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A TALE OF TWO MOLECULAR CALIFORNIAS

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Abstract

Molecular identification technologies are often framed in terms of their societal benefits. Forensic uses of DNA databases benefit society through the efficient identification of criminal suspects, while consumer DNA services empower individuals by identifying ethnic, health-related, and potentially sexual, molecular genealogies. Two examples of these technologies are California's criminological database CAL-DNA and the revitalized project to find a 'gay gene'. Both examples show how molecular identification technologies are also entangled with histories of coercion and stigmatization. The search for a 'gay gene' is premised on the historical stigmatization of homosexuality as deviant as well as contemporary concerns with resisting the idea that it is a lifestyle choice. The CAL-DNA database demonstrates that stigmatization still underpins contemporary identification technologies. This 'race-neutral' database puts racial minorities at increased risk of getting caught up in the criminal system precisely because of a racist history of identifying men of color as potential criminals. While the increasing criminological and consumer applications of molecular identification technologies are spearheaded in California, their uses emerge in a futurist culture that decontextualizes them from historic and contemporary coercion. The molecular identities these technologies create tell a tale of two Californias; one of empowerment and another of surveillance and stigma.

Keywords

identity; identification; risk; consumer genomics; California

Introduction

Molecular technologies and genetic databases are often framed in terms of their societal benefits, including individual empowerment. They can help solve crimes by identifying suspects, help anticipate health risks, and underpin new biocultural identities. But as two current applications in California show, the uses of these technologies have also intensified forms of racial surveillance and the risk of racial and sexual stigmatization.

Since 2004, the state of California has collected DNA samples from convicted offenders and people arrested for specific felony charges. As a result, the state's genetic database – called CAL-DNA – now contains the genetic profiles of nearly two million offenders and, separately, over 700,000 arrestees. It is one of the largest criminological DNA databases in

the world. Law enforcement agents swab convicts or arrestees for saliva, which they send to a DNA laboratory. There, the biological sample is analyzed through short tandem repeat (STR) technology, in which twenty DNA loci are sequenced. This process is designed to identify an individual through the unique arrangement of molecules at these loci, which the state selected because they do not indicate the individual's traits, ancestry, or health conditions. Resulting genetic profiles are used to aid criminal investigations because they are extremely unlikely to be shared by two persons.

Since 2006, the Silicon Valley personal genomics company 23andMe has conducted scientific research using DNA samples from customers who purchase their services. These samples are compiled into a database that contains the genetic profiles of five million people and is quickly growing into one of the largest in the world. Customers receive a 23andMe DNA kit in the mail and deposit their saliva into a vial, which they send to a company-affiliated DNA laboratory. There, the biological sample is analyzed using 23andMe's genotyping technology, which identifies selected single nucleotide polymorphisms (SNPs) within an individual's genome. SNPs are variants of single base pairs of DNA at known locations of the genome—molecular markers associated with physical traits and susceptibility to specific diseases. The test results can confirm traits that customers already know from their lived experience, such as eye color or the propensity to sneeze reflexively when exposed to bright lights. Based on scientific findings in molecular biology and population genetics, 23andMe claims the test results also 'have the potential to tell you about your ancestry . . . and certain health conditions.'[1]

23andMe's customer base has pushed the company to start research on molecular determinants of sexual orientation. The consumer appetite for genotyping services and requests for high-tech research to identify a gay gene reveal a desire for molecular answers to complex questions of lived identities. The resulting genetic profile is used in a new science industry to mobilize a cultural imagination of a measurable self in research, consumption and identity formation (Nelson, 2008; Reardon, 2010; ; TallBear, 2013; Lee, 2013a; Lupton, 2014).

What can these molecular identification technologies tell us about culture and politics in a place like California, which is seen as a global center of technological progress? The molecular identification technologies represented by CAL-DNA and the 23andMe consumer genetic database serve as vantage point for sketching the Californian frontier. In this context, histories of technological utopianism and imaginaries of the predictability of the future bolster a readiness to use molecular technoscience as a pathway to both risk reduction and self-understanding across the criminal system and health and consumer industries.

Although the STRs used to identify criminal suspects in CAL-DNA do not indicate physical traits associated with race or ethnicity, the coercive process of identifying criminal suspects at the molecular level emerges from an ingrained US history in which racial and ethnic minorities have been identified as risky and dangerous others (Rollins, 2018). Likewise, the

[1]See https://customercare.23andme.com/hc/en-us/articles/115013846688-What-ancestry-related-information-can-I-learn-from-23andMe-, accessed February 27, 2018.

elective process of consumer DNA testing cannot exist without similar histories of physical identification. Consumer-driven research to find a gay gene is premised on the historical identification of homosexuality as deviant from an invisible societal norm (O'Riordan, 2012). Only from this historical context does the contemporary desire to remove agency from one's gay identity—that is, to recreate it as a molecular one rather than a lifestyle choice—make sense.

Rather than suggest that these forms of genetic identity or social stratification are unique to California, I argue that such uses of molecular identification technologies emerge enshrined in a futurist imaginary that decontextualizes these technologies and the molecular identities they create from past and present inequality, racism and homophobia. To make this argument, I draw on feminist science studies, gender and critical race studies and anthropology, and on data from historical, online and ethnographic research. I analyze publicly available reports, personal conversations and scientific posters, bringing together theories of the Californian frontier with writing about identity and science in the USA. The article draws on empirical materials from several years of research in California in a range of diverse spaces—academic, clinical, industrial, regulatory, cultural and mixes thereof—in which genomic technologies are debated, defined and used.

Identity/Identification

A growing number of science and technology studies (STS) scholars have investigated the socio-ethical implications of criminological genetic databases and the legal applications of DNA profiling in light of racialized surveillance and stigma (e.g. Ossorio and Duster, 2005; Aronson, 2007; Duster, 2008; Fullwiley, 2008; M'charek, 2008). While scholars like Tutton and Levitt (2010) have analyzed differences in the governance of forensic and biomedical DNA databases, for the most part STS scholars have not studied the forensic uses of molecular technologies alongside consumer and medical genetic identification technologies. In the context of consumer and health industries, and in particular with the emergence of direct to consumer genetic testing over the past decades, the formation of new biosocial identities has been intensely debated (Rabinow, 1996; Reardon, 2004; Lee, 2013b; Nelson, 2016).

The increasing convergence of molecular databases has led to speculation about their future trajectories. For instance, in criminal investigations in the USA, law enforcement agencies have requested personal genomics companies to release information about a suspect's DNA (Howard, 2015; Murphy, 2015). The reverse crossover took place in the Netherlands when scientific researchers were granted access to the national DNA database to study the phenotypes of criminals (so-called forensic DNA phenotyping), a use to which the 'data sources' did not consent (Ossorio, 2011; M'charek et al., 2012; Toom, 2012). In their work, M'charek et al. (2012) and Toom et al. (2016) outline some of the troubling ethical issues that arise here, in particular in relation to racialized questions about the relationship of individuals to populations entailed in the use of molecular technologies in forensic and police practices. Potential convergences of databases multiply when considering biomedical databases, pointing to the nature of such databases as networked infrastructures worthy of further critical investigation.

In this article, I draw on the futurism of the frontier as collective sociotechnical imaginary that is generative of, and generated by, meanings and practices, and on critical approaches to California exceptionalism (Thompson, 2013; Jabloner, 2015; Jasanoff, 2015). The notion of the exceptionally innovative frontier is itself steeped in the narrative of the opportunity awaiting European explorers in the American West, and the resulting European-American settlers' industrial and technological visions from which a particular future-oriented ethos emerged (Barbrook & Cameron, 1995; Didion, 2004; Glenn, 2004; Cumings, 2010). To ground my analytic approach, I bring together four strands of writing. Outlining identity's relationship to bodies and choices, the primacy of identification practices over identities and of deviance over difference, and the persistence of biological determinism, I aim to show how progress and empowerment remain only relative Californian realities.

Identity Categories

Thinking through molecular identities requires looking at identity itself—whose very nature, in its fraught and ever-shifting categories and institutional and experiential origins, is at stake (Scott 1991; Comaroff and Comaroff, 2009). An enormous body of literature has long recognized identity as a necessarily relational phenomenon of human existence (Minh-ha, 1989; Butler, 1990; Crenshaw, 1993; Omi and Winant, 1994; Alcoff, 2006). Under the term of identity, questions of agency, responsibility and control are continuously articulated that are crucial in determining how Californians become subjects or consumers of molecular technoscience.

Past and present categories through which identity is conceived and practiced are, in myriad ways, framed by biology; that is, by bodies and the normative discourses about those bodies (Fausto-Sterling, 1992; Schiebinger, 1993; Haraway, 1997). Contemporary identity categories such as gender, sexuality, race or disability, as well as historical grouping like class and criminality, have been articulated by both social and natural scientists as derived from or in bodies, through skin color, facial features, finger ridges, genitalia, skulls, bones, hormones, blood and molecules (Fausto-Sterling, 2000, 2008; Magubane, 2003; Fullwiley, 2007a, 2007b; Washington, 2008; Marks, 2010; TallBear, 2013). Researchers have long considered the question of who is or becomes criminal in part through bodily aspects (Sekula, 1986; Rabinow, 1996; Rose, 2000; Cole, 2001; M'charek, 2008; Heinemann, 2014). As such, identities necessarily refer to a range of identification practices and technologies, as well as experiences, through which meaningful categories (race, sex, gender, etc.) emerge and continue to materialize (Scott, 1991; Epstein, 2006; M'charek, 2013; Browne, 2015; Benjamin, 2016).

By asking whether identity is in the body—and if so, how much of it, and precisely what aspects of it—political questions around agency, choice and responsibility have long been articulated in the context of race, gender, sexuality, and culture. Is identity ascribed to us based on how we are perceived (Fanon, 1969)? Is identity something we choose, and if so, what do our bodies have to do with this choice (Haraway, 1988; Butler, 1993)? Does identity's potential in-the-body-ness relieve one of responsibility? This crucial question, which anthropologist Joseph Dumit (2003) articulated as 'Is it me or my brain?', arises frequently in science, popular culture, and politics; for example, in debates around

culpability (‘Am I responsible for committing a crime or was it my body?’), sexual orientation (‘Did I choose a gay identity or are my molecules responsible?’), US administrations (‘Do Presidents appear more or less evil when I consider them to be sane or mentally ill?’), or the alleged root causes of social inequality (‘Are some people innately less intelligent/capable than others?’) (Marks, 2014).

Importantly, recent work in bioscience, and to an extent also social science, has significantly revitalized a key aspect of this identity complex; the idea that race and ethnicity exist categorically at the molecular level (Abu El-Haj, 2007; Fullwiley, 2007a; Bolnick, 2008; Morning, 2014, 2011; Bliss, 2012; Marks, 2017). For CAL-DNA’s molecular identity, the question of a molecular basis of race at first seems irrelevant: the information sequenced in the database does not reflect physical traits. Yet, a historically ingrained apparatus of suspicion, surveillance, policing and arrest practices in the US has led to an overrepresentation of California’s Black and Latino men in this database, a situation that increasingly puts these populations at risk of becoming implicated in criminal prosecutions when they or their relatives have been subjects of molecular identification (Alexander, 2012; Murphy, 2015). In turn, researchers have often studied the biological contributions to criminality in prisoner populations (Cole, 2001; Ossorio and Duster, 2005). There is a robust logic to CAL-DNA’s molecular identity not being about race, yet the molecules stored there are predominantly from racialized populations.

23andMe’s molecular identities, on the other hand, specifically claim to be about ethnicity, race and other differences, although the company database stores the molecules of mostly wealthy white Americans (Tung, et al., 2011). Scholars have intensely debated the meanings of race for the growing consumer populations who buy molecular services to answer questions about their experiences and identities, and pointed to the empowering effects of finding genetic relatives and geographical roots (Reardon, 2010; Roberts, 2011). These identities often employ the language of recreation in exploring new technologies to identify in one’s body traces of the past or signs of the future (Nelson, 2008; Lee 2013a, 2013b; Lupton, 2014). Consumers are invited to purchase the molecular services of companies, browse data online, access scientific literatures, and deduce their own meanings about their molecules (Somerville, 2014). These engagements have created new social ties and claims, a particularly significant process for those Americans whose genealogical archives are missing or contested (TallBear, 2013; Nelson, 2016).

Racecraft as Identification

To think through this entanglement of identity, agency and control, I draw on Karen and Barbara Fields’ (2012) work on the processes of identification at the core of what is often taken for granted as simply identity in the USA. These authors argue that the naturalized US category of race is inseparable from settler colonialism, slavery and racism: ‘Race as identity breaks down on the irreducible fact that any sense of self intrinsic to persons of African descent is subject to peremptory nullification by forcible extrinsic identification’ (ibid., p. 157). There is no neutrality to race given its historical origin in a hierarchical imaginary based on the presumed norm of whiteness. In analogy to witchcraft, Fields and Fields articulate ‘racecraft’ as a foundational practice in the USA, ‘pieced together in the ordinary

course of everyday doing' (ibid., p. 25). Stephan Palmié reworks this notion into what he calls 'molecular racecraft':

> Genomic forms of identity arbitration ultimately partake of the ethnographically well-known logic of systems of divination that, in disclosing the "hidden" agencies and essences that appear to shape particular social arrangements and events, stabilize and reproduce the cultural order that throws up the question such oracular systems purport to answer in the first place (2007, p. 210).

Practically, the majority of those with a molecular identity in criminal and forensic databases have already been racialized/identified in US society (Murphy, 2015). This form of molecular identity points to the exceptional US histories of who has always been identified and identifiable as someone who does not belong, or as someone who presents a risk to the social order — questions that already preoccupied Tocqueville during his travels in the USA (Cole, 2001; Ngai, 2004; Gross, 2008; Browne, 2015). In California, historically shifting and mobile populations have long made the question of who belongs and has real agency to shape the future particularly potent (Didion, 2004; Glenn, 2004; Pitti, 2004; Cohen, 2011).

Because some have already been identified and others have not, it is important to conceptualize molecular identity projects as necessarily partial. One can only be different if another is the same; practices that identify difference presume a previously established norm, which originates in human practice (Fanon, 1969; M'charek, 2013). The invisible norm of whiteness in US history is the grounds on which sameness and difference were negotiated in the first place and, in consequence, racial, gender, sexual and other identities have emerged (Davis, 1981; Spillers, 1987; Wiegman, 1995).

Racecraft—as deeply ingrained everyday doing in the USA—has not only produced race, but more abstractly defines practices of identification at the heart of identity. Rather than question the authenticity, materiality or power of identity categories, I conceptualize racecraft as a process through which difference and identity are produced relationally. Because '[r]eality is an active verb,' Donna Haraway writes, '[b]eings do not preexist their relatings' (2003, p. 6). Identities, including race, indeed emerge in these relatings, or in the ordinary 'doings' that precede all 'things' (Barad, 2007, p. 151). Amade M'charek draws on this ontological synthesis of nature and culture in her analysis of race as a 'relational object' that, she argues, materializes in practice (2013, p. 420). No less real in this account, molecular identities are preconditioned by practices of identification.

Molecular Identities and the Specter of Deviance

The notion of removing agency from one's identity, i.e. to emphasize that it is not a choice, is predicated on stratified societal relations in which difference is ascribed in relation to physical and behavioral norms (Patton, 1993). For example, attempts to identify a molecular determinant of sexual orientation have to use genetic samples provided by self-identified homo- and heterosexual customers and entail commercializing molecular identification technologies as an empowering tool of self-knowledge. Yet the existence of such self-identified customers is predicated on practices that identify some as different from others—and not just different, but deviant. Sexual minorities exist because they were historically identified as deviating from normative heterosexual formations, indeed often as deviant from

white heteronormativity (Hammonds, 1997; Ordover, 2003; Ferguson, 2004; Puar, 2007). Such experiences can end up shaping not only resistance against identification, but also the resulting identities that are formed in relation to (and often embrace of) deeply gendered and racialized, and criminalized, communities of sexual practice (D'Emilio, 1983; Lorde, 1984; Rubin, 1984; Anzaldúa, 1987; Epstein 1996).

While molecular research on sexual orientation long predates both consumer genomics and criminological genetic databases, the search for a molecular gay identity has revitalized longstanding debates about a 'gay gene'. According to Kate O'Riordan (2012, p. 362), the gay gene 'exists as an idea, a repetition, a discursive pattern, an emotional effect, a label, and a hypothesis'. For some people, it represents the positive re-positioning of responsibility for their identity onto molecular causes. As Joseph Dumit (2003) argues in the context of depression, new technologies (e.g. brain scans) enable a form of 'objective-self fashioning' that allows patients to feel relieved of responsibility for their mental illness. In both cases the rejection of responsibility works by re-drawing the Cartesian line between body and self.

A Rupture with Molecular Determinism?

Identities are preconditioned by deeply ingrained histories of racial-sexual classification and relative to cultural ideas about what bodies signify (Sekula, 1986; Cole, 2001; Aas, 2006). In the context of a paradigm shift in life science from determinism to susceptibility, Nikolas Rose (2006) diagnoses a shift in how identities are conceived in 'advanced liberal societies.' He argues that a new probabilistic politics characterizes these societies:

> In our present configuration of knowledge, power, and subjectivity, what is at stake . . . is not the resurgence of racism, the specter of stigmatization, a revived biological reductionism, or the legitimation of discrimination: it is the changing ways in which we are coming to understand individual and collective human identities in the age of genomic medicine and the implications of these for how we, individually and collectively, govern our differences (2006, p.185).

Rose argues that the desire consumers have to learn about themselves or anticipate risks is framed by the experience of health as an individual responsibility (cf. Lee, 2017). Here Rose, however, does not address how history has shaped contemporary US life to enable different futures for differently positioned subjects. The historical imposition of difference remains a detriment to those who have been identifiable from an invisibly white standpoint and now populate CAL-DNA. Not all are consumers, and despite promises of empowerment, even consumer participation in the governance of differences remains uncertain (Parthasarathy, 2003). Molecular identities relate back to practices that have long identified some people as risky; in this sense, there cannot be a resurgence of racism when it has never ceased to structure every aspect of US life. It is no wonder, then, that in the intensifying efforts for data collection and identification, scholars have found molecular identities and identification technologies to compound racist surveillance, policing and control (Generations Ahead, 2009; Washington, 2010).

Two Molecular Californias

Histories and Futures of a Technological Frontier

California is a frontier of various sorts—of geography, techno-science, innovation. As a state, California epitomizes a notion of unbounded capitalist development in which biological materials and information are the value-producing heart of new industries, and where novel technologies are used in controversial political or administrative processes (Sunder Rajan, 2006; Murphy, 2010). Silicon Valley stands out globally as one of the most generative sites of bio- and information technologies (Saxenian, 1996; Marwick, 2013). The technological frontier represented by California also reflects a frontier of the USA's intensifying inequalities. On the one hand, the state's gross domestic product (GDP) is the largest in the USA and ranks twelfth among world economies. Moreover, California has the USA's highest number of billionaires who 'personally hold assets worth $485 billion, more than the entire GDP of all but 24 countries in the world' (Alexander, 2014) and the state's economy ranks seventh worldwide in 'employment, home values, and personal and corporate income' (Marois and Pei, 2015).

On the other hand, California is home to some of the USA's economically poorest regions, which are also intensely stratified by race and ethnicity (Lewis and Burd-Sharps, 2014). Effects of rising rents and foreclosures are here as ubiquitous as the ever-growing tent cities of the homeless. There is a strong equation of the technological enterprise with California's overall economic progress, although the state government recently went through a budget crisis and public services are being increasingly eliminated (Allegretto and Reidenbach, 2012). As a result, there is a growing divide in which legal and medical services, for example, for poorer communities are cut while high-end condominiums continue to be built, despite already extreme stratification and an increasing shortage of affordable housing (Dillon 2011; Solnit, 2013; Bourgois et al., 2017). Such cultural complexes—that is, globally circulating ideas about California as a technological and, therefore, progressive frontier—have largely upended the notion that California represents a bastion of liberal values through rising gentrification, displacement and white privilege (Solnit, 1994; Finney, 2014; Knight, 2015; Fleming, 2016). These realities serve to ground the risks of using molecular identification technologies with concretely situated actors.

California I: CAL-DNA, a Racialized Archive

Grounded in this history, the question of who is part of the (governing or knowledge-producing) collective imposes itself. A key example is CAL-DNA, which is a database that contains the molecular identities of nearly two million offenders and, in a separate index, over 700,000 arrestees as well as the forensic profiles collected from crime scenes. The US-wide DNA database index for law enforcement, CODIS, of which CAL-DNA is a part, overall contains 13,084,145 offender profiles; 2,891,856 arrestee profiles; and 811,065 forensic profiles (FBI, 2017). These databases are used in a range of applications in criminal and other investigations and are said to have become indispensable as biometric identification technologies (Heinemann et al., 2012).

In California, collection of DNA from those arrested for specific felony charges began in 2004, and in 2009 from those arrested for any felony, i.e., from criminal suspects not convicted felons (National Conference of State Legislatures, 2013). This practice has significantly increased the number of samples in the database (Suter, 2010). The difference between the two database indexes is important to keep in mind; unlike the offender index, the arrestee database compiles genetic information of those who were arrested on a felony charge. The arrestee database is thus a collection of the molecular identities of criminal suspects, a repository of suspicious bodies, traces with the potential to become meaningful signals but taken from bodies already embedded in webs of signification (Browne, 2015; Murphy, 2015).

The disproportionate arrest and incarceration rates of Black and Latino men have become an often-cited fact about the USA. Civil rights lawyer Michelle Alexander writes that:

> The U.S. Census Bureau reported in 2002 that there are nearly 3 million more black adult women than men in black communities across the United States, a gender gap of 26 percent…Although a million black men can be found in prisons and jails, public acknowledgment of the role of the criminal justice system in "disappearing" black men is surprisingly rare (2012, p. 179).

California is currently estimated to have thirty-eight million inhabitants, 73.2 percent of them white, 38.6 percent Hispanic or Latino, 14.4 percent Asian, 6.5 percent Black or African American, and 1.7 percent Native American.[2] Yet 'Black[s] and Hispanics comprise 68 percent of inmates' in California's prison population of 133,217, of which 127,229 are men (California Department of Corrections and Rehabilitation, 2013; Taylor, 2013). In 2015, the state reports a total number of 314,748 felony arrests, 41.5% of them are Latino, 32% White and 20.3% Black (California Department of Justice, 2015).

Precisely because they drastically overrepresent some identity groups—African Americans make up 6.5% and Latinos 38.6% of the Californian population but much higher proportions of prisoners and arrestees—the numbers show that race and gender profoundly intersect in the identification of certain signifying bodies as suspicious or risky (Ordover, 2003; Ossorio and Duster, 2005). To my knowledge, proportions of ethnic groups in the national or state-level DNA databases are not collected or publicly available information, but reports and legal analyses indicate that they reflect the racial disparities of the criminal justice system. For instance, social justice organization Generations Ahead states: 'Blacks and Latinos are disproportionately represented at every phase in the criminal justice system. By every measure, these disparities determine whose DNA goes into the databases, and with every wave of expansion these disparities become greater' (2011, p. 6). Similarly, Daniel Grimm writes:

> The speed at which DNA databanks acquire Hispanic profiles is going to accelerate at a disproportionately high rate for several reasons. . . . [L]ike the African American community, the Hispanic population is subject to embedded system

[2]See https://www.census.gov/quickfacts/table/PST045216/06, accessed March 16, 2017. In U.S. census practices, multiple entries of race and ethnicity are possible. The census itself has a contested history of collecting and classifying data (Porter, 1996).

> multipliers that converge to amplify disproportionate risks of privacy violations from DNA databanks (2007, p. 1184).

Those being identified externally via the state are the usual suspects of the American criminal justice system—Black and Latino men who are subjected to state scrutiny through the application of molecular science to law enforcement (Generations Ahead, 2009; Silverstein, 2013). Here, racecraft operates such that difference necessarily refers back to deviance from (white) bodily and behavioral norms (Palmié, 2007; Fields and Fields, 2012) , showing how identity is inscribed in identification practices and technologies, specifically in terms of readily identifying (gendered-male) race or ethnicity as associated with risk and risky behavior.

In CAL-DNA, STRs can be used for identification because they differ in each individual but are not indicative of health or physical appearance (M'charek, 2005). In the USA, these data have not (yet) been connected to the molecules through which geneticists and anthropologists have claimed to manifest race (Duster, 2006; Fullwiley, 2007b). Even though CAL-DNA's data can indeed claim race-neutrality, the database's demographics are influenced by a long history of racialized punishment that targets non-white male bodies and preconditions CAL-DNA as a racialized archive (Skinner, 2013; Browne, 2015). The reason that the CAL-DNA database can be characterized as racialized lies not in the molecular data itself but in the socio-history and context that frames the molecular data. For example, Duster (2008) points out that the increasing overrepresentation of racial minorities in US genetic databases amounts to a biometric registration of a subpopulation.

Through the controversial use of CAL-DNA for so-called familial searches, which California has pioneered alongside the UK and the Netherlands, criminal suspects' relatives increasingly come under legal scrutiny based on their genetic relationship to an alleged offender. Traditional searches match crime scene DNA to a sample in the database. Familial searches scan offender databases for partial matches of crime scene DNA, and any resulting genetic relatives can then become investigative leads (Murphy, 2010; Dolan, 2011). Rising numbers of false positives in database searches through a range of such new methods, and in some European states by forensic DNA phenotyping, reflect an increase in the risks that minority populations face in becoming implicated in criminal investigations (Obasogie, 2009; Kim, et al., 2011; M'charek, et al., 2012; Rohlfs, et al., 2013).

CAL-DNA identifies subjects who did not choose a molecular identity, but who are at its receiving end. Daniel Grimm writes:

> Inferring the possibility of wrongdoing through genetic identity will stigmatize some groups more than others. As a result of the disparate input and output situations within the DNA databank system, it follows that African Americans and Hispanics will face the sting of stigmatization far more often than others. Such a result creates the possibility of entrenching stereotypes that correlate race and ethnicity with criminality. DNA databanks expose the possibility that social and political forces will become increasingly reduced to biological explanations, such that behavior is viewed as prefigured by identity (2007, p. 1193).

Grimm highlights the danger of prefiguring behavior via molecules of those whose identities are already stigmatized. A historical association between male Black and Latino populations and criminality—indeed an entrenched sociological belief—is what makes molecular identities so risky for some Americans. Scientists may have moved beyond molecular determinism, but that does not mean that biologically determinist politics have changed.

California II: 23andMe, Gay Genomics

Even though increasing overlaps in database populations are likely, the consumers of personal genomics services are generally not the same people whose bodily traces populate CAL-DNA. What began, spearheaded by 23andMe, as exclusive so-called 'spit parties' to market DNA testing as a fun recreational experience has grown over the last decade into a mass consumer genomics industry. While the clinical utility of the genome remains controversial, this industry makes broad claims across health and genealogy that are entwined with identity and identity politics. The data sources of the industry's molecular databases are largely a different collective, and the example of 23andMe's gay gene project shows how claims to molecular identities are co-constituted with political ideas about agency, choice and empowerment.

23andMe explains online that requests from its customers—explicitly described as well-situated European Americans—motivated a study to identify molecular determinants of sexual orientation.[3] A scientific poster presented at the American Society of Human Genetics (ASGH) annual conference in 2012, a mix of science conference and industry fair, stated:

> We examined the correlation between sexual identity and ~1000 phenotypes already characterized in the . . . database through other surveys. We replicated previous findings showing a positive association between lesbians and alcoholism, and between lesbians and gay men and several psychiatric conditions. . . We did not find evidence of an association between sexual identity and SNPs on the X chromosome in men, women or the samples combined at genome-wide significance. (Drabant, et al. 2012)

The replicated non-genetic findings, here called phenotypes, were listed prominently in a colorful graphic. They included a puzzling array of categories from sports to personality, for example: 'playing golf,' 'reflux,' 'AIDS,' 'Alcoholism,' 'Cries Easily,' 'Served in Military,' 'Shaves Legs,' 'Taken Psych Meds,' or 'Short of Breath from Stairs.' The poster also stated that 'Genome Wide Association Studies analyses were conducted in individuals of European descent.' The study concluded that '[p]revalence of homosexuality is difficult to estimate due to sample bias and participants' unwillingness to divulge their sexual orientation, among other things.' In this statement, the historic and contemporary risk of identification—indeed of stigmatization as deviant or pathological—that underlies the resistance to disclosing sexual identity becomes apparent.

[3] https://blog.23andme.com/23andme-research/23andme-studies-the-genetics-of-sexual-orientation/, accessed December 13, 2017.

On its website, 23andMe links to O'Riordan's (2012) above-cited article, 'The Life of the Gay Gene: From Hypothetical Genetic Marker to Social Reality.' In it, O'Riordan analyses the gay gene within a history of pathologized homosexuality, as medicalized deviance from a heterosexual norm. She argues that the gay gene became entrenched in public consciousness precisely when a range of clinical databases continued to define homosexuality as a biomedical condition and potential molecular variant, despite scientific evidence to the contrary. She concludes that 'genomics has become an everyday explanatory narrative that depoliticizes questions about identity by categorizing them as genetic' (2012, p. 367). Linking to this article without commenting on its findings, 23andMe's scientific abstract at ASHG however optimistically concluded that, while no indicative molecular variants were found, 'data collection is still ongoing, and increased sample size may help to clarify the roles for currently suggestive associations.' Indeed, 23andMe states online that this project 'is now the largest genome-wide association study [GWAS] of sexual orientation ever done.'[4]

In a conversation I had at the ASHG conference, a practicing scientist from 23andMe (PS) was quick to establish that she herself identifies as a lesbian with an interest in studying her own sexual orientation genetically. Although the study did not identify genetic associations or clarify the significance of European descent, PS asserted that the political import of this research was to make sure that (white, in this case) sexual minorities were represented in genomics. She argued that self-identified minority groups' specific genetic risks should be addressed in molecular studies and framed this project as meaningful progress toward the political inclusion of racial or sexual minorities (Fullwiley, 2007b).

When I raised doubts in our conversation about studying sexual orientation genetically and concerns that this research was historically predicated on deviance from a heterosexual norm, PS emphasized that 23andMe's gay customers have themselves pushed for this research. She argued, 'they just want to know.' Customers wanted to know if their gay identity was influenced, or even determined, by their genes. While no genetic causation could be implied from the research, the project revealed a consumer desire for molecular identities as a framework of self-fashioning and as a possibility of becoming someone in the kinds of politics Rose (2006) describes as probabilistic.

In our conversation, PS stated that 'as a member of the gay community, I support our efforts to find out more about ourselves, so as to empower ourselves.' Speaking as a lesbian, she drew on the power of a lived experience as evidence of the legitimacy of her knowledge project. It was precisely her subject position—her identity—that authorized her project. Well-versed in direct-to-consumer genomics' vocabularies of marketing and identity politics, she suggested that because self-identified gay customers demanded this research, its value was not problematic.

To question someone's desire for empowerment is of course to tread in murky political waters; for instance, Alondra Nelson (2016) argues that the social life of DNA forms part of a wider racial reconciliation project in the USA. But in the present discussion, a white gay

[4]https://blog.23andme.com/23andme-research/do-ask-do-tell/, accessed December 13, 2017.

geneticist used her identity to legitimize a knowledge project and quest for empowerment. She claimed membership in a historical identity category that she sought to recode as molecular. In this encounter as much as in the rhetoric of the new personal genomics industry, sexual and ethnic minorities become potentially empowered consumers of molecular identification technologies, while collective histories of resisting identification and criminalization and embracing stigmatized identities are made invisible.

In our conversation, I sensed PS's discomfort about my own position as we, somewhat heatedly, discussed the project at one of US bioscience's most important scientific events. A young geneticist joined our discussion at the poster exhibit to articulate his enthusiasm about studying himself and others like him molecularly. The 23andMe project, he said, had the potential to authoritatively settle the question of choice versus nature when it comes to sexual identities. I asked PS what the company would do if they found causal associations between sexual orientation and a specific SNP, and a well-funded anti-gay group then petitioned the company for a project to develop gene therapy to "cure" homosexuality. 'We just wouldn't do that,' was her reply. The assumption that molecular identities are divorced from social processes becomes clear when considering that another group might fund their own project for gene therapy based on 23andMe's research.

In her ethnographic work at 23andMe, Sandra Lee cites a customer's hope to construct a molecular identity:

> Describing her results as "pretty much 100% European," Helen said that she was not surprised that her maternal haplotype originated in central Europe, but she was hoping that her genetic results would settle a long-time argument she had with her sister about the exact location of their "family village." She was disappointed that her results did not provide an answer (2013a, p. 554).

Helen's desire to determine the origins of her DNA in a modern European nation state is a prime example of what Marilyn Strathern (1995) described as contemporary American nostalgia for culture articulated in consumer demands. PS cites consumer demand and uses it as legitimizing reason for genomic research. She implies that any group can petition for research about itself, as long as the reason represents an argument about the need for empowerment. It remains unclear what other mechanisms play into the decision to pursue a project. If consumers can direct research priorities, and anyone can theoretically become a consumer in a democracy, the decision to fund a project necessarily depends on the politics of decision makers. Panofsky and Donovan's (2017) study of the popular uses of genetic ancestry tests by white nationalists, who want to prove their pure genetic lineages, shows not just how impossible it is for companies to control their products' uses, but also the uncomfortable trajectories of molecular identities that are based on fraught political solidarities expressed in consumer demand.[5]

Like the personal genomics industry at large, PS ultimately legitimizes her research under the paradigm of the agency provided by participation, pushing for the inclusion of sexual or

[5]Notably, in the right-wing extremist online fora these authors tracked, 23andMe is described as a Jewish company engaged in a multicultural conspiracy against white Americans.

ethnic minorities in molecular enterprises by arguing that empowerment is paramount in a probabilistic politics of the consumer self. From the 23andMe project, a ‘white gay identity’ also becomes imaginable as a bounded group, as if it had always been there at the molecular level. Difference is re-inscribed molecularly, normalizing a new white gay identity against which other sexual and racial deviants are already being identified (Puar, 2007). Stratifications of race, sexuality, gender, perhaps even class all crystallize in the possibility of niche markets for molecular identities. The white gay subject described here seeks molecular causality, in order to explain identity as molecularly prefigured. There is agency in this crafting of molecular identity, while disempowering horizons of knowledge projects, and the coercion or stigmatizing effects they may entail, are dismissed as a road that simply will not be taken.

Perhaps it is a question of numbers and inclusion; that is, as more people become consumers of molecular identification technologies, more people can select their molecular identities. Yet what is empowering for some is stigmatizing for others. As CAL-DNA’s molecular identities show, they do not always entail a self-identifying subject who partakes in probabilistic self-crafting. Rather, CAL-DNA’s molecular identities intensify an old risk of becoming implicated in criminal investigations—of being identified yet again without one’s own choosing. The demographics of CAL-DNA’s subjects illustrate how much identity categories are contingent upon norms of whiteness and the continuous workings of racecraft. A rupture with biological determinism thus seems to apply only to the consumers of molecular identification technologies, and in California these consumer populations dominate both governing and knowledge producing collectives. In both arenas, these collectives look increasingly to bodies rather than to a historically understood present.

Conclusion

Despite claims that molecular identification technologies are harbingers of consumer empowerment, the identities these technologies create tell a tale of two molecular Californias: one is a tale of an unchanged biological determinism that continues to mark some bodies as risky and criminal, the other tale is of individual empowerment through the consumption of molecular knowledge. The applications of molecular identification technologies in CAL-DNA and 23andMe respectively constitute different molecular identities which emerge in practice through the interplay of naturalized identity categories with processes of perceiving, ascribing, naming and reclaiming, all as relational practices.

The first is a molecular identity constituted by the state for arrestees and offenders. CAL-DNA places ethnic and racial minorities at increased risk of contact with the criminal justice system, and thereby exacerbates these groups’ removal from important social positions. The history of external identification of some, but not others, as suspicious constitutes an ongoing form of biological determinism that has framed the emergence of identity categories in the first place. This political reality, indeed the incessant force of American racecraft as a form of external identification (Fields and Fields, 2012), has made CAL-DNA— a facially race-neutral genetic database—an archive that now overrepresents Black and Latino men. The disparate effects of the overrepresentation of externally-identified groups in the database are magnified through this database’s increasing uses (Duster, 2008). Through familial

searching technologies, the genetic relatives of criminal offenders may become implicated in criminal investigations based solely on a molecular relationship, evidencing the partiality of claims to new probabilistic self-making (Rose, 2006).

The second is a molecular identity constituted by consumer choices about how to create and use knowledge. In a growing personal genomics industry, the research company 23andMe has played a significant role in delineating a white gay molecular identity. That identity is said to empower but is decontextualized from historical practices of stigmatization that made —and continue to make—some people different or "deviant" from societal norms (O'Riordan, 2012). This history of identification created sexual and racial minorities in the first place and preconditions desires to find identity in molecules. While some people may indeed feel personally empowered by situating their sexuality in their genome, the specter of anti-gay gene therapy haunts a molecular gay identity at a time when white supremacist consumers claim that DNA proves their purity.

Molecular identification technologies coexist with social stratification, racism and homophobia. While bodies and behaviors are significant only in relation to one another, the personal genomics industry naturalizes them as molecular categorical identities, empowering some through new knowledge, but also creating an illusion of control over how our bodies are identified by others. I described this process by drawing on literatures in science, gender, race and queer studies that analyze the primacy of relational processes (doings or practices) over reified categories (things) (Haraway, 2003; Barad, 2007; M'charek, 2013), and that elaborate in myriad ways how gender, racial and sexual identities can correlate with such processes (Butler, 1990; Epstein, 2006; Benjamin, 2016). The uses of molecular identification technologies in California show that progress, including agency in the crafting of selves, remains a relative term. When some are already identified and always more identifiable than others, and when identity classification is predicated on whiteness, the resulting identity projects are necessarily partial and tenuous. To argue that identities are no longer negotiated through the surfaces of always/already perceived bodies neglects to consider people's divergent realities at this technological frontier and the fraught histories that continue to shape its political present.

In California, a futurist imaginary of the frontier embodies the white settlers' spirit of moving forward, of opening up new domains and creating new realities. In this cultural context, the risks entailed in using molecular identification technologies are downplayed, and the new genetic identities these technologies create obscure both past and present inequalities. As STS scholars have argued, the increasing uses of these technologies in California, like in other centers of technological progress, are embedded in political claims about empowerment (Reardon, 2010; Roberts, 2011; Lee, 2013b). These claims are oriented toward the future and de-historicize identity from the foundational practices of racecraft and identification that have preconditioned contemporary commonsense subject categories and precarities in the USA. As direct-to-consumer genomics grows and many states are expanding the criminological uses of molecular databases, increasing overlaps between database populations will highlight the precarity of inhabiting one subject population versus another, and the entangled dynamics of coercion and choice when it comes to matters of identity.

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