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## Bioethnography and the Birth Cohort: A Method for Making New Kinds of Anthropological Knowledge about Transmission (which is what anthropology has been about all along)

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These are pots and dishes. They transmit food and love. They transmit lead. They transmit class. They transmit enduring inequality and new forms of environmental degradation. These transmissions are conveyed through food, love, and chemical leaching. These pots are for sale in working class neighborhoods in Mexico City. They are passed around in families. They break constantly and families buy more. They are called *barro vidriado* (glazed clay), *trastes de barro* (clay dishes), or simply *barro* (clay). Lead makes the glaze shiny. The kilns of the potters who make these pots are not hot enough to melt the lead away. The lead that remains makes beans and coffee taste sweeter, even more when they are shared.

### *Transmission*

These pots are central to my collaborative research with a longitudinal birth cohort study in Mexico City. The study, called ELEMENT (Early Life Exposures in Mexico to ENvironmental Toxicants)[\[1\]](#) began in 1994 by investigating the developmental effects of lead over the life course (Perng et al., 2019). ELEMENT researchers from both Mexico and the United States were interested in the neurotoxic effects of lead leaching from maternal bone (Afeiche et al., 2011, Tellez-Rojo et al., 2004). They found that, among this birth cohort of working class mothers and children, the surest predictor of high lead levels was eating off these lead glazed ceramic dishes (Tellez-Rojo et al., 2002). Over time these researchers expanded their investigation to include exposure to other chemicals, like mercury and BPA, and other potentially environmentally influenced conditions, like obesity, menarche, menopause, and sleep. They are interested in what passes from mothers to children, with what effects, and from environments into bodies, with what effects. They are interested in transmission. So are anthropologists.

Birth cohorts scratch the itch of the longstanding anthropological fascination with transmission, the conveyance of something from one person or place to another. And I *do* mean longstanding. The sympathetic magic of Frazer's *Golden Bough* (Frazer, 1935), Mauss's gift (Mauss, 1990), Malinowski's exploration of paternity (Malinowski, 1929), and Leach's virgin birth (Leach, 1967), were all examinations of what passes between people and how. And so were Boas and his anthropological offspring's preoccupations with how humans get to be the way they are, through various complex transmissions of environment, culture, and biology; whether they were environments that allowed for peaceful adolescence in Samoa (Mead, 1953); or the constitution of African and African American folklore across slavery's diasporas (Hurston, 1995, Hurston et al., 1931). To this day, anthropological examinations of transmission— through person, place, or process—remain lively and open to question, debate, and controversy.

Birth cohort research stimulates these questions afresh in areas with which current medical anthropologists and anthropologists of the life sciences are already engaged, through "situated biologies" (Lock and Nguyen, 2010), "looping effects" (Hacking, 1995), and "chemical kinships" (Agard-Jones, In Press). Birth cohorts can help us understand how persons are made, enacted, disassembled, and come to matter in the long run, in relation to milieu (Niewohner, 2011, Strathern, 1992). Birth cohorts take up never-ending, tired, and also new concerns with nature and culture, through the lens of time and place. Birth cohorts are ripe for fruitful cross-pollinating collaborations with anthropologists. And birth cohort research fits right in with the well-established girl-ghetto of the

anthropology of reproduction (Franklin, 2013, Rapp, 1999, Roberts, 2013, Taylor, 2004) and follows along with where so many of us who began with reproduction have gone: environment (Lappe et al., 2019, Kim, 2016, Lamoreaux, 2016, Roberts, 2015). You could call many of us transmissionists – of the environmental kind.

When you think about it, the topics of reproduction and environment encompass nearly all twentieth century transmission debates. Up until the late nineteenth century, the most common way of understanding and experiencing how people and things came to be, in Europe and the US, was through acquiring characteristics, marinating in places over time, and then passing them on through a variety of means (Keller, 2010, Feely-Harnick, 2014, Roberts, 2014). This common sense and common experience of how people and places are entwined got called to the carpet when newly essentialist and boundary-making approaches to being – involving genetics, germs, and neurons – came into vogue in the later nineteenth and early twentieth century (Meloni, 2014, Keller, 2000). Thus started the nature/nurture debates, which can seem timeless but are really only 150 years old or so (Roberts, 2016).

Think of it this way: until the late nineteenth century nearly everyone in Europe was a Lamarckian, even Darwin (Degler, 1991). But they weren't called that because everyone assumed this kind of transmission. It was the shared air that nearly everyone breathed. With the ascendancy of germs and genes the scientists who kept insisting on this environmental conveyance of acquired characteristics over time and place got labeled "transmissionists" (Thomson, 1899, 226). Retrospectively, we can see that everyone was and is a transmissionist. Even the scientists who now insisted that genes pass unaffected by environment were preoccupied with *what* gets passed and *how*.

Anthropology in the United States became central to the transmissionist nature/nurture debate by agreeing to its terms. Cultural anthropologists came to advocate for culture as the "super organic," transmitted between people, but never inside or through bodies, (Kroeber, 1917). This had consequences for anthropology, as well as for how transmission came to be lived in twentieth century Euro-American life worlds, and for those races and sexes deemed inferior by these debates, either because of their malleable culture or essential biology.

Now back to birth cohorts. Birth cohorts recruit at or before birth, and so they reinstate a kind of biological essentialism. Who gives birth to whom, who the mother is, and who the child is, are mostly predetermined. Configurations of queer and assisted reproduction, adoption, fostering, and child circulation are not taken into account. But while birth cohorts studies don't queer kinship in the most obvious sense, they do trace the

effects of time, place, and events on bodies beyond individual human lives, which locates them within current approaches in the life and social sciences that implode individual selves and the tyranny of vertical gene transmission (Paxson and Helmreich, 2014). These approaches play well with current medical anthropological fascinations like lateral gene transmission (Helmreich, 2014), queer kinship (Weston, 1997, Bailey, 2016), para communicable environments (Moran-Thomas, 2019), and *querencia* (Garcia, 2010). And these anthropologists are thinking through how epigenomes, microbiomes, exposomes, and DOHaD (the developmental origins of health and disease) can be linked to violence, poverty, addiction, wealth, trauma, murderous care, love, feeding, and transnational economic policies that reshape chemical landscapes (Lock, 2013, Stevenson, 2014, Yates-Doerr, 2015).

And then there is time and place. Although their methods are different, both ethnographers and birth cohort scientists often pay much more attention than other social scientists and life scientists to specific groups of people in specific places over the *longue durée* (Colson, 1960).

### *Bioethnography*

I have collaborated with ELEMENT since 2012, naming the collaboration Mexican Exposures<sup>[2]</sup> (MEXPOS) to foreground a specific time and place. The MEXPOS team (other social science researchers and students) and I observe how transmission is arbitrated for ELEMENT participants and researchers, including ourselves. What is passed? What is not? This is now possible because ELEMENT is over 25 years old, the original participant children have had children, and there are now three generations of participants to guide us through this process. I have worked intensely with six ELEMENT families and their communities in two neighborhoods since 2013, and recently expanded to 60 ELEMENT families in a project about neighborhoods, water infrastructure, and water trust. In all these projects all kinds of things pass.

My interests in environmental transmission may be easier to activate and may be more rewarding with a Latin American birth cohort, because, for the most part, regular people and scientists in Latin America have stayed more environmentally transmissionist throughout the twentieth century than their counterparts in Western Europe and the United States (Stepan, 1991). It's the ELEMENT researchers who seem new to the environmentalist approach where bodies and environments are intermingled, while the participants have been there all along. For ELEMENT participants, lead, bodies, pots, and environments are not held as essential, fixed, or steady. Their relationships change over time. The pots are situated and keep resituating. Participants tell me that the pots were less damaging when the world was less damaged. Their

grandparents and great-grandparents made and ate off the pots into their 90s, and were whip smart and not neuro-affected until the end. Now they are forced to reconfigure their relationships to the pots and to each other in light of the fact that there is more contamination all around. They also must grapple with the fact that the pots now have more lead because, with less available firewood, the kilns burn at lower temperatures to melt the lead away.

This is an environmental transmissionist mode that takes the changing conditions of people, pots, and places into account. This mode is a resource for theorizing environmental transmission which predates how the birth cohort scientists have come to understand the situated effects of intertwined chemical interactions over time (Watkins et al., 2017). Environmental transmissionist approaches like these have inspired my efforts to develop bioethnography, a method for combining ethnographic and biological data to arrive at better understandings of the transmitted life circumstances that shape health and inequality (Roberts and Sanz, 2017).

Our MEXPOS team models bioethnography on forms of knowledge production that are distinguished not by their objects of study, but by their methods for knowing the world (Mol, 2002). With this methodological focus we conduct analyses that suspend in advance prevalent domaining practices that designate some phenomena (like blood-lead levels) as biological/natural, and others (like family meals using lead-glazed ceramics) as social/cultural. Bioethnography allows us to regard a phenomenon such as lead exposure and its effects as knowable through methods of both blood-lead measurement and observation of household mealtimes. Bioethnography allows us to examine why the pots continue to have extraordinary power for congregating loved ones, despite and because of the chemical reactions they entail. After all, they make mealtime sweeter.

Under the banner of MEXPOS we currently seek to make bioethnographic knowledge through projects examining neighborhood water infrastructure, sleep and menopause, and mealtimes, within transforming food and chemical landscapes (Jansen et al., 2020, Téllez-Rojo et al., 2020). We also examine how we develop and transmit methods ourselves (Roberts, Under Review, Leighton, In Preparation, Leighton and Roberts, 2020). Bioethnography has allowed me to make the case for new approaches in ELEMENT that are directed towards the specificity of place, such as neighborhoods, which ELEMENT had never focused on before.

During my intensive MEXPOS fieldwork I lived and worked in two distinct working-class neighborhoodswith a density of ELEMENT participants and spent time in many others. It came to seem that different neighborhood

environments shaped health and bodily being (Roberts, 2017). One of the neighborhoods where I lived, Colonia Periférico, has a “bad reputation.” It is surrounded by a sewage-filled dam, a freeway, and cement factories. Inside there is visible public drug use, graffiti, and garbage. The standard neighborhood effects literature would categorize these attributes as unhealthy markers of “neighborhood disorder” (Gibson, 2011, Sampson, 2011, Diez Roux and Mair, 2010). I observed, however, that in Colonia Periférico, children play on the streets and residents take care of drug users. It appeared that this apparent “neighborhood disorder” served a purpose. It prevented the entry of outsiders, especially the police, who have become militarized since the Drug War and who are associated with violence and extortion. Bad reputation and noxious environmental boundaries have also prevented the post-NAFTA gentrification so prevalent throughout Mexico City.

The other working-class *colonia* where I lived and worked, Buena Vista, boasted a “good reputation,” fresh air, beautiful views, and bustling commerce and transportation routes. This openness, however, contributed to water shortage, land speculation, evictions, petty crime, and frequent police violence, making everyday life far less secure than in “unsavory” Colonia Periférico. And when we combined my ethnographic observations with biomarker data, our statistical correlations demonstrated that my ethnographic observations might be predictive. We found that the blood lead levels of ELEMENT participant children in Colonia Periférico were nearly a full microgram per deciliter higher than in Buena Vista and the ELEMENT cohort overall.

This preliminary statistical correlation makes the case that neighborhoods shape biological processes, and that besides prompting us to make that correlation, bioethnography provides crucial context for the results. High blood lead levels might not only indicate damage but also the ability of neighborhoods to withstand other, larger dangers, like police violence. This finding is supported by critical geography and urban studies literature, which demonstrates how marginalized populations use toxicity and other boundaries to keep oppressive authorities out (King, 2016, Aguirre Beltrán and Walker, 1979). In other words, like the leaded pots that transmit both love and harm, chemical toxicity might play a complicated role in sustaining social worlds. Within bioethnography then, we work against separating phenomena such as blood-lead levels, household dynamics, class hierarchy, and police violence, as well as biostatistical data and coded ethnographic data. Instead, we focus on how these phenomena emerge in coordination with each other.

It seems rather obvious now that we need toxicology, epidemiology, biostatistics, neuro-psychology, exposure science, epigenetics *and* ethnography to make satisfying accounts of how characteristics are

acquired, passed, and not passed. The affinities, lateral and vertical, between anthropology and birth cohort research can be harnessed for making bioethnography a new “technology of the biosocial” (Gibbon and Pentecost – this issue), in our anthropological efforts to keep parsing transmission over the *longue durée*.

### Notes

[1] <https://sph.umich.edu/cehc/element/index.html>,

[2] <https://sites.lsa.umich.edu/mexican-exposures/>.

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