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Trust/Distrust in Multidisciplinary Collaboration: Some Feminist Reflections

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Abstract

In this paper we theorize trust as emerging in different material/infrastructural and epistemic realities as part of our multidisciplinary collaboration about water, called Neighborhood Environments as Socio-Techno-Bio Systems: Water Quality, Public Trust, and Health in Mexico City (NESTSMX). This collaboration, led by feminist anthropologists, brings together anthropology, environmental public health, and environmental engineering researchers to analyze how neighborhoods, as "socio-techno-bio systems," shape how people trust or distrust water. Our project follows the infrastructures and social structures that move water in and out of neighborhoods, households, and bodies making them trust it more or less. At the same time, our multidisciplinary research team inhabits different material and epistemic research environments, which creates tensions about how we make knowledge and what counts as data. Trust and distrust, then, shape how we constitute both our object of inquiry and how we know it.

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A Multidisciplinary Team Reacts to News of a Shadowy Conspiracy

In spring 2018 a team of Mexican and US environmental public health researchers, civil and environmental engineers, and anthropologists stood in the courtyard of a working-class extended family household in Mexico City, politely listening to a speech about the Illuminati. More precisely, they listened as Samuel, one of the adult household members who had collectively built this courtyard and its houses, explained how the Illuminati (a secret society reputed to be controlling governmental affairs around the world) was to blame for his family's poor water.

The researchers were part of Neighborhood Environments as Socio-Techno-Bio Systems: Water Quality, Public Trust, and Health in Mexico City (NESTSMX), an National Science Foundation–funded four-year collaborative multidisciplinary project bringing together anthropology, environmental public health, and environmental engineering researchers from the University of Michigan and Mexico's Instituto Nacional de Salud Pública (National Institute for Public Health, INSP). NESTSMX's analyzes neighborhoods as "socio-techno-bio systems" that shape how people trust or distrust water. The anthropologist and Principal Investigator (PI), Elizabeth (Liz) F.S. Roberts (Author 2), had brought the interdisciplinary team to meet one of her long-term informants, Leona, a woman in her late sixties. Leona was describing the effects of intermittent water supply on her daily life when her husband, Samuel, arrived home and took over the conversation.

The couple lived with their children and grandchildren, thirteen people in total. Households in their neighborhood of Buena Vista, which are made up of similar multigenerational housing compounds, receive water only on weekends. Over the years, occupants constructed, patched, and mended their household water systems to deal with this scarcity. While touring the household's water supply, the US-based researchers noted Leona and Samuel's intimate knowledge of their household's pipes, cisterns, pumps, cracks in the earth, and *tinacos* (rooftop water storage containers). This expertise is rarer in middle-class households, where residents tend to lack tacit skills with tools and building materials. But the non-anthropologists found it strange when Samuel shifted from the seemingly concrete world of pipes and pumps to describing how the Illuminati working inside the government purposefully poison the aquifers to control the population.

This moment illuminated differences between the STEM collaborators and the anthropologists. The engineering and environmental public health researchers

expected to hear how local water supplies are impacted by political corruption and patronage, but not secret societies. If informants believed seemingly absurd conspiracy theories, how could anyone trust their judgment on other matters, like their daily water use? Was a mention of the Illuminati "data"? The non-social scientists did not know what to make of this conversation, or if it would help us understand something as slippery as "trust in water." They needed convincing that Samuel's description of the Illuminati was in fact data about water trust that could be analyzed *reliably*.

This visit took place right at the beginning of our interdisciplinary collaboration, and ten months before the project fieldwork began. The goal of the trip, which included tours of water treatment facilities, labs that would process some of the team's biological and water samples, and a few neighborhoods and working-class households, was to give the US-based STEM researchers a feel for Mexico City. Most had never visited Mexico before, including those who have worked for years as part of a Mexico City–based birth cohort study, Early Life Exposures in Mexico to ENvironmental Toxicants (ELEMENT).[1] For many of the non-anthropologists, it was the first time they had spoken to a "research subject," let alone entered their homes.

Research collaborations between anthropologists and STEM scientists are, of course, not unusual (Hubbard et al., 2019; Sangaramoorthy et al., 2017). However, in looking for examples prior to beginning our research, we found only a limited number of collaborations with engineering or public health that were led by cultural anthropology, rather than the other way around. In this review paper, we describe how, in the first year of our project, this reversal of the usual collaborative relationship shaped how we theorized and practiced trust, both in how we organized the collaboration and collected water data. With an anthropological approach guiding the research design, our engineering and public health colleagues had to trust our assertion that, for instance, the Illuminati were data. We, the team anthropologists (Mary Leighton [Author 1] and Liz), work within a feminist technoscience framework that follows various actors where ever they go, attending to the situatedness of knowledge embedded in unequal power relations (Benjamin, 2016; TallBear, 2014; Webber, 2006). For us, it makes sense that people's situational trust in water requires consideration of both pipes and the Illuminati, and whatever else constructs their experience of water. However, our collaboration forced us to put into practice something we already knew in theory: that what counts as trustworthy data and expertise within one discipline does not necessarily carry over to another (Knorr Cetina, 1999). This has been, at

times, harder than we anticipated.

In regards to trust itself, as anthropologists and feminist technoscience scholars, we do not assume "trust" is something immutable that can be tracked as a presence or absence. Instead, we have structured the project to understand how it is enacted, or not. In theorizing trust this way, we work against a "common sense" understanding of trust that sees it as a problem arising from a lack of knowledge or inappropriate calculation of risk. STS researchers have dismantled this formulation of trust, both in terms of how scientists trust knowledge claims and expertise within their own discipline (e.g., Knorr Cetina, 1999; Shrum et al., 2001; Shapin, 2011) and why non-scientists trust or distrust technoscience and biomedicine (e.g., Jasanoff, 2005; Eubanks, 2009; Benjamin, 2011, 2014). However, this common sense understanding that knowledge=trust dominates current research on trust in water conducted by public health or engineering researchers. Solutions to studies of water mistrust in Mexico and elsewhere almost always conclude with recommendations for better and more targeted public education programs, based on the belief that people will trust more if they have better information (e.g., Pierce & Gonzalez, 2017; Parag & Roberts, 2009; Fragkou & McEvoy, 2016; Espinosa-García et al., 2015). In our first year of NESTSMX, our goal was to establish the basis for a research project that would leave the reasons for (mis)trust in water open, rather than assuming that it is directly related to a lack of knowledge or education.

This open-ended approach to trust was unusual for our collaborators. Somewhat to the frustration of our environmental public health colleagues, we have not developed a questionnaire to measure water trust because we rejected the notion that trust is something that can be captured by a quantifiable form, completed by research subjects, validated against other surveys, and connected to a deliverable intervention as an "output." Instead, we sought to create an interdisciplinary research design that will examine trust as situated and co-constituted process and practice—as something that emerges, shifts, or fades into the background within specific households, neighborhoods, and within our study (Haraway, 1991).

At the same time, and through the situated co-constituted process and practice of collaborating together, we attempt to convince our STEM colleagues that invocations of the Illuminati are data that is as significant, and trustworthy, as pipes and microbes. And yet, our goal in this interdisciplinary collaboration is also to explicitly move beyond standard anthropological or feminist technoscience *critique* of the work of other researchers, and "past a simple opposition between

stories and numbers" (Moats, 2016, p. 596). By agreeing to meet our quantitatively-minded colleagues "half way" (Barad, 2007), we attend to the fact that more knowledge or data does not necessarily lead to more trust between our collaborators and ourselves, on its own. Put simply, we can't expect that a brief immersion in anthropological methods and theory will automatically lead our STEM colleagues to shift their epistemological moorings; nor should it. Working with other disciplines as equal collaborators meant starting from a position that assumes good intent on their part; trusting that their impulse to, for instance, produce knowledge that can be made into a deliverable intervention elsewhere in the world should not be immediately dismissed as "universalizing." And equally, it has meant opening ourselves to the possibility that they may challenge our approaches and assumptions in return.

NESTSMX

NESTSMX works with sixty family households living in Mexico City who are long' term participants in ELEMENT, an ongoing longitudinal birth cohort study that studies developmental effects of chemical exposure (Pantic et al., 2018). Liz has collaborated with ELEMENT since 2013, developing methods that combine environmental public health and anthropological data (Roberts, 2017; Roberts & Sanz, 2017).[2] NESTSMX involves collecting multidisciplinary data from families that we seek to combine with historical biomarker data from the ELEMENT biobank. Working with approximately eight hundred mother-child pairs over twenty-five years, ELEMENT has established a bank of biological samples to answer questions prospectively or retrospectively. New data is collected in response to newly funded questions; new questions emerge about old data. Our collaboration with ELEMENT allows us to collect data about water trust, management, and insecurity, which we can then link to previously collected biomarker data. We ask new questions about water and neighborhoods through biomarker data we are collecting during NESTSMX; this new data, tied into our new questions, will become part of the larger ELEMENT biobank.

Our interest in water trust arose from Liz's previous collaboration with water ecologists at the Laboratorio Nacional de Ciencias de la Sostenibilidad (LANICS), a multidisciplinary lab dedicated to researching sustainability, based in the Ecology Department of the Universidad Nacional Autónoma de México. We learned from LANCIS that municipal tap water in Mexico City tends to meets international safety standards when it reaches households in many (but not all) neighborhoods. Additionally, a majority of Mexico City residents used to drink tap water, but stopped after the 1985 earthquake. The suspicion of tap water prompts

consumption of bottled water or soda instead, which residents consider safer, more reliable, and healthier (Roberts, 2015). However, the consumption of soda and single-use plastic bottles is an ecological and health disaster (Chapa-Martínez et al., 2016; Cantoral et al., 2016; Jiang, 2018; Jiménez-Aguilar et al., 2009; Muñoz-Cadena, 2009; Schwanse, 2011). Additionally, as is the case in many cities around the world, Mexico City has a growing water access and supply crisis. NESTSMX aims is to understand which of these phenomena might be shifted to restore trust in tap water for residential consumption.

Our approach brings together environmental public health, ecology, anthropology, and engineering to study water quality, biological health, and the history of water politics and access. Our engineers and anthropologists are conducting what we call a "water audit" in sixty ELEMENT households spread through fifteen neighborhoods. Audits include three separate visits. We collect ethnographic data on general household organization and water use through the lens of gender, age, and class, access, and trust; biological samples (hair, saliva, urine) to measure health markers like cortisol (stress) levels; and water-sensor data from continuous and periodic samples throughout homes. Once we have a clearer picture of the range of water-system possibilities within neighborhoods and households, we have plan to scale up to a larger sample of ELEMENT households. Through its socio-techno-bio methodology, NESTSMX will develop new tools for the general and specific understanding of neighborhood and household environments that contribute to trust/distrust in water, which can be extrapolated to other settings.

Distrusting Waters in Mexico City

In designing our more open-ended approach to trust within NESTSMX we have drawn from anthropologists, such as Matthew Carey (2017) and Katrine Bendtsen Gotfredsen (2016), whose ethnographic work demonstrates the *positive* qualities of mistrust and suspicion. In Carey's ethnography, *mis*trust of intimate relations and friends is a means to respect their inherent unpredictability, unknowability, and right to change. Gotfredsen (2016), meanwhile, illustrates how conspiracy theories and political mistrust can be reassuring, rather than alarming or destabilizing. Their work has allowed us to frame some our initial fieldwork results that suggest that distrust in water is not necessarily related to a direct mistrust of politicians, or scientific/medical experts, but more strongly related to mistrust of household objects and infrastructures that they have built themselves in response to the intermittency of the water supply that some experience as political and others do not.

For instance, our ethnographic fieldwork allows us to know that *knowability might not lead to greater trust; but rather its opposite*. Samuel, for instance, knew far more about how the water circulated through his household than the average middle-class citizen in Mexico City. But this increased knowledge of neighborhood/household water distribution did not lead to increased trust in the water itself or the system bringing it to his house. By spending extensive time with Leona and Samuel's household, Liz is familiar with Samuel's pervasive mistrust. That Samuel worked in a state office made him even more certain that shadowy forces run the government. Yet he and Leona seem to have a positive experience of mistrust. They were once traveling magicians, living off illusion. More recently, Samuel become involved in a shamanistic group that seeks global transformation by manifesting a simultaneously preconquest world and a high-tech future. For Samuel, world transformation will arrive through (a) more people becoming stronger and more adapted to rampant pollution emanating from government and corporate injustice, and (b) more people coming to realize that we all live within layers of illusion that need to be cast off. His knowledge of government corruption allows him to imagine this transformation. Samuel's sense of the world's shadowy corruption and illusion was not that different from other working-class residents, who have described to Liz how their relatively recent mistrust of tap water was shaped by their sense of how powerful Coca-Cola is in Mexico. Mexico is the largest consumer of Coca-Cola products in the world (Coca-Cola, 2012). One difference between Samuel's mistrust of the government and the prevalent mistrust of Coca-Cola is that Samuel possesses a vision of change towards a different world. Both examples of mistrust, towards a nefarious force, either the Illuminati or Coca-Cola, hold geopolitical processes, water infrastructure, and water together, rather than seeing them as separate spheres. But for Samuel, laying the blame on the Illuminati provides a blueprint for transformation, and the hope for a better world to come—one that includes, among other things, decent water. Within NESTSMX, then, we understand water trust/distrust as enacted through geopolitical, religious, historical, and economic processes that encompass uncertainty and transformation.

We take a similar theoretical approach to water, which allows us to trace both trust and waters as emergent and multiple (e.g., waters *in the* plural, rather than water as singular) (Walsh, 2019, p. 6; Linton, 2010; Hamlin, 2000). Drawing on Mary's background in material culture studies, we theorize water(s) in all their slippery, transformatory "water-ness": as material and physical things, like air,

that are not bounded but flowing and co-mingling (Ingold, 2007; Shove et al., 2014, p. 115); ambiguous and transmutable (Kamash, 2008); simultaneously depth and surface; entities that have "a taken-for-granted materiality (liquidity, or wetness), within one of three physical states that exist in continual interchange (the other two being ice and vapor)" (Steinberg & Peters, 2015, p. 252). We have the luxury of working with two disciplines that are intimately attuned to the physicality and mutability of different kinds of waters. The environmental public health researchers focus on the properties of water entering bodies: how leaded water and sugary soda flow in to bodies and transform/become blood, flesh, and epigenetic methylation tags. The engineers, meanwhile, measure water's taste, smell, and texture as it comes into contact with mouths, hands, noses, and eyes. They break water down into its organic and non-organic components: the percentages of bacteria, lead, or plastic, for instance, that make up water found in different parts of a house.

We have come to understand in detail *what waters are*, as material objects that contains more than hydrogen and oxygen atoms, and *what waters do* when merging with bodies, infrastructure, and social life (e.g., facilitating diabetes, eroding pipes, or causing clothes and bodies to smell less). And in that vein our anthropological observations and discussions with Mexico City families document conditions and circumstances where people experience water as an *object of suspicion*. Water might be there, physically present, but its presence does not necessarily mean it is knowable or has a reliable existence—and from this, that it is trustworthy. For instance, we can say that water in Mexico City is reliably unreliable—that residents can rely on it to be unpredictably available. Women develop habits like regularly getting up at 2 a.m. to fill buckets that enable greater control over tasks like cooking, cleaning, and laundry during the day. There is also reliable mistrust: a mother can always assume that other family members are suspicious of tap water, and so will always buy soda for the household to drink instead.

As anthropologists, we build on what we learn from our colleagues' work on water's physicality to develop our understanding of how water knowledge, reliability, and trust are interconnected. For example, we have found that purchased plastic bottles filled with privately treated water are more trustworthy objects than *tinacos* and cisterns, to the extent that the water inside them becomes trustworthy because it takes on the properties of its container (the plastic bottle versus the suspect cistern). To some extent this happens literally: our environmental public health collaborators study the effects of water merging

with other physical materials, and the impact this has on study participants' health. ELEMENT's on-site principal investigator in Mexico, Martha M. Téllez-Rojo (Mara), has extensively studied how liquids cooked in lead-glazed ceramics become sweeter and more toxic, as the lead and water co-mingle (Hernández-Avila et al., 1996). Deborah Watkins et al. (2016) investigate how chemicals in consumer products are absorbed into pregnant bodies, impacting fetal development and, years later, brain function, metabolism, and puberty. Similarly, our engineering collaborator Krista Rule Wiggington has conducted research on chemicals such as triclosan, which common in household soaps used for washing dishes and bodies. Her research has shown that when triclosan comes into contact with chlorine in piped water, it can potentially cause dangerous by-products, including chlorinated phenoxy-phenols, chlorinated phenols, and trihalomethanes, some of which are carcinogenic (Fiss et al., 2007) Her research involving two experiments in two US cities demonstrated that different chlorine levels in the water, and the temperature of the water, reacted with the triclosan in soaps to produce chloroform levels in excess of US Environmental Protection Agency guidelines (Fiss et al., 2007). As each of these examples shows, water's changeable nature—its ability to absorb, merge, and change its state—makes it potentially dangerous. In asking how people trust water or waters, we are asking how they trust something that is reliably unpredictable, known to be changeable and co-mingleable, quotidian in its absence as well as its presence, both life-giving and potentially harmful (Kamash, 2008; Strang, 2004; Watson, 2017).

Waters in Mexico City

What is today Mexico City was originally Teotihuacán—a city of canals, and islands built on a lake. The "problem" of water in Mexico City dates from the Spanish conquistadors' policy of draining the canals, despite warnings from Dutch engineers they had hired (Nash, 2007). Today, citizens' right to clean water is enshrined in the constitution, and Mexico City has a vast, publicly managed clean water supply (albeit one that does not provide water into every home on a continuous basis). However, although this water meets international standards of cleanliness, public trust in tap water has been deteriorating since the devastating 1985 earthquake. Residents in certain politically organized neighborhoods periodically stage protests, demanding better and more equitable access to clean water (Huberts, 2019). But for the most part, working-class households get by on a combination of some piped water, individually purchased multi-gallon water containers (*garrafones*) produced by corporations or filled by local neighborhood businesses, and water delivered by water trucks (*pipas*) that are either privately hired or supplied by the municipality or political parties.

STS approaches to water have focused on city-level or state-level water infrastructure, exploring the themes of

> the interrelationship between water technologies, water management paradigms and associated processes of knowledge formation, organizational forms (such as the hydro-state), and governance practices. These relations are mediated through specific political projects, whether associated with colonialism, imperialism, land reclamation, or contemporary "development." (Bakker, 2012, p. 618)

In the current literature on water infrastructure, technological objects such as pipes, dams, and sewers are conceptualized as a "living, breathing, leaking assemblage of more-than-human relations" (Anand, 2017, p. 6). These human-nonhuman assemblages are always relational, situated, and co-constituted (Mol, 2002). For instance, in Anand's exploration of Mumbai's water infrastructure—which bears many similarities to Mexico City—citizenship is made through residents' relations with pipes. The design and implementation of water infrastructure has been examined as a way of large-scale water management technologies (dams, for instance, or irrigation systems) as the materialization of geopolitics, particularly in colonial contexts (Sneddon, 2012; Pritchard, 2012).

A question to be asked, however, of each of these studies is what makes the *water itself* situated and specific, as opposed to the technologies, landscapes, and infrastructures that surround and contain it. In the literature, the water that flows through the dams, pipes, and sewers tends to remain a single, coherent object—albeit one that is historically, socially, and technologically shaped by the places and objects it flows through. This singularity reflects what historians of science have considered to be a relatively recent move towards *water* as a single element—H_2O—and away from experiencing a multiplicity of *waters* with various characteristics, a shift that can be traced to nineteenth-century advances in microbiological and sanitation reform (Walsh, 2019; Linton, 2010; Hamlin, 2000).

Some anthropologists of water who work within an STS paradigm have explored the situatedness, and thus non-universalizability, of bodies of waters located within a landscape (lakes, rivers, oceans) (e.g., Strang, 2004; Watson, 2017; Kamash, 2008). Such approaches emphasize the materiality of water, and thus its potential for multiplicity, through attention to landscape (e.g., water in one lake is not the same as water in another lake). Kamash, in particular, focuses on the

"intermingling of ideas concerning water as both a life-giving and a deadly substance, as well as being liminal and transcendent between states and locations of being" (2008, p. 226). In paying attention to the transmutability and "capriciousness" of water, Kamash anticipates Philip Steinberg and Kimberley Peters's (2015) concept of *wet ontologies*: an emphasis on place—in this case, the ocean—but also depth and volume, and the multiple forms water can take (ice, liquid, steam). Wet ontologies imagine water as a "dynamic assemblage," seeing the vast depth of the ocean in terms of mobile, vital, continually moving humans and nonhumans (including molecules) (see also Helmreich, 2009). Elise T. Jaramillo's (2019) concept of *fluid kinship*, meanwhile, focuses on water users and the negotiation of water rights to think through how human relations are shaped and mediated by water and water infrastructure's materiality—in this case, a system of water dams and canals known as *acequias*. Jaramillo's example of how multiple communities in New Mexico negotiate ancient and contemporary rights to water echoes Anand's approach to understanding water infrastructure and citizenship as co-constituting each other. She argues, however, that it is precisely the material reality of water flow through the *acequias* that confounds political conceptualizations of water as an abstract resource (Jaramillo, 2019). *Acequias* particularize water, constrained or enabled within specific landscapes.

Each of these approaches *implicitly* explores the idea that water is mutable and multiple, and can be understood through attention to its place in a specific, physical landscape. Some STS researchers attempt to examine the specificity of water through attention to its materiality (e.g., Barnes, 2013). Karen Bakker (2012), however, suggests that "this is in practice a difficult concept to deploy" (p. 621), and the results have a tendency to take either a technological approach, or to consider it an "object" in a broader, epistemological sense ("object of science") (e.g., Daston, 2000). We propose that part of the problem with the strong tendency to objectify water as singular may be the *scale* of most studies of water in STS to date. Water is examined as an epistemic, political, neocolonical, and technological problem in relation to a river, an ocean, or a dam. With NESTSMX, however, we examine contexts in which multiple different waters are visible at the same time—the household—and thus elucidate something that is more difficult to see at the larger scale. By focusing on the movement of water within households, we aim to document and analyze what *multiple, relational, and situated waters* look like and feel like in the everyday life of specific places—in this case, working-class households in Mexico City. Our hope is that once we understand the multiplicity of waters *situated* within people's homes, we will be able to see (mis)trust in water as more complicated than a simple presence or absence, or

indeed as only a reflection of wider social processes.

Trust/distrust in Multidisciplinary Research

The process of theorizing water trust/distrust among our informants has caused us to reflect on a parallel debate about trust in scientific communities, particularly those that bring together more than one discipline. This question has been addressed by those outside STS who study interdisciplinary collaborations (Gethmann et al., 2015; Wagenknecht, 2016; Kaiser et al., 2016; Callard & Fitzgerald, 2016; Bendix et al., 2017). The consensus in this literature also follows the "common sense" understanding of trust as correlating with information and risk calculations: collaborations involve risk because there is always a lack of knowledge (you can't understood exactly what your colleagues are doing), and therefore they require trust. In our theorization of water trust in Mexico City, we are attempting to understand mis/trust as something changeable, malleable, and contradictory. Can the mis/trust in our multidisciplinary collaboration be understood as equally complex and multifaceted as it is for the residents of the Mexico City households who we study? In the remainder of this article, we will describe how we negotiated and built trust in each other's data during the first year of our collaboration as we planned our initial fieldwork.

Our three disciplines have important points of similarity; as we noticed in one of our early meetings, the names of all three disciplines contain people in them: *civil* engineering, *public* health, *anthro*pology. But even though, we all conduct field work in relation to people, there are significant differences in how we conduct fieldwork and what counts as trustable data. Scientific practice within disciplines is built on a foundation of trust; trust is a matter of recognizing another's judgment, a crucial component of expertise (Knorr Cetina, 1999). Objectivity, and specifically quantification, arose as a solution to the problem posed by the necessity of trusting trained judgment (Porter, 1996; Daston & Galison, 2007). Scientists rely on quantification to communicate to non-scientific stakeholders. But what about communicating with other scientists in other fields? This problem is pertinent for ethnographers, whose data tend not to be quantifiable.

During the NESTSMX team's trip to Mexico City in March 2018, tensions about what counts as data emerged as the anthropologists worked to convey how open-ended ethnographic encounters could provide useful data. Prior to that point, we the anthropologists had extensively explained what ethnography was to the rest

of the team, shared articles that demonstrated what it involved, and given PowerPoint presentations on our prior research.[3] The questions our colleagues asked during these presentations reflected their unfamiliarity with ethnography as a research method, and they continued to express the sense that ethnography is "fuzzy." Going to Mexico City created new concerns (e.g., why are stories about the Illuminati data?). However, experiencing for themselves a shift in their *own* understanding enabled them to appreciate what ethnography could add. Meeting participants and experiencing the place in person—core values of ethnographic work—changed their sense of what ethnography might provide. As a result, they came to trust ethnography more.

Additionally, up until that point, the project engineers Krista Rule Wigginton and Branko Kerkez were worried that we were starting the NESTSMX water audits without a clear hypothesis. The trip changed their sense of the necessity of having a hypothesis in advance of field work. The visit to just a few households allowed them to appreciate how households' water management and water storage capacity are extremely different between households. In other words, the engineers were able to change their sense of the *purpose* of the water audits from hypothesis testing to hypothesis generating. They could then trust the anthropologists' sense that we could begin fieldwork without a hypothesis.

The trip to Mexico had different effects on the environmental public health team. Up until the point of the 2018 trip, most of the US-based ELEMENT researchers had only worked with ELEMENT families through their biological data. They knew people as aggregated numerical values derived from vials of blood, urine, and saliva, and envelopes of fingernail clippings. If individuals are ever analyzed singularly in ELEMENT, they are identified by a score on a numerical scale. For these researchers, therefore, the experience of meeting ELEMENT participants *as people* was novel. Meeting people in their homes, interacting with them, and asking them about their lives revitalized the data ELEMENT had previously captured, and the kinds of questions ELEMENT researchers considered important to ask going forward.

Ana Benito, the ELEMENT field manager in Mexico City at the time, commented on how although the environmental public health teams had collected biological markers of stress in the past, they had not been in the position to say what that stress related to and what its cause might be; nor could they distinguish different kinds of stress. In contrast, asking people direct questions through face-to-face conversations could resulted in significantly "richer" data. Mara, the ELEMENT PI

in Mexico, described how learning more about participants' lives through NESTSMX has been an "amazing" experience that had already changed her sense of the kinds of questions ELEMENT could ask in the future. ELEMENT participants are habitually brought to a clinic for data collection, rather than visited in their own homes. As leading members of ELEMENT's team in Mexico City, Ana and Mara had already worked closely with individual ELEMENT mother-child pairs for over a decade. Despite their significant experience interacting personally with participants, the ethnographic encounter enabled them to understand these interactions in new ways. This change stems in part from the novel experience of seeing research subjects in their own homes, rather than the clinic.

In effect, this trip provided all the researchers with what Donna Haraway (1988) and other feminist STS scholars call "situated knowledge,", where experience shapes how we know the world, including scientists. Not only did the researchers' knowledge increase about how participants' lives are affected by unpredictable water supply, they also developed an appreciation for how "being there" is an important means to know what research questions to ask. Even if ethnographic data is difficult to enumerate at first, there is a value to it. It took being "situated" in homes to appreciate the value of ethnographic data, situated as it is in the complexity of people's lives and the diversity of household water systems (Roberts In Press).

It is important to stress that it took several years of work on Liz's part to get to the point where the public health and engineering researchers would welcome and value ethnographic methods and visit Mexico City with an ethnographer. She had been meeting with, working alongside, and reporting back to ELEMENT researchers since 2013, and it was through this sustained interaction that she convinced them to consider this new collaboration about water. First, ELEMENT had to experience Liz's work as useful. For instance, her ethnographic work suggested that ELEMENT started looking at neighborhood-level data, not only individual-level data to understand health outcomes. To be able to ask new questions about neighborhoods instead of only individuals required substantial, ongoing effort to make environmental public health and ethnography mutually intelligible to each other. In effect, the non-anthropologists in NESTSMX only began to trust ethnography as a method when it had proved itself to be capable of producing useful (i.e., reliable) scientific insights for ELEMENT.

When Liz approached ELEMENT researchers in 2013 to propose a year-long ethnography of six ELEMENT participant families, epidemiologist Mara and

biostatistician Brisa were concerned. Mara and Brisa are now co-PIs of NESTSMX with Liz, but, initially, they worried that such "anecdotal" data might damage the integrity of the larger ELEMENT research project.

> I met Liz six years ago and she said that her method for research was "hanging out." I laughed. So, I asked, How many people do you want to study? Six families. And the method is *hanging out*? Hah! (Mara, August 2018)

> When Liz came and said she wanted to do this study on six families, not only my brain as a statistician was going like, oh wow, the sample size is six? But it was also like, what is this going to open up for ELEMENT? I do not want this…It was actually ELEMENT's PI's broad vision that said, "yeah, this is kind of cool, let's see what happens." At that point, the sample size of six meant that it was a really small risk. This is how I ended up finally saying, "Okay. Six." [*Shrugs.*] But the thing is that we have a lot of trust from the participants, from many years of their participation in ELEMENT, and so I also feel a lot of responsibility. (Brisa, August 2018)

For Brisa, the unreliability of data produced through such small numbers meant less trust on her part, but also less risk if it went wrong. What made ethnography scientifically suspect (its non-statistically adequate sample size) also somewhat mitigated its potential for problems.

Trusting the Ethics of Others

In NESTSMX, we especially began thinking about trust in our collaboration during the process of writing the fieldwork protocols (i.e., the detailed document outlining the research process that would be used by the field team) that would be submitted to the Institutional Review Board (IRB) that oversees research to ensure it complies with ethical standards. The process of discussing the specific details of what we would actually *do* when we were in households, and how we would then *make data* from these interactions, illuminated the different ways in which each discipline evaluates expertise. Specifically, the STEM and STEM-adjacent researchers had difficulty trusting the trained judgment required to manage and make sense of ethnography—that is, knowledge of living people derived from ongoing open-ended interactions.

Environmental public health's model of isolating individual cause-effect factors through statistically robust observational or experimental studies relies on quite different forms of judgment (for instance, about what makes a reliable number)

and different ethical expectations of the researchers' relationship with the research subject. Similarly, engineers deal with numbers and experimentation. Our public health and engineering colleagues found it difficult to imagine deriving "data" from uncontrollable or unpredictable interactions with individuals—such as a man launching into a monologue about the Illuminati when the topic at hand is drainage.

The multidisciplinary debates we engaged in as we discussed the practical details of our research protocol highlighted the different expectations we had about the relationship between a researcher and an object of inquiry, when that object is another human being. In environmental and public health, there tends to be a separation between the researchers who design the research questions and write the protocol, the administrative staff who write the IRB application, and the field staff who interact with participants. In ELEMENT's case, some of the researchers are based in another country from the field staff and the study participants (the US versus Mexico). Socio-cultural anthropologists typically work on their own, collecting and analyzing their own data, and writing their own research design and IRB applications. The engineers had extensive experience working with city- or neighborhood-level infrastructure, and were used to doing field work abroad. They tended to go into the field to gather their own data, or would work closely with student lab-members who would do the field work. But their fieldwork involved interacting with infrastructure rather than human subjects, or with the material traces of people's actions (for instance, the waste water they flush away in their houses). For the most part, they do not seek IRB approval.

When it came to understanding that *people* are our research objects, there were areas of overlap and difference between the three disciplines. The public health researchers were very attuned to human research subjects, particularly as defined by the IRB, but in many cases had never met or talked to a subject. The engineers were used to going into the field to collect their data directly, but generally did not interact with people as official research subjects. The anthropologists were used to working with people directly and thinking of them in IRB terms as human subjects, but had no experience taking biological samples like saliva and hair.

As a result, while writing the protocol we bumped into each other's presumptions and concerns surrounding known and unknown people as objects of research. For instance, during our retreat in Mexico City, the environmental engineer, Krista, was struck by the trust people like Leona and Samuel placed in Liz and the ELEMENT researchers. "Do you worry that you could lose their trust?" she asked.

By which she meant, were we concerned that our research methods relied on a kind of access that could be taken away at any moment, if the research subjects became suspicious or uncomfortable with us? Our research subjects had to trust in getting to know them more that we would not harm them; we had to trust that as our subjects got to know us more, they would continue to allow us access.

The answer to this question came first from the environmental public health scientists in Mexico City who have worked with the ELEMENT cohort the longest and the most intimately, Ana and Mara For them, trust is constituted in two ways: through a strict and sincere adherence to institutional ethics requirements (IRB in the US and INSP's ethics review board in Mexico), and through their long-term relationships with, and knowledge of, participants. These long-term relationships mean that researchers are moved to go beyond the letter of the IRB, and into anticipating participants' needs and interests at every stage of the research design. Mara, for instance, is a frequent advocate for participants during NESTSMX meetings. She encourages the development of research protocols that can be translated into useful or interesting data for participants, such as blood glucose tests that can immediately give them actionable information. As the birth cohort participants enter adolescence, Mara has established ways to look out for mental health issues and connect teenagers with professional psychiatric help, even though this is not a topic covered by any of ELEMENT's research projects.

The anthropologists, on the other hand, have a different sense of how to establish and maintain trust, which comes from a parallel depth of experience working with people. An anthropologist's intimate knowledge of the communities under study enables them to anticipate what research subjects would want from their participation. For environmental public health researchers and ethnographers, a trusting relationship between the researcher and research subject is created and maintained through intimate, long-term knowledge and in-person experience, which leads to a long-term practice of care.

This implies that trust is a component of intimacy in human subject research. And yet, as we found during the process of writing our IRB proposal, intimacy is in conflict with the research subject's personal privacy as conceptualized by the public health IRB. In the environmental public health research world, where biological samples are taken from hundreds of human subjects, respect for privacy means that researchers only circulate anonymized information about participants. Privacy/anonymity is understood to be necessary to protect individual human subjects. For ELEMENT researchers, maintaining anonymity/privacy was an

ingrained, unquestionable ethical imperative. As such, lab-based researchers who have worked for ELEMENT for years (in some cases decades) have an intimate knowledge of the ELEMENT population; but this intimacy is of a specific kind. While Mexico City–based researchers like Mara and Ana meet with participants face to face and know their real names, all other ELEMENT researchers, particularly those in the US, only encounter participants through the anonymized physical samples of their blood, urine, hair, and finger nails, or through de-identified survey responses and demographic information.

These differences point to the non-stable, contextually malleable nature of trust in human subject research. Maintaining participants' trust is based on both intimacy and depersonalization. As Mara and Ana implied above, when answering Krista's question about participants' trust, trust depends on researchers like Ana having worked for many years to create and maintain in-person relationships with each individual ELEMENT participant. Ana and the team at the clinic where ELEMENT research is carried out know each participant personally, remember their families, greet them like old friends, and refer to themselves as the aunties of the babies-turned-teenagers they have seen grow up in the project, even if they know very little about participants' biomarker data (i.e., the results of all the biological tests that are carried). At the same time, trust stems from protecting those same participants' privacy through practices of de-identification. Records never contain real names but rather an identification code, and anonymizing security practices are rigorously adhered to. De-identification ensures that other members of the ELEMENT team, away from the field site of the clinic, will never know participants intimately or personally.

This balance of intimacy and depersonalization is not necessarily a problematic one in the world of public health, or one that lessens the reliability of *data*. Whereas ethnographic data-from-experience was seen by our STEM colleagues as problematic, practices of intimacy that buttress participants' trust make ELEMENT data *more* reliable, because participants' trust leads to a high rate of continued participation in the study. The purpose of a birth cohort study such as ELEMENT is to understand health at the *population* level, rather than the individual level: the subject being studied is the population, not the individual. A single individual (or even six) does not "count" as useful data, so even though a personalized, intimate relationship is necessary for maintaining ethical, trusting relationships with participants, de-personalization later down the road does not affect the scientific integrity of the data.

This is not the case in ethnography, where the integrity of our data relies on intimacy and personalized experience (personalized in the sense that the ethnographer gathers data his- or herself, and personalized in the sense that the individual informant matters). Ethnographic research methods, including the ethical considerations that are written into ethnographic IRBs, are based on evaluating the kinds of risks or benefits that might arise as a result of the ethnographer's long-term presence in a small group of people's lives. Ethnographers build trust over the long term, and engage in forms of ethical trust-building that can be hard to condense into a standardized list or script. Moreover, trust in the ethnographic relationship is *predicated on the intimacy of individual relationships*, which is the opposite of anonymity. In ethnography, both ethical and epistemic trust arise from intimate knowledge of individuals.

Trusting How Multidisciplinary Collaboration Change Us

One of the aspects of NESTSMX we, Mary and Liz, value and believe has enabled it to be successful so far, is that the PI of our multidisciplinary collaboration, Liz, and the project postdoc and manager, Mary, are feminist anthropologists and STS scholars. Anthropologists usually serve as consultants on multidisciplinary collaborations, if they are included at all. In contrast, in NESTSMX, feminist anthropologists have set the agenda from the beginning—for instance, by insisting that we do *not* define "trust" before we start the fieldwork, and we do *not* go to the field ready to measure trust on a quantifiable scale, but instead we design an open-ended field work methodology that allows trust or mistrust to emerge.

Additionally, feminist technoscience studies provides a plethora of resources for understanding and managing power dynamics embedded in the production of scientific knowledge, between disciplines and between nations where STEM scientists from the Global North usually have the most power to set the agenda (Cueto, 1989, 2015; Dahdouh-Guebas et al., 2003; Lowe, 2004; Anderson, 2002; Dasgupta, 2009; Gavroglu, 2012; Leighton, 2014, 2020). What this has meant in practice, during protocol development and fieldwork, is that Mary and Liz are somewhat equipped to handle tensions and conflicts between researchers and know how to manage differences in data collection and analysis. As with any anthropological research, our guiding principle is that no one is irrational. We know that when tensions arise about how to proceed it is not because one discipline role (fieldworker/manager) is wrong or right, but because they are situated differently in different research ecologies that shape how data is gathered and knowledge is produced.

We have also modified our own practices, learnt to make peace with numbers, trusting that we will end up with what is still recognizably "anthropological" data (Roberts In Press). The NESTSMX fieldwork involves visiting sixty different families on three occasions, for a few hours each. This is not ethnography in the usual sense—rather, it is a hybrid kind of house-to-house survey with semi-structured interviews, and open-ended but time-limited observations. As ethnographers, we are doing "less" than what we normally consider the "gold standard" for making our own data: long-term, immersive, embedded ethnography with a small group of informants.

There were practical issues to overcome when moving from the model of single ethnographer to a multidisciplinary team of field researchers, all visiting houses together and producing multiple kinds of data (e.g., water samples, blood samples, semi-structured interviews, maps). In designing the practical organization of the fieldwork data, Mary was able to draw on her knowledge of how archaeologists organize large-scale team-based research projects, and codify individual researchers' embodied experience/tacit knowledge as collectively comprehensible data (Leighton, 2016). We use "house forms," modeled on British archaeologists' "context forms" (Leighton, 2015), that include checkboxes, an area for drawing an annotated map, and prompts to write long-form narrative fieldnotes. Each form, photograph, water sample, and blood-lead reading is tracked across a set of databases that Mary modeled on the data-organization strategies of archaeologists, with additional help from ELEMENT's project managers. In this process, ethnographic socio-cultural anthropology changes, as it takes on the team-based fieldwork practices of archaeology, engineering, and public health. An unspoken assumption is that the data's quality won't be damaged by this process—but we have yet to see if we can trust this assumption.

From our study of water trust in Mexico City neighborhoods and our own multidisciplinary collaboration, we have begun to outline a theory of trust as situated, co-constituted practice and process. Trust/distrust emerges from this exploration as something malleable and mutable, seemingly transparent, and yet, on closer inspection, holding together disparate elements (Coca-Cola, pipes, the Illuminati; intimacy, water buckets, depersonalization, experience, IRBs, house forms). In this respect, waters—often transparent but also reflective, ubiquitous yet also deceptive, life-giving, or destructive—are the ideal material through which to explore the constitution of an entity as fluid as trust.

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Notes

[1] ELEMENT is a longitudinal birth cohort study that has followed mother-child pairs in Mexico City since 1994. The study participants come from similar neighborhoods to Leona's. See the study's website: https://sph.umich.edu/cehc/element/index.html.

[2] For details on the project's origins and ongoing findings, see Liz's project website, *Mexican Exposures: A Bioethnographic Approach to Health and Inequality*.

[3] During the first year of our collaboration, we each gave a half-hour presentation to the rest of the group during our biweekly meetings, to explain our own research discipline and prior research. The presenter also shared short readings from our own discipline. The combination of the collective readings and the introductory

lessons was instrumental to helping us understand each other's discipline better. They were also extremely interesting for everyone involved.

References

Anderson, W. (2002). Introduction: Postcolonial technoscience. *Social Studies of Science, 32*(5–6), 643–658.

Bakker, K. (2012). Water: Political, biopolitical, material. *Social Studies of Science*, *42*(4), 616-623.

Barad, K. (2007). *Meeting the universe halfway: Quantum physics and the entanglement of matter and meaning*. Duke University Press.

Barnes, J. (2013). Water, water everywhere but not a drop to drink: The false promise of virtual water. *Critique of Anthropology*, *33*(4), 371-389.

Bendix, R., Bizer, K., & Noyes, D. (2017). *Sustaining interdisciplinary collaboration: A guide for the academy*. University of Illinois Press.

Benjamin, R. (2011). Organized ambivalence: When sickle cell disease and stem cell research converge. *Ethnicity & Health*, *16*(4–5), 447–463.

Benjamin, R. (2014). Race for cures: Rethinking the racial logics of "trust" in biomedicine. *Sociology Compass, 8*(6), 755–769.

Benjamin, R. (2016). Racial fictions, biological fact: Expanding the sociological imagination through speculative methods. *Catalyst, 2*(2), 1–28. https://doi.org/10.28968/cftt.v2i2.28798

Callard, F., & Fitzgerald, D. (2016). *Rethinking interdisciplinarity across the social sciences and neurosciences*. Palgrave Macmillan.

Cantoral, A., Téllez-Rojo, M. M., Ettinger, A.S., Hu, H., Hernández-Avila, M., Peterson, K. E. (2016). Early introduction and cumulative consumption of sugar-sweetened beverages during the pre-school period and risk of obesity at 8–14 years of age. *Pediatric Obesity, 11*(1), 68–74.

Carey, M. (2017. *Mistrust: An ethnographic theory*. Hau Books.

Chapa-Martínez, C. A., Hinojosa-Reyes, L. Hernández-Kez, A., Ruiz-Ruiz, E., Maya-Treviño, L., & Guzmán-Mar, J. L. (2016). An evaluation of the migration of antimony from polyethylene terephthalate (PET) plastic used for bottled drinking water. *Science of the Total Environment, 565*, 511–518.

Coca-Cola Company. (2012). *Per capita consumption of company beverage products*. https://www.coca-colacompany.com/cs/tccc-yir2012/pdf/2012-per-capita-consumption.pdf

Cueto, M. (1989). Andean biology in Peru: Scientific styles on the

periphery. *Isis*, *80*(4), 640–658.

Cueto, M. (2015). An asymmetrical network: National and international dimensions of the development of Mexican physiology. *Journal of the History of Medicine and Allied Sciences*, *71*(1), 43–63.

Dahdouh-Guebas, F., Ahimbisibwe, J., Van Moll, R., & Koedam, N. (2003). Neo-colonial science by the most industrialised upon the least developed countries in peer-reviewed publishing. *Scientometrics, 56*(3), 329–343.

Dasgupta, D. (2009). Progress in science and science at the non-Western peripheries. *Spontaneous Generations: A Journal for the History and Philosophy of Science, 3*, 142–157.

Daston, L. (Ed.). (2000). *Biographies of scientific objects*. University of Chicago Press.

Daston, L. J., & Galison, P. (2007). *Objectivity.* MIT Press

Eubanks, V. (2009). Double-bound: Putting the power back into participatory research. *Frontiers: A Journal of Women Studies*, *30*(1), 107-137.

Espinosa-García, A. C., Díaz-Ávalos, C., González-Villarreal, F. J., Val-Segura, R., Malvaez-Orozco, V., & Mazari-Hiriart, M. (2015). Drinking water quality in a Mexico City University community: Perception and preferences. *EcoHealth*, *12*(1), 88–97.

Fiss, E. M., Rule, K. L., & Vikesland, P. J. (2007). Formation of chloroform and other chlorinated byproducts by chlorination of triclosan-containing products. *Environmental Science & Technology*, *41*(7), 2387–2394.

Fragkou, M. C., & McEvoy, J. (2016). Trust matters: Why augmenting water supplies via desalination may not overcome perceptual water scarcity. *Desalination*, *397*, 1–8.

Gavroglu, K. (2012). The STEP (Science and Technology in the European Periphery) initiative: Attempting to historicize the notion of European science. *Centaurus*, *54*(4), 311–327.

Gethmann, C. F., Carrier, M., Hanekamp,G., Kaiser, M., Kamp, G., Lingner, S., Quante, M., & Thiele, F. (2015). *Interdisciplinary research and trans-disciplinary validity claims*. Springer.

Gotfredsen, K. B. (2016). Enemies of the people: Theorizing dispossession and mirroring conspiracy in the Republic of Georgia. *Focaal, 74*, 42–53.

Hamlin, C. (2000). "'Waters' or 'Water'?: Master Narratives in Water History and Their Implications for Contemporary Water Policy." *Water Policy* 2: 313–25.

Haraway, D. (1988). Situated knowledges: The science question in feminism and the privilege of partial perspective. *Feminist Studies*, 14(3), 575–599.

Haraway, D. (1991). *Simians, cyborgs and women: the reinvention of nature.* London: Free Association Books.

Helmreich, S. 2009, Alien Ocean: Anthropological Voyages in Microbial Seas. Berkeley: University of California Press.

Hernández-Avila, M., Gonzalez-Cossio, T., Palazuelos, E., Romieu, I., Aro, A., Fishbien, E., Peterson, K. E., & Hu, H. (1996). Dietary and environmental determinants of blood and bone lead levels in lactating postpartum women living in Mexico City. *Environmental Health Perspectives, 104*(10), 1076–1082.

Hubbard, A., Trostle, J., Cangemi, I., & Eisenberg, J.N.S. (2019). Countering the curse of dimensionality: Exploring data-generating mechanisms through participant observation and mechanistic modeling. *Epidemiology, 30*(4), 609–614. http://doi.10.1097/EDE.0000000000001025

Huberts, A. (2019). Credit, blame and substitution: Mexico City's unequal provision of water. Paper presented at American Political Science Association Meeting, Washington, DC, August 29–September 1, 2019.

Ingold, T. (2007). Earth, sky, wind, and weather. *Journal of the Royal Anthropological Institute*, *13*, S19–S38.

Jaramillo, E. T. (2019). Fluid kinship: Race, power, and the hydrosocial order of water flow along New Mexico's acequias. *Environment and Planning D: Society and Space*, 0263775819879719.

Jasanoff, S. (2005). Designs on nature: Science and democracy in England and the United States. Princeton University Press.

Jiang, J. Q. (2018). Occurrence of microplastics and its pollution in the environment: A review. *Sustainable Production and Consumption*, *13*, 16–23.

Jiménez-Aguilar, A., Flores, M., & Shamah-Levy, T. (2009). Sugar-sweetened beverages consumption and BMI in Mexican adolescents: Mexican National Health and Nutrition Survey 2006. *Salud Pública de México*, *51*, S604–S612.

Kaiser, M. I., Kronfeldner, M., & Meunier, R. (2016). Problems and prospects of interdisciplinarity: The case of philosophy of science. *Interdisciplinary Science Reviews*, *41*(1), 61–70.

Kamash, Z. (2008). What lies beneath? Perceptions of the ontological paradox of water, *World Archaeology, 40*(2), 224–237.

Knorr Cetina, K. (1999) *Epistemic cultures: How the sciences make knowledge*. Harvard University Press.

Leighton, M. (2014). *Uneven fields: Transnational expertise and the practice of Andean*

archaeology [Unpublished doctoral dissertation, University of Chicago].

Leighton, M. (2015). Excavation methodologies and labour as epistemic concerns in the practice of archaeology: Comparing examples from British and Andean archaeology. *Archaeological Dialogues*, *22*(1), 65–88.

Leighton, M. (2016). Indigenous archaeological field technicians at Tiwanaku, Bolivia: A hybrid form of scientific labor. *American Anthropologist*, *118*(4), 742–754.

Leighton, M. (2020). Myths of meritocracy, friendship, and fun work: Class and gender in North American academic communities. *American Anthropologist, 122*(3), 444–458.

Linton, J. 2010. *What Is Water?: The History of a Modern Abstraction*. Vancouver: UBC Press.

Lowe, C. (2004). Making the monkey: How the Togean macaque went from "new form" to "endemic species" in Indonesians' conservation biology. *Cultural Anthropology, 19*(4), 491–516.

Moats, D. (2016). Of stories and numbers: Rethinking the settlement between anthropology and metrics in global health. *Science as Culture, 25*(4), 594–599.

Muñoz-Cadena, C. E., Arenas-Huertero, F. J., & Ramon-Gallegos, E. (2009). Comparative analysis of the street generation of inorganic urban solid waste (IUSW) in two neighborhoods of Mexico City. *Waste Management, 29*(3), 1167–1175.

Nash, J. (2007). Consuming Interests: Water, Rum, and Coca-Cola from Ritual Propitiation to Corporate Expropriation in Highland Chiapas. *Cultural Anthropology*, *22*(4), 621-639.

Pantic, I., Tamayo-Ortiz, M., Rosa-Parra, A., Bautista-Arredondo, L., Wright, R.O., Peterson, K. E., Schnaas, L., Rothenberg, S. J., Hu, H., & Téllez-Rojo, M. M. (2018). Children's blood lead concentrations from 1988 to 2015 in Mexico City: The contribution of lead in air and traditional lead-glazed ceramics. *International Journal of Environmental Research and Public Health, 15*(10), 2153.

Parag, Y., & Roberts, J. T. (2009). A battle against the bottles: Building, claiming, and regaining tap-water trustworthiness. *Society and Natural Resources*, *22*(7), 625–636.

Pierce, G., & Gonzalez, S. (2017). Mistrust at the tap? Factors contributing to public drinking water (mis) perception across US households. *Water Policy*, *19*(1), 1–12.

Porter, T. M. (1996). *Trust in numbers: The pursuit of objectivity in science and public life*. Princeton University Press.

Roberts, E. F. S. (2015). Food is love: And so, what then? *Bio-Societies, 10*, 247–252.

Roberts, E. F. S. (2017). What gets inside: Violent entanglements and toxic boundaries

in Mexico City. *Cultural Anthropology, 32*(4), 592–619.

Roberts, E.F.S (In Press) Making Better Numbers Through Bioethnographic Collaboration. *American Anthropologist*.

Roberts, E. F. S., & Sanz, C. (2017). Bioethnography: A how-to guide for the twenty-first century. In M. Meloni (Ed.), *A handbook of biology and society* (pp. 749-775). Palgrave Macmillan.

Sangaramoorthy, T., Jamison,A., & Dyer, T. (2017). HIV-stigma, retention in care, and adherence among older Black women living with HIV. *Journal of Association of Nurses in AIDS Care, 28*(4), 518–531.

Schwanse, E. (2011). Recycling policies and programmes for PET drink bottles in Mexico. *Waste Management & Research, 29*(9), 973–981.

Shapin, S. (2011). *A social history of truth: Civility and science in seventeenth-century England*. University of Chicago Press.

Shove, E., Walker, G., & Brown, S. (2014). Material culture, room temperature and the social organisation of thermal energy. *Journal of Material Culture*, *19*(2), 113–124.

Shrum, W., Chompalov, I., & Genuth, J. (2001). Trust, conflict and performance in scientific collaborations. *Social Studies of Science*, *31*(5), 681–730.

Steinberg, P., & Peters, K. (2015). Wet ontologies, fluid spaces: Giving depth to volume through oceanic thinking. *Environment and Planning D: Society and Space, 33*, 247–264.

Strang, V. (2004). *The meaning of water*. Berg.

TallBear, K. (2014). The emergence, politics, and marketplace of Native American DNA. In D. L. Kleinman & K. Moore (Eds.)., *The Routledge handbook of science, technology, and society* (pp. 21–37). Routledge.

Wagenknecht, S. (2016). *A social epistemology of research groups*. Palgrave Macmillan.

Walsh, C. (2018). *Virtuous Waters: Mineral Springs, Bathing, and Infrastructure in Mexico*. Oakland, California: University of California Press.

Watkins, D. J., Peterson, K. E., Ferguson, K. K., Mercado-Garcia, A., Ortiz, M. T., Cantrol, A., Meeker, J. D., & Téllez-Rojo, M. M. (2016). Relating phthalate and BPA exposure to metabolism in peripubescence: The role of exposure timing, sex, and puberty. *Journal of Clinical Endocrinology Metabolism, 101*(1), 79–88.

Watson, S. (2017). Liquid passions: Bodies, publics and city waters. *Social & Cultural Geography, 20*(7), 960–980.

Webber, J. (2006). From science and technology to feminist technoscience. In K. David, M. Evans, & J. Lorber (Eds.), *Handbook of gender and women´s studies* (pp. 397–414). Sage.

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