics of stress, and he has keen interest in the legal ramifications of scientific inquiry.

Let's list all of the abstractions that we encounter in these analyses:

- Watch short BBC video (2.57 minutes) on toxoplasmosis: <https://www.youtube.com/watch?v=XQ4Y27RQaZk>
- And a short (5 minute) video on why we love cats: <https://www.youtube.com/watch?v=rqno7K2zXi4>

2. causality

Example 1: *Toxoplasmosis*

- “*Toxo* doesn't really want to be in me! It wants to be inside the cat. *Toxo* can only reproduce sexually in the gut of cats.... A rat will come along and eat the cat poop.... But rats have a hard-wired aversion to cats.... **Here's where the mind-control comes in:** *Toxo* starts off in the stomach of the rodent, takes about 6 weeks to migrate up to the brain, finds the amygdala [fear/anxiety/terror and sexual arousal] ... what I think is going on is that *Toxo* knows how to make cat urine smell sexy to rodents: *Toxo* makes rodents *like* the smell of cats, so they approach and are more likely to end up in the stomach of the cat. **The rodent is totally normal in all other ways, just hot for cats.**” (“The Scratch”)
- “Is it possible that *Toxo* is what's been drawing *me* to cats?... *Toxo* can really change you.” (“The Scratch”)
 - There are links between *Toxo* and schizophrenia and other psychoses, because of a historical link. Schizophrenia was quite rare until the late 18th-c, but it increased rapidly. This is also when it became very fashionable to have a cat.
 - “*Toxo* may affect something much more common: people who are *Toxo*-affected have two to four times the likelihood of dying in car accidents. Insofar as *Toxo* makes rodents get really imprudent

about cat smells, maybe *Toxo* makes all mammals become more imprudent."

Example 2: Testosterone

- "If and only if the amygdala is already sending an excited volley down the stria terminalis, testosterone increases the rate of such activity by shortening the resting time between bouts. **It's not turning on the pathway**, it's increasing the volume of signaling if it is already turned on. It's not causing aggression, it's exaggerating the preexisting pattern of it, exaggerating the response of environmental triggers of aggression" (Sapolsky, "Testosterone Rules," 30).

3. The power of scientific authority

- Robert Sapolsky points to "physics envy" as a real phenomenon, one that leads many thinkers to over-inflate the authority of certain scientific claims. Envy leads behavioural biologists, for example, "to wish for the techniques of biochemists, biochemists to covet the clarity of the answers revealed by molecular geneticists, all the way down until you get to the physicists who confer only with God" ("Testosterone Rules," 28).
- Physics envy, he says, is a kind of reductionism, in which "**it would be so nice if there were a single gene** (or hormone or neurotransmitter or part of the brain) responsible for everything." But, he continues, "Violence is much more complex than a single hormone, and it is supremely rare that any of our behaviours can be reduced to genetic destiny" (31).

4. The possibility of kickback

- Can we think of examples of "kickback" to so-called physics envy, reductionism or other naïve approaches to scientific practice or expertise?

Philosophy of Science: The Drama of Abstractions

Take-Home Final Exam

This exam consists of four essay questions. There are 4 lists of questions, and you'll choose 1 question from each list (writing 4 answers in all).

I. Abstractions as Lively Phenomena in the World

We began our course by studying a twofold definition of abstraction, as elaborated by Stephen Jay Gould and Ian Hacking. According to this definition, abstractions are *made up* (they are proxies, statistics, maps or other abstractions created by scientists in order to measure variable and complex phenomena) but they also *make up* the world (they become crucial proxies for ourselves, our social relations or other key aspects of our experiences and our world). This is why we are describing abstractions in our course as *lively phenomena in the world*: we need to remember that there is a gap between a statistic and the variability that that statistic seeks to measure, but we also want to attend to the work that that statistic does in the world.

Choose one of the following questions about the lively dynamics of abstractions:

1. Isabelle Stengers explains that, after all, "in most cases a 'fact' is not in and of itself so talkative" ("Who is the Author?" 165). A "fact" is only talkative, she explains, *by way of* the experiments, proxies and other abstractions that scientists devise—experiments that give natural phenomena the capacity to testify (164). Scientific practices, in other words, are practices that help the world become a reliable witness (161). And it matters where we place our hope for reliable witnessing because, in the words of Bruno Latour, the witness serves as an "ontological touchstone" ("Foreword," x) for scientific inquiry. What's crucial here is that an ontological touchstone has the capacity to kick back: this is what makes it a touchstone. (It's not *reducible* to the scientist's own imagination). What is an example of an "ontological touchstone" that you learned about in this course? How does this "touchstone" bear witness to something important about the world? What particular scientific practices are necessary in order to capture the testimony of this touchstone, and how hopeful are you that this touchstone can actually give rise to "talkative facts"?

2. Brian Blanchfield, the poet who wrote one of our key texts *Proxies: Essays Near Knowing*, suggests that it is not an easy task to delineate *abstractions* from the *phenomena* that abstractions seek to make sense of. "Even to say 'abstraction,'" he writes, "to behold it as a quality, involves an essentializing act of abstraction" (*Proxies* 81). Similarly, Angela Willey explains that her fieldwork in the science labs of monogamy researchers often led her to question "what the research was 'really about'" (*Undoing Monogamy* 53). This question is a question because it is not always transparent *which phenomena* are being represented by abstractions. What is an example of a non-transparent abstraction that you learned about in this course? And what is the danger of mistaking this abstraction for what it purports to measure? Thinking especially of the ideological effects of this abstraction, explain the scientific, political or moral stakes of actually clarifying what this research is "really" about. (You might consider the writings of Kimberly TallBear or Melanie Yergeau for this question).

II. Causation and the Entanglement of 'Nature'/'Nurture'

One reason that scientists create abstractions is because of the vexing question of causation: abstractions are often created so that scientists can figure *why* or *how* phenomena emerge or operate. And one persistent framing of causation involves the highly problematic binary of nature/nurture. ("*Either nature or nurture*": this remains a proposition about causation within science, social science and public discourse). The thinkers in our course share wide-ranging skepticism about this binary. Angela Willey writes, for example, "I want to challenge the epistemic status accorded to the natural and, more specifically,

recourse to a natural imagined as something categorically distinct from culture—either its determinative origin or the object of its betrayal" (*Undoing Monogamy* 76).

Choose one of the following questions about the entanglement of nature/nurture and the problem of causation.

1. Angela Willey explains that the "normal" becomes "naturalized" when statistics over-represent averages and ignore individual variability (*Undoing Monogamy* 65). In Larry Young's influential research, for example, prairie voles are said to be "monogamous" on the basis of their performances on quantifiable tests, but Willey points out that "announcements about the monogamy gene have led to misunderstandings that a genetic basis for sexual fidelity have been found" (51). Thinking about this experimental work on prairie voles, identify a proxy that you think is especially significant in this scientific study of causation. How exactly does the proxy that you've chosen to analyze enable scientists to seek out a cause for monogamous behaviour? Making use of Willey's skepticisms, what are the misunderstandings about causation that this proxy makes possible?
2. The old dichotomy between nature and nurture, "between intrinsic factors and extrinsic ones, between genes and environment" is a sham, according to Robert Sapolsky: there is only the interaction between these supposedly causative forces ("Testosterone Rules," 30). In a similar vein, Vinciane Despret explains that Rosenthal's students "confirmed" his hypothesis because they placed so much trust in his own presumptions about scientific inquiry (ie. their good rats behaved well and their poor rats behaved badly because Rosenthal explained that this was the expectation to his students). On this basis, Despret concludes that cause and effect are entwined ("The Body We Care For," 115). Think about an example that you've learned about this semester that demonstrates that the relations between cause and effect, biology and society are *entwined*. Why is it so important, in the case of your example, that we recognize the biosociality of this phenomenon? What's at stake when that old dichotomy of nature-versus-nurture is invoked as a way to explain what's going on in your example?

III. Scientific Authority and Power

Building on the previous question, scientific research often carries tremendous authoritative weight because of its arguments about nature and causation. Choose one of the following questions about "power" and science.

1. Scientists themselves wield power when they "force" their objects to speak (Stengers, "Is There a Women's Science," 128). In turn, scientific evidence itself wields power when it attains "a genuine currency" in the scientific and broader community (Stengers 129). The film, *The Experimenter*, dramatizes both of these forms of power. In the film, Stanley Milgram explains that most of the participants behaved with obedience and compliance because of the convincingly authoritative power of scientific expertise. Along these lines, Bruno Latour argues that "humans are incredibly complacent, behaving too easily as if they had been mastered by the scientist's aims and goals" ("Foreword" xv). What is an example that you have encountered, in our course or in your own research, that demonstrates the power of "scientific expertise"? How are "objects" being forced to speak? What are the symptoms or manifestations of obedience to such expertise? Can you think of a counter example where scientific research undermines such obedience in the name of more open-ended, complex understanding?
2. Kimberly TallBear argues that the authority wielded by genetic science is linked directly to the ongoing genocidal logics of settler colonialism. Through genetic science, indigeneity becomes "a discourse of scarcity and death," she explains, instead of "a discourse of survival" ("Genomic Articulations of Indigeneity," 510); this is a discourse that re-racializes indigeneity rather than undermining pseudoscientific accounts of biology and race. TallBear's analysis resonates closely with Michel Foucault's indictment of the close relations between science and biopower, in which science and social science produce norms that serve as normalizing forces in social life. Identify an example in which science produces norms that perpetuate the colonial or racializing dynamics of biopower. How does this "scientific" norm produce obedience to the normalizing dictates of capitalism? And where could we turn for resistance to these normalizing effects of science?

IV. Science and the Kickback of Creative work

Our exam questions come together in our audio projects, in which we are identifying abstractions, assessing the scientific practices that give rise to these abstractions, and pointing to potential or actual kickback to these abstractions from the objects of inquiry or from the world itself.

Choose one of the following accounts of *kickback* and reflect on whether your own engaged and systematic work on your project enabled you to experience the force of kickback. How did the kickback emerge, how did you notice, and what was its significance for your own critical thinking about science?

- Kickback can occur **through science itself**, especially when scientific practice is understood as “science in the singular” (Stengers, “Complexity: A Fad?” 30). Science in the singular occurs when scientists themselves avoid the temptation to overly generalize their results, taking care to notice the local and particular dimensions of what they are studying.
- Kickback can also occur when scientists find ways to “**let the material speak**” (Stengers, “Is There a Women’s Science?” 126), perhaps most significantly in ways that undercut the scientists’ initial presumptions about what they were going to discover through their interactions with the material.
- Kickback can also happen when the objects of research express **resistance, recalcitrance** or other forms of disobedience. For example, Angela Willey describes prairie voles as “systematic, determined and creative,” fantastically cooperative in their interactions (*Undoing Monogamy* 66-67). And Vinciane Despret affirms the important role that the resistance of participants plays in scientific inquiry (“The Body We Care For” 130).
- Kickback is also at play when science is taken up by what Aimi Hamraie calls “**non-conforming users**” (“Universal Design”). This is what we encounter in Melanie Yergeau’s article, in which, as a person diagnosed with autism, Yergeau asks, “Would we have a theory of mind without autism?” (Clinically Significant Disturbance).

“The Drama of Abstractions” audio project checklist

Deadlines:

Audio project: **due April 21**

Take-home exam: **due April 26** (we will go over the exam questions during our last class)

Audio Essay Project overview & requirements:

- Here are the elements that each individual or group should submit:
 1. **Title :** provide a title for your episode
 2. **Audio essay:** if you're in a group, decide who will be responsible for sending the completed Audio Essay to Ada. What's going to work best is if you send it as a rendered mp3 project: you can email the mp3 to Ada. I'd also love it if you can send it to me as a REAPER project: ideally, if you send me the link to your google drive project folder, I'll be able to load the REAPER project (via all the media files that are in your folder).
 3. **Attributions:** every student can decide how you'd like to be represented on the podcast episode page. Be sure to be as specific as you'd like on the checklist below, and of course you can also choose to be anonymous if you'd like. Options include: your name; a hyperlink to your website if any; a photo if you'd like; a short bio. Just to reiterate: this is all entirely optional. Part of this project involves thinking about sharing our voices as part of an open access resource. And so part of the challenge is for you to discern the quality and parameters of your voice, in this context.
 4. **Image:** provide an image for your episode. You can use one of your photographs, or you can search the creative commons for images.
 5. **Student Permissions:** fill out the “learning gene” permissions form and sign it. (You can find the form on Bb)
 6. **Interview Permissions:** if your audio essay includes any interviews, you'll need to submit a signed permission form from each interviewee. (You can scan and email these to Ada if that's easier)
 7. **Transcript:** it's very important, for accessibility reasons, that our audio essays are available in transcript-form, and so each group will need to submit a transcript of their complete episode.
 8. **Show Notes:**
 1. are there citations or references to share?
 2. And did you use sound effects or soundtracks or songs that need to be publicly acknowledged?
 3. In addition, are there any suggested readings or links you'd like to include in the show notes? This is the place where our audio essays truly become “open educational resources”; be sure to think about how you envision others engaging with your work for educational (including unlearning) purposes. *There should be a minimum of two or three*

references for your audio essay's show notes; think about research that you conducted or texts that you read as crucial background reading, and provide citation information.

4. Are there specific thank you attributions that you'd like to include in the show notes (individuals you'd like to recognize publicly)?

9. **Individual Website Reflections (optional):** are there reflections you are willing to share on the podcast's official website about the process of producing your audio essay? This is also a place where our audio essays become vibrant sites of conversation and learning/unlearning! Consider submitting a sentence or two that captures your own perspective on the process itself or on the finished product. Or submitting a sentence or two about how you hope this audio essay might prompt certain conversations, questions or new creative projects. (You can submit something and have it on the website anonymously or with your name on it).