Navigating narratives of genetic categorization at the frayed edges of identity

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History can be described as a story, or narrative reporting on past events to create meaning and explanation for the present/future. Narratives of genetic history are presented in the genetic ancestry testing (GAT) results specifically maps, percentages, and related information to consumers expecting “answers” related to identity and belonging. Engaging in thematic narrative analysis I ask how GAT results’ narratives use ethnicity/race/nationality to categorize sameness/difference and what these narratives inform about group boundaries through the comparison of online result materials received from four GAT companies: 23andMe, Ancestry, MyHeritage, and FamilyTreeDNA. These results are presented as an in-between space where bio-historic-cultural contents are negotiated with previous knowledge/experiences. This study found results narrate dichotomies of “self” and others, individual and collective, personal and private, and the present and the historical, and serves to highlight problematic perceptions of genetics history as an essential/unchanging product, reducing and ignoring diversity within and moving between groups.

Keywords: genetic ancestry testing; narrative; results; ethnicity; culture; genealogy

Introduction

Genetic ancestry test (GAT) companies offer consumers the story of their genetic history, emphasizing the results of genetic testing as revealing authentic belonging to one or several genetic groups each tied to a “unique” story imbedded in the collective through historical/socio-cultural narrative. Research has found that individuals engage with genealogy or family history research in their search for a sense of belonging and identity (Mehtiyeva and Prince 2020; Moore and Rosenthal 2021). Therefore, consumers, the majority “amateur” genealogists, who send their DNA samples to GAT companies for a fee, expect in return “answers” regarding identity...

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questions such as “Who am I?”; “What genetic/ancestral/ethnic group do I belong to?”; “Where do I belong?”; and “What do these results mean?”

The body and its representation in a strand of DNA are presented by companies and researchers as an encrypted archive, whose secrets require an “expert” to decipher and are portrayed as illegible for “ordinary people” (Harrison 2020, 48). The gene in relation is represented as a historical document (Nash 2015), containing the resources for political, ideological, and individual claims to return to, and to learn and gain understanding from (de Saint-Laurent and Obradović 2019). Thus, engaging with GATs and specifically the results received, is presented as a means for gaining a better understanding of oneself, as MyHeritage (2021b) claims, “Your DNA-test offers you the powerful experience of discovering what makes you unique and learning where you really come from.” Therefore, if individuals engage with genealogy and GATs to learn more about themselves, as previous research shows, the content of these results and how they are narrated is important in gaining understanding of the potential impact on individuals’ construction, conceptualization, and maintenance of identity. This study compares the narratives presented through the results of autosomal tests from four GAT companies 23andMe, Ancestry, MyHeritage, and FamilyTreeDNA, and asks how GAT results’ narratives use the underlying social phenomena of ethnicity/race/nationality to categorize sameness/difference and what these narratives inform about group boundaries.

This study applies Brubaker, Loveman, and Stamatov’s (2004) challenge to treat racial, ethnic, and national groups as collective cultural representations rather than a stagnant product, arguing that traditional definitions undermine the constructivist perspective of dynamic and shifting group borders. In other words, ethnicity/race/nationalism become a way of seeing and making sense, classifying sameness and difference, acting as “filters that shape what is noticed or unnoticed, relevant or irrelevant, remembered or forgotten” (47). Therefore, they become part of the conceptual process of searching for “self” that occurs through and in relation with the “other,” noting differences and similarities (Stets and Burke 2000).

Identity negotiations “between self and other, individual and social, personal and historical” made by consumers through their interaction with results on the GAT website can be understood as an in-between or transitional space (Ellsworth 2005, 60; Winnicott 2005). Through acquiring knowledge and experiences that informs, this in-between space has the potential to challenge previously held conceptions (Barth 1993).

The narratives presented by GAT results are not always straight forward but underline a presumed link between ethnicity and “soil,” while simultaneously presenting two seemingly contradictory constructions of ethnicity: one embodied, primordial in the biological (blood), and the other culturally constructed in the form of traditions. It is through the analysis of narratives presented in the in-between space that the frayed edges of identity are exposed (Grosz 2001) and structuralist concepts of genetic groups, ethnicity, race, and nationality are challenged.
Genetic ancestry tests (GAT)

Since the emergence of GATs beginning late 1990s, their status as a scientific authority versus recreational pastime, and influence on individuals’ concepts of identity remains widely debated. Stories of “hidden ancestry” or mistaken identities followed by “discoveries” and revitalization of cultural heritage or disenchantments in family lore regularly appears in media. Genetic ancestry history relayed in television programming including celebrities serves to increase the scope of awareness and popularity of these tests and GATs have become more accessible through the reduction of fees and an increasing number of companies offering these services. The process for the test itself is intuitive: the consumer is provided with material to spit into a tube or wipe a cotton-swab inside their cheek that is subsequently returned to the company for analysis. The results are received several weeks later through the company’s website platforms in the form of genetic ancestry/ethnicity estimate percentages, color-coded geographical worldwide maps and various regions, and cultural/historical information.

In their study of interpreting other’s genetic ancestry results, Bobkowski, Watson, and Aromona (2020) found that individuals initially perceive results as intuitive, but the closer they read and/or attempted to decipher meanings of percentages, concepts, groupings, and scientific explanations, the more confused and doubtful of the results’ accuracy they become. Previous research has examined the marketing of the tests (Scodari 2017; Elliott 2020; Bliss 2013), the impact of tests on test-takers’ perception of identity (Phelan et al. 2014; Roth 2018; Bliss 2013; Panofsky and Donovan 2019; Scully, Brown, and King 2016; Kramer 2015; Shim, Alam, and Aouizerat 2018; Williams et al. 2021; Bobkowski, Watson, and Aromona 2020; Gregory 2019), as well as motivations for engaging with GATs (Roth et al. 2020; Roberts et al. 2017). A few studies have engaged specifically with the results material provided by the GATs companies, however, these tend to focus on mDNA/YDNA (following the migration of maternal/paternal line respectively) and the consumer’s use of, or lack thereof result documents, and the online chat forum (El-Haj 2012; Ruckenstein 2017).

Consumers’ agency and perceptions of results are highlighted by El-Haj (2012)’s study of the adjacent online forum posts, finding that while “being Jewish” means more than simply having genetic material, upon receiving the test results users presume them to be meaningful and credible. Tyler’s 2021 study also focused on commentators use of results to “self-fashion” identities to legitimize previously held social and political positions of race and national belonging. She concludes that a critical approach does not necessarily result in anti-racism or liberalism but rather can reinforce legacies of colonialism, and white racial/power hierarchies (Tyler 2021). Similarly, White Nationalists used statistical, logical, genetic and/or historical knowledge to dispute the legitimacy of unwanted results and to negotiate racial identity boundaries (claiming diversity within whiteness) (Panofsky and Donovan 2019).
While GATs may be used to reify biological notions of race, studies have found that GATs may also be used to empower, shape, and reimagine ideas of racial and ethnic groupings and experience (Benn Torres 2022; Tyler 2008). The current study, while noting the user’s agency and interaction with results, also recognizes like others before (e.g. Reese 2001), that what information and how it is presented to consumers affects the user’s reading, and engagement (Ruckenstein 2017). This article uses Brubaker, Loveman, and Stamatov’s (2004) proposition to take a cognitive perspective of ethnicity, race, and nationalism – perceiving the three to have a common underlying phenomenon.

The process that GAT companies engage in, including translating DNA samples into results presented through various levels of association i.e. reference groups, geographical regions, present and past inhabitants, and their associated cultural traits, (myths) of identity and continuity, and consumable end products, suggests that the results presented are far removed from the initial biological material submitted. It is through this process that the negotiation of dichotomies arises of “self” and “other/s,” individual and collective, personal and private, biology and culture, and the present and the historical. The current study focuses only on one portion of this process of identification and belonging – the narrative in which this negotiation is situated and provides a critical examination of the three main information components received by consumers in their results from GAT companies: percentages, maps, and accompanied historical/cultural information.

Key concepts

*Ethnicity, race, and nationalism*

Definitions, discussions, and research surrounding this trilogy abound. What is interesting with Brubaker, Loveman, and Stamatov’s (2004) discussion is how they observe an intersectionality of ethnicity, race, and nationality. They observe several common subdomains with varying dimensions of differentiation that could be attributed to all three, not exclusively to one conventional definition, including: criteria of membership, transmission, fixedness/fluidity, degree and form of naturalization, degree and form of embodiment (physical/phenotypic markers), importance attributed to distinctive culture, degree and nature of territorialization organization/symbolism, nature of claims to autonomy (48). While they do not suggest that one concept should take the place of all three, Brubaker, Loveman, and Stamatov argue that the cognitive and socio-cognitive mechanisms and processes, on a larger scale, are grounded in the same form of phenomena conventionally coded to the distinct domains of race, ethnicity, and nationalism.

The results presented by GAT companies act as a pedagogical pivot point, a hinge as Ellsworth argues, through which the past and present inform each other. The individual is presented a transitional in-between space of learning in which they negotiate past and future, self and others (Ellsworth 2005; Grosz 2001). Rather than a comparison of fixed identities, the in-between space allows
for a comparison, a development or becoming that reveals the frayed edges of identity and the potential for social/cultural transformations (Grosz 2001, 92–93; Ellsworth 2005).

El-Haj (2012) argues that group categorizations of an ethnic/nation group are depicted with modern cultural and political ideas and that it is important to recognize membership as unstable/shifting. El-Haj observes the “double speak” of genealogy as individuals are faced with the “authenticity” of the biological meaning of genetics and simultaneously are told they have agency to choose (to forge ties, adopt practices, etc.). These choices are “made authentic” in relation to the genetic grid that provides “truths” of who you were from the beginning. Thus, choosing to “reject” GAT results, means to reject a “historical authentic self” that is verified scientifically (247).

**Genetic ancestry**

GAT companies emerging in the late 1990s (Nash 2017), are among the latest additions of marketed pursuits of the past to be consumed (Cross 2015; Sierra and McQuitty 2007; Salmose 2019), visited (Alexander, Bryce, and Murdy 2017; Murdy, Alexander, and Bryce 2018), or preserved/revitalized/discovered (Bennett 2018). These pursuits include historical media (e.g. television programs), ancestral tourism, theme parks, pilgrimages (religious and secular), and genealogy research groups/workshops (Foeman 2012).

Traditionally genealogy is defined as the study of pedigrees or descent and used mostly to prove rightful lineage/ancestry and thus, inheritance of power or land. The term genealogy is associated with building a family tree with names, dates of birth and death and in some cases place names. Genealogy has developed and is used often interchangeably with “family history” which is a broader concept and includes the concept of “kinship.”

Genetic genealogy is a development of this traditional form of family history research. GAT companies attempt to differentiate genetic testing from traditional genealogy by way of emphasizing its “scientific rigour,” presenting their tests as “the latest science” (23andMe 2021a), “cutting-edge” and “more precise than ever” (AncestryDNA 2021) conducted by “experts in the field” (FamilyTreeDNA 2021a). They claim to break through “brick wall[s]” in your genealogy research and offer a “revolutionary strategy” (MyHeritage 2021b), implying not only the scientific “factual” value of GATs but its necessity for discovering “your origins” and who you are. Initial GATs focused on tracing mtDNA back to the “cradle” of civilization in Eastern Africa to one of the original “Eve(s)” (Nash 2015). Increased mediaization on public platforms resulted in an exponential increase of popularity of direct-to-consumer GATs. The Autosomal genetic test is now arguably the most well-known and popular, tracing all ancestral lines with the claim to reveal one’s ancestral ethnicity (or the ethnic grouping of ancestors).
Genetic genealogy challenges and adds to the debate of whether identity is primordial (biology/genetics based) or constructed through experience, culture and/or choice. Some test-takers perceive GAT through notions of legitimacy, as the “scientific nature appears to offer consumers a sense of objectivity” in terms of a claiming a particular identity or heritage (Golbeck and Roth 2012, 416). Other test-takers and researchers (e.g. TallBear 2013) argue that identity and the development of self, is more complicated and corresponds to a person’s experience and environment, including their exposure to or possession of cultural heritage. Scodari (2017) studying GAT advertising concludes that while there is a primary focus of biological relatedness, the inclusion of culture inheritance is contextual and subjective. She points out that using terminology such as “ethnic ancestry,” GAT companies construct categories that are based upon racial categories and the claim that race and ethnicity can be discerned from individuals’ DNA. Scodari asserts that in doing so, GAT companies not only are complicit in the processes of racialization of identity but contribute to the misappropriations of genetic science (11–12).

Arguing that culture inheritance is nonbiological, El-Haj (2012) claims an entanglement of GATs with geography and ethnicity. Agreeing, Nash emphasizes that genetic identities (as opposed to other forms of identity) are a combination of empirical evidence (historic/cultural/social “facts”/archival or genetic material) and a practice of self-fashioning (choice) (2002, 2015, 13; Eller 1997). Thus, ethnic identities are behaviors that are learned/taught in relation to and interaction with others (Winnicott 2005; Barth 1969, 1993). This perspective is in opposition to the primordial discourse which perceives ethnicity as predetermined, non-negotiable, and embodied in individuals’ DNA.

**Critiques of genetic ancestry**

The analysis of the use of genetic data within academia as the field grows and divides into more specific areas including ancient DNA (aDNA) (Strand and Källén 2021; Halewood and Hannam 2001) is not proportional to the number of studies conducted (one exception is Claw et al. 2017). The geographic nature of DNA has been discussed and problematized extensively by Nash (2002, 2004, 2006, 2013, 2015, 2017, 2020) and already in 2003 Welinder problematized the oversimplification in the interpretation of genetic data. Reardon and Tallbear (2012) among others, argue the databases collection of “original populations” closely resembles the theories of cultural evolutionism despite the Human Genographic Project (National Geographic Society 2021) organizers’ attempts to steer clear of accusations of racism (Digangi and Bethard 2021). Roth and Ivemark (2018) found that individuals’ construction of identity was based more on their identity aspirations and social appraisals than simply accepting GAT results. This paper continues this critique of the use of genetic data through the examination of the narrative(s) presented by GAT companies.
Sample and method

For around one-hundred US dollars GATs offer consumers a “scientific” breakdown of their genetic makeup related to ancestral genetic groups linked to geographical places. While the number of companies offering GATs has increased (74 in 2016; Phillips 2016) this study focuses on four of the most popular and longest operating namely: FamilyTreeDNA (the first direct-to-consumer GAT), Ancestry.se, 23andMe, and MyHeritage.

There are multiple types of tests focused on ancestry, mitochondrial (mtDNA) following the maternal line, the Y-chromosome (YDNA) following the paternal line, and the autosomal test that analyzes 22-pairs of (non-sexed1) chromosomes inherited from both parents in comparison to the company’s “reference group” – specific to each company. Other tests available include health (e.g. Saukko 2017, 2018) and tests specific for various groups such as African Americans (e.g. Abel 2018).

This study focuses specifically on the autosomal test in the analysis and comparison of the results received by the author. Each of the GAT companies provided through their web-platform a list of percentages, a map, and historical/cultural information. This is the focus of the study’s analysis and comparison, not the periphery information (e.g. adjacent blogs or chat forums).

In using my DNA, this study could have developed in various ways, including autobiographical or autoethnographic. As this study aims to analyze and compare the narratives of the four GAT companies rather than from a user’s (or my own) perspective, my interaction with the results is to be seen as a convenient sample. Other researchers have utilized their own DNA samples prior. El-Haj (2012) submitted her DNA to understand the results received but does not describe or discuss these at length but analyses the online forum for users’ reactions of results. Similarly, Ruckenstein (2017) used her sample to gain access to other users and their use of results.

Having submitted a sample of DNA to MyHeritage in December 2019, I submitted further samples to the remaining companies in the autumn of 2020. The results were returned at varying rates but all within 8 weeks of submission. All companies sent an email upon analysis completion with the invitation to login and view the results. As described above, autosomal tests compare a specific section of individuals’ DNA samples to a “reference group” which is the combination of the company’s reference population, those they describe as representative of a specific genetic origin – most often related to a geographical location, and customers’ data results. These vary in size and thus are not proportionally comparable. For example, 23andMe uses the reference datasets of 45 populations of individuals who they believe, “reflect populations that existed before transcontinental travel and migration were common (at least 500 years ago).” Customers’ data is included as part of the reference dataset when they indicate their known ancestry of both sets of grandparents from the same
region that has not experienced “massive” migration in the last hundred years. 23andMe states they are vigorous in their filtering of candidates and 10% are not included (https://www.23andme.com/ancestry-composition-guide/). That means, however, that the majority, 90%, are included and the comparison data is reliant on individuals to some extent knowing their ancestral heritage in advance. Strontium isotopic analysis which investigates human bones to determine where individuals have lived, ate etc. during their lifetime is not what GAT companies claim nor do.

Interestingly results are often “updated,” shifting either percentages and/or inclusion in ethnic/genetic groups. For the sake of comparison purposes, the researcher has decided to focus specifically on the commonly found “Scandinavian” or “Swedish” region of the results. Digitally saved results from Autumn 2021 are compared in this study.

**Deep map**

The map included in the results presented by the GAT companies could be described as a “deep map” or a “regular” map that is enhanced through the layering of socio-cultural and/or historical information that goes beyond the traditional geographical coordinates and description of environment (e.g. mountains, buildings etc.). The deep map is described as place and its contents (people, animals etc.) in a mediated form that includes the ideological dimensions as well as the physical according to Bodenhamer, Corrigan, and Harris (2015, 3). Deep maps are perceived as a useful tool to examine this complexity of the multiplicity of places and acknowledge reflexively how human agents construct spatially framed identities (Bodenhamer, Corrigan, and Harris 2015, 3).

**Thematic narrative analysis**

Identity is not self-evident in a swab or spit-sample, and results, initially deceptively simple, create confusion (Bobkowski, Watson, and Aromona 2020). Thus, customers require GAT companies to dictate how they should interpret the results, by framing the construction of identity and “filling in the blanks.” A story, or narrative(s) are thus, created to guide, create structure, and organize information presented. Riessman and Quinney (2005) emphasize how the use of narrative illuminates how everyday communicative action co-constructs knowledge. Oikkonen’s (2013) study of UK GAT company Oxford Ancestors observed narratives of commercialization, scientific advance and personal quest in the construction of gender. Similarly, thematic narrative analysis in the current study examines the historical-socio-cultural components included within the results presented, highlighting reoccurring patterns of text (including photos/sound) to reveal how, when interacted within the space, constructs a storied narrative of ethnic, racial, and national categorizations.
Key findings

All four companies presented the data similarly, but what they called my results varied. 23andMe presents the results as an “Ancestry Composition.” My Heritage labels the same as an “Ethnicity Estimate” while including additional “Genetic Groups” (MyHeritage 2021a). AncestryDNA uses the same term “Ethnicity Estimate” with percentages of, as they call it, “identity-by-descent,” genetic ethnicity or ancestry inference (Ball et al. 2021). FamilyTreeDNA labels this as my “Origins” stating that it is a “unique genetic assemblage that has been passed down to [me] from [my] ancestors” with the option of also examining my “ancientOrigins” (FamilyTreeDNA 2021b).

Regardless of label, GATs present results, ancestral composition and by proxy ethnic identity, as a primordial biological trait which can be “decoded” with the aid of the right scientific resources. The person attached to the body is presented as requiring assistance to access their “true” ethnic/genetic identity (self). The genes define the “self” in reference and in difference to “others,” simultaneously defining the individual while drawing the boundaries of collective groups.

Ethnicity is prevalent in the narrative discourse placed forth by GAT results, either as a title or implied by description and is presented via percentages. As I am of mixed heritage and have conducted “traditional” paper and archives family history prior, I believed I had relatively good knowledge. As others prior (Tyler 2021; Panofsky and Donovan 2019) stressed, there is a danger for GAT results to be used to legitimize previously held social/political positions of race and national belonging, however like El-Haj (2012) and Ruckenstein (2017), I use my GAT results as an entry point for analysis. While this current study focuses on my Scandinavian and/or Swedish categorization, I am also Chinese and Polish. In focusing on one “part” of me, I am not ignoring nor rejecting my other “parts,” but for the sake of simplifying the comparison and demonstration between companies I have chosen one region.

Examining specifically Scandinavia and/or Sweden as categories, 23andMe notes that I am a “likely match” with Sweden (21.2%) and specifically Västerbotten county (Northern Sweden) and did not detect evidence for recent ancestry from Denmark, the Faroe Islands, Iceland, or Norway. Ancestry concurs stating ironically that Sweden is “Primarily located in: Sweden” estimating that I am 19% Swedish and mostly likely from Northern Sweden. Contradictory, according to My Heritage I am not included in the Scandinavian/Swedish ethnic group but am included in the genetic group Sweden (Västerbotten, Västernorrland and Jämtland counties) asserting instead that I am 10.4% Finnish. The other companies also find Finnish ethnicity/origins/ancestry as 2.2%, 5%, and 8%. FamilyTreeDNA allocates 4% to Scandinavia (which by their definition and map is comparably an enormous geographical region).

Interestingly, while most groups overlap between companies, FamilyTreeDNA also found a large percentage Middle Eastern/African, while Ancestry and
23andMe, found Ashkenazi Jewish heritage. As a consumer, one would assume that, as the samples of DNA sent to the companies were identical, the results received would be similar, however, as seen this is not the case. The large differences between the companies in reference groups, geographical placement and cultural associations that are made can result in very different results and thus may not be used for exact comparison. The presented narrated interpretation/translation of GAT results is the focus and is examined first by company and consequently compared in the discussion.

**FamilyTreeDNA (FTDNA)**

FamilyTreeDNA (2020) provides “myOrigins – a mapping tool that provides a detailed ethnic and geographic breakdown of where your ancestors came from” as well as “ancientOrigins” mapping ancient ancestors’ migration routes matching customers’ DNA to “ancient” European civilizations, and “Family Matching” which sorts the DNA matches according to maternal/paternal lines. A “Chromosome Browser” tool is also included to compare the DNA “blocks” with the “genetic matches.”

FamilyTreeDNA compares the submitted sample to 90 “population clusters.” These are grouped by first “Continental region” in which one or more “Super populations” are located. These “Super populations” contain one or more “population clusters” which in turn consists of a “reference population” matching the submitted sample. These reference populations are based upon the combination of academic reference population clusters as well as the company’s own testing databases.

Interestingly, the FamilyTreeDNA Help Centre answers “Who are you?” under the heading of “Population Clusters,” stressing the “self” as the result of negotiated socio-cultural experiences and learning accumulated over a lifetime, while separating the genetic “self” as a scientific “fusion” of the past and future that “continues through you.” They state:

> That’s a question with many possible answers. You are the sum of a lifetime of experiences. You are the result of the choices you have made. You are the result of truths your parents instilled in you. You are the outcome of values drawn from your culture. From a genetic perspective, however, you are the outcome of a long process of genealogical fusion. A man and a woman coming together, one of the millions on a vast constellation that explodes out across the earth and coalesces back to a few ancient progenitors. The personal tree of life continues through you. (FamilyTreeDNA 2021c)

**Information**

Heavily focused on historical events, the information begins at the end of the last Ice Age in Europe 11,700 years ago. Scandinavia is described as the “last frontier”
to be settled by Hunter-Gather groups migrating from continental Europe. Several key culture crossings are noted as important including: the “Corded Ware culture,” the introduction of Indo-European languages from central Europe, and the Viking-era migration of Norse peoples. The 400-word narrative notes briefly the establishment of the kingdoms of Norway, Denmark, and Sweden, and ends with describing the contemporary Nordic model of public welfare and free-market capitalism. Scandinavia is narrated while initially remote and “untouched” through history becoming a place of exchange and movement, and now-modernity. The edges of where exactly Scandinavia ends and begins are demonstrated as frayed, overlapping and as seen in the map-far reaching across political or national borders.

MyHeritage
“Genetic groups” introduced in December of 2020 by My Heritage are based on the comparison with a selected 1.7 million other consumers’ test results (MyHeritage 2020). This they describe is an “enhancement” of the initial 42 ethnicities that are based upon comparison to the company’s reference panel (“Founder Populations”). While results show a percentage for ethnicity estimate, the genetic groups are not assigned a percentage and state “you are either a member of the group or you are not” (MyHeritage 2020). Moreover, MyHeritage acknowledges the possibility of groups to be comprised of several ethnicities, stating that “members of a group share geographic origins, but they may have members who come from diverse ethnic backgrounds” who after migration create a group of their own (MyHeritage 2020). Thus, genetic groups are about who you are connected to (sameness of geography) rather than your composition (difference of ethnicity).

MyHeritage labels percentages as “ethnicity estimate,” explaining further in a frequently asked section, “an ethnicity or ethnic group is a group of people who share distinct social attributes such as culture, heritage, language, history, religion, and other characteristics. Ethnicities are usually identified with a specific geographic region where their group originated” (MyHeritage 2021a). Thus, both ethnicity and genetic groups are connected to and through a geographic region. The results narrate difference portraying determined genetic groups and ethnicity as individuals who share constructed/learned “social” attributes. Curiously, although ethnicity is narrated as constructed, their social attributes are biologically measurable as a percentage.

Information
The connected information is brief but includes a music clip of a contemporary rendition of violin fiddling music with drums. Although there is no explanation for the music choice it can be assumed (as each “ethnicity” has a link) it is intended to be representative of the musical culture of the presented categorization. The text
describes Finland and Western Russian culture as influenced by Nordic and Slavic culture – emphasizing the integration and interaction of cultural heritage and revealing the difficulty to categorize a “pure” genetic group, ethnicity, race, or nation. It describes that, while words were borrowed into the Finnish language, it is not related to Scandinavian nor Russian languages, but rather to Sámi languages and other minority languages. The included picture depicts two dogsled teams in Lappland, while Finland is shown at the edge of a snowy forest. There is a narrative of the contemporary grounded in the past – the gene (individual/“self”) embedded in the socio-culture (collective in relation to “others”), utilizing references to folk-music, indigenous languages, and cultural activities as evidence.

Ancestry

Ancestry also features a subcategory to the “ethnicity estimate” called “genetic groups.” According to Ancestry “ethnicity estimates” reveal information from your ancestry hundreds to thousands of years ago as a result of the DNA sample compared to the reference panel. “Genetic groups” in contrast, consist of AncestryDNA members (i.e. customers) who are connected through a shared recent ancestor from the same region or culture despite possibly having different ethnic backgrounds. To be included in the reference panel (70 overlapping regions/groups) individuals require paper proof of a long genealogy connected to a place/group and genetic confirmation (Ancestry 2021). Like MyHeritage, Ancestry narrates genetic groups as a commonality between people and ethnicity as unchanging for thousands of years.

Information

Ancestry provides another variation of a “deep map” for their consumers’ results. This is particularly interesting as different maps highlight different information to the consumer (Reese, Gandy, and Grant 2001). Ancestry, while still a blend of socio-cultural and historical information has a clear emphasis on temporality (historicity) and emigration (little acknowledgement of immigration) demonstrated through an interactive timeline on the right-hand side of the map.

This timeline when scrolled down to read the information zooms in and out of corresponding places on the map. Each year listed has also been paired with selected DNA matches (i.e. other consumers). Beginning in the 1700s with an overview of Sweden’s “group history” (contrasting previous companies’ start at the Ice Age), it describes common work forms in northern Sweden (e.g. mining, reindeer herding, and seal-hunting), and historical crises (e.g. failed harvests and famine). After the overview, it details main historical/cultural events for every 25 years from 1700s to 1925.
Ancestry’s description includes cultural and social aspects such as types of food baked, traditional gendered work roles, etc. The section 1800–1825 entitled “Traditional cultural expressions” includes the description of holidays and celebrations such as weddings and funerals that lasted for several days at home rather than in a church. Traditional dishes such as pickled herring, meatballs and salmon were common for Christmas and Midsummer meant dancing around the Maypole. This, Ancestry claims, is the beginning of the “so-called Swedish identity” with music and stories folk-traditions “a newly awoken interest for the so-called Swedish identity was created.” The years 1825–1850 narrate school reforms as a nation becoming – centralizing education through the building of schools and removing it from individual households and priests. Sections 1850–1900, 1900–1925, and 1925–1950s, focus on the Swedes’ mass emigration specifically to the United States, the subsequent difficulties of employment, and maintenance and transference of cultural inheritance, describing how Swedish Americans “read Swedish newspapers and Swedish was spoken in clubs, churches and families.” It also includes the struggle to keep their culture through attempts for their children to be offered courses in Swedish in school and through the Swedish church. Swedish identity is narrated as something created, and while grounded in the past requiring continual maintenance and refueling for the next generation to carry into the future.

23andMe

While similar in many ways in its aim and services, 23andMe develops a more elaborate educational narrative. 23andMe’s “Learn More Explore your Scandinavian heritage” is found under “Ancestry Composition” with nation-states outlined and a table of “populations” and percentages included. 23andMe compares the GATs to 45 test populations divided into contemporary political nation-states/geographical connected regions (e.g. Northwestern European–Scandinavian–Sweden–Västerbotten County). Three exceptions are culturally defined: Ashkenazi Jewish, Gujarati Patidar, and African Hunter and Gatherer. Selecting a category causes the map to magnify and reveal corresponding information. For example, selecting Northwestern European provides brief information that these “countries rim the North and Baltic Seas and have been connected throughout much of history by those waters” (23andMe 2021b).

Information

Inside “Learn More Explore your Scandinavian heritage” a shared genetic heritage narrative of the people of Norway, Sweden, Denmark, and Iceland is relayed. A pan-Scandinavian narrative of a genetic (racial/ethnic) commonality is created by treating these four nationalities as one, while contradictorily treating the political borders and collective nationalist identity of nation-states as definitive.
Likewise, 23andMe reiterates the reciprocal influences and interactions of the historic Scandinavian people and others, emphasizing historic Vikings’ maritime expansion and the continual immigration of people from hunter-gatherers to Germanic-speaking tribes – this contradicts the genetic uniqueness previously claimed.

Highlighting the narrative of uniqueness, the consumer is asked by 23andMe if they are “curious about Scandinavian history, art, and traditions? Explore a few of the many nuances that make this population distinct” (2021c). Previously the focus of the results was its reliability evidenced by science. Now the myths and fantasies of Scandinavian culture create a “how-to” for engaged consumers.

A schematic organization of various “nuances” of Scandinavian cultural identity is presented, beginning with the “Anatomy of a Hygge Space” or the Danish concept of “coziness” instructing how to recreate and learn this cultural component to construct a Scandinavian identity. The space of Hygge with the use of the term “anatomy” implies a living embodied space. Noting how Hygge has become a “buzz word” internationally in recent times and provides a three-step guide to its construction, the individual is told to “be present” to eliminate noise “either literal or emotional” and to “surround yourself with joy” in the form of people and things. In this one cultural aspect, 23andMe has constructed a cultural space in which the individual can enact/embody their cultural identity concretely. Individuals are to tangibly feel, taste, hear, see, and smell this aspect of their Scandinavian identity which 23andMe labels “Craft & Tradition” underscoring the ritualistic historical nature of this activity and thus its “authentic” nature within the lexicon of (pan)Scandinavian culture.

Airbnb Advertisement follows on the webpage, reminding the reader of the business partnerships engaged with by GAT companies and questioning the divide between personal and private while offering cultural heritage for identity purposes as evidenced in the offering of playing with “polar dogs” and enjoying winter sports. 23andMe reflects the Norse mythological references in descriptions by highlighting specific cultural events which a person could inhabit for a limited amount of time. Connecting the Norse pagan goddess Skade with competitive Nordic skiing is an attempt to construct skiing as specifically part of the Scandinavian (“(pan)nationalist”) myth. Moreover, the juxtaposition of the cultural and scientific is highlighted in, “your DNA ties you to a millennia-long history of winter sports, cold-weather adventures,” while noting you should start exploring the homes and experiences that are “as unique as your DNA.” Additional information is included such as the teaching of the Swedish word “Gökotta” meaning the early rising to listen to birdsong and the introduction to the Icelandic Thorrablot Festival Feast, an offering of songs, poetry, stories and eating exotic foods such as selsheifar (fermented seal flipper). “The Magical Princesstårtå” is offered as the quintessential Swedish dessert despite being a more recent cultural addition introduced in Åkerström’s 1932 cookbook. The “Norwegian Fjords” is
the final offering, narrating poetically as “dramatically towering” and noted as a UNESCO-listed wonder. 23andMe’s business partners emerge again emphasized in the three alternatives to experience the Fjords from the railway, by kayaking “past the Viking-era ruins … crystal clear lagoons, and bubbling waterfalls” or hiking “along the craggy edge … [to see] ancient cemeteries, flowering meadows, and fairytale-like creeks” (2021c). These narratives, while highly descriptive aiming to bestow an atmospheric experience, is eclipsed by the photo of the Northern Lights which engages the viewer and at first glance one would think this is the “sight to see” as the category suggests.

Discussion and conclusion

Comparing the narratives presented in autosomal test results from four GAT companies 23andMe, Ancestry, MyHeritage, and FamilyTreeDNA, I show how this narrative of sameness/difference is an underlying factor grounding social categories of ethnicity/race/nationality. While previous studies indicated consumers are not naïve nor passive users of GAT, the conflicting narratives of scientific rhetoric, combined with historic, and socio-cultural traditions, create a confused message of what exactly is found in one’s genes, and therefore potentially alters the reading and interaction of the user.

Geneticists perceive DNA as an encrypted historical document, or map, that contains instructions for the body while simultaneously citing the past (Nash 2015; Harrison 2020). The prominence placed on the requirement for another, an expert/scientist, to interpret and unlock this genetic history (Harrison 2020) underlines the test results as an in-between place of negotiation for consumers.

The following discussion is organized according to reoccurring (sometimes overlapping) thematic dichotomies of self-others, individual-collective, personal-private, present-historical and nature-culture.

“Self” and others

GAT companies, as seen in the rhetoric from their webpages and advertisement, emphasize that consumers and their genetic samples are unique and require deciphering to unlock their genetic secrets (Scodari 2017). The results received narrate identity as primordial and are relayed through a breakdown of the customer into various labeled percentages while simultaneously implying cultural inheritance as an inherent factor. While GAT companies emphasize the “uniqueness” and personal ancestral story, they do so through the comparison of others’ genetic samples found in the companies’ respective reference databases. Therefore the “self” is constructed relationally to “others” and as seen by the results, this “self” is constructed using different percentages depending on the “others” found in the reference database.
Individual and collective

The choice made by the GAT companies to utilize and focus on the map as the first presentation of a consumer’s results is curious as traditionally genealogical information is presented as a family tree and many GAT companies offer the option to build a family tree connected to these results.

It is interesting to note that all four companies use maps with contemporary political borders labeled more or less extensively while not taking into consideration the changing nature and movability of these borders. This is problematic because when GAT companies connect reference groups to geographical regions and label them in contemporary terms, it creates a false sense of a continual, unadulterated collective identity; when in fact people from the beginning of time have migrated in and out of regions as described in the accompanying historical information. Following the logic of the “ancestry composition” or “ethnicity estimate,” DNA results are equivalent to a collective imagined community of “nationality” (e.g. Swedish). While the GAT companies argue that DNA is compared to “population groups” these groups are visibly closely tied to a geographical landmass which they have categorized in mainly nationalist terms. There are exceptions to this such as “Ashkenazi Jewish” which while tied still to land, is defined by a continual cycle of diaspora.

GAT’s results received by the four companies project a narrative of identity. FamilyTreeDNA, while first in its offering of direct-to-consumer genetic testing, provides the least amount of information. The sweeping and brief historical overview includes a nod to the cultural influence and migration patterns of individuals (e.g. cordware). MyHeritage interestingly allows and acknowledges the multiplicity of ethnic backgrounds and identities and includes the confusing information that while ethnicity is innate, primordial genetic groups are not and can comprise of several ethnicities. Moreover, the inclusion of contemporary musical representations and the influence of other cultures and languages portrays a culturally constructed narrative of identity. Ancestry provides a historical overview and migratory path for those individuals connected through the consumer’s DNA sample. This historical account, however, also contains an emphasis on cultural traditions and the inheritance of “Swedishness” by Swedish Americans. The emphasis on Swedish Americans and the emigration to the US, while important, fails to recognize the unequal development of Swedish identity in Sweden vs the US, the former evolving and integrating new cultural activities and the latter primarily maintaining cultural traditions of yore (Blanck 2006). It also ignores the fact that many Swedes in the era of the great emigration of 1850s–1930s emigrated to a variety of places around the world including Australia, New Zealand, and Canada in addition to the US.

23andMe’s results portray a similarly framed duality of identity construction. 23andMe attempts to separate “genetic ancestry composition” and “ethnic identity” but in their inclusion of cultural “how-to’s” create a connection and narrative
of identity as anything but separate. The inclusion of the “how-to” for individuals wishing to become more of the ethnic identity their genetic tests already state they “are,” is flawed on many levels (El-Haj 2012).

Approaching Scandinavia as a homogeneous culture while there is intersecting and a sharing of cultural traditions (Barth 1969), there are many who would argue that “being Swedish” is different from “being Danish.” The example of “Finnish” vs “Swedish” is perhaps even more complicated. Historically they have moveable borders, with Swedish still spoken in regions of Finland. Culturally there are some similarities but there are more distinctions. In terms of language, Finnish is closer to the indigenous peoples of the indigenous region Sápmi than it is to its neighbor and once ruler, Sweden. The GAT results shared in this study reflect the discord of various heterogenous cultures placed together, which leads to the question of why certain geographical regions are categorized as a group while others are not. It is important to note that 23andMe in their definition of the so-called region of Scandinavia, does not include the indigenous and minority populations, namely the Sami, Romani, Jews, Swedish Finns and Tornedalers, nor do they acknowledge their historical and cultural influences, thus propagating a notion of an erroneous unified type of nationality, race, and ethnicity within the region.

Likewise, cultural aspects emphasized by GAT results as “authentic,” making the population – note not a geographical region – “distinct,” project the narrative of a culture gene rather than as Scodari (2017), TallBear (2013) and others argue as something contextual and based on experience/environment.

Furthermore, the choices of various cultural traditions are flawed. The reference to “polar dogs” and sledding is a false claim for “Scandinavian” identity and lifestyles, as large polar dogs used for sled pulling were not common or used in Scandinavia until very recently for “recreation” and tourism purposes (as evidenced by the ad). Indigenous Sami reindeer herders traditionally traveled on skis using smaller breeds of dogs for herding, and tame reindeer to pull their sleds. “Polar dogs” are a North American Inuit tradition and are a cultural import. Moreover, the juxtaposition of the cultural and scientific is highlighted in, “your DNA ties you to a millennia-long history of winter sports, cold-weather adventures, and so much more,” while noting you should start exploring the homes and experiences that are “as unique as your DNA.” These statements and the attempt to “pass” cultural imports as uniquely Scandinavian are falsehoods which present framed contradictions of the construction of identity as cultural and personal preferences, implying that the connected ancestral composition percentages can be proven valid through personal preferences and tastes (e.g. enjoying skiing validates a Scandinavian genetic ancestry).

The individual consumer is connected to collective groups through GAT results. The self and individual identity are attributed value through the connection and placement within various collective groups. These collective groups are constructed through the imagined community of shared genetic material and the presented historical, socio-cultural information (Anderson 2006). GAT results do not
only divide the world into contemporary political geographical regions presented neatly on a map, but these regions are attributed historical and socio-cultural components that transcend temporal boundaries to create an anachronistic construction of a collective group identity. The cultures and traditions of the past are not differentiated from those more recently acquired, and thereby, facilitate the marketing of business partners’ products as valid choices for consumers to connect with their ancestry and ancestors of another time. As 23andMe stated, “you may choose to identify with your Scandinavian ancestry” and this is accomplished, it is implied, through engaging in various ways with the presented cultural activities (2021c).

**Personal and private**

The GAT results’ offerings of selected cultural experiences and information also is an indication of a blurring between perceived private or personal spheres of activity with that of the public and commercial. This blurring is also seen through the inclusion and connection with genetically matched “relatives” or as some say, “genetic cousins.” Test-takers can access others’ percentage ancestral/origins/ethnic groupings as well as compare their results with those found on the list. The lists are updated regularly with the possibility (often requiring a subscription fee) to contact those they are matched with. Moreover, online forums/chatrooms allow users to engage and “self-fashion” identities to legitimize as demonstrated by previous research (Panofsky and Donovan 2019; El-Haj 2012; Tyler 2021). The fact that personal genetic data results are collectively available for comparison with others and in some cases are shared beyond the marketing and matching, to researchers (upon the consumer’s agreement) and/or in the case of FamilyTreeDNA to law enforcement, highlights the slippage between what is private and what becomes public.

**The present and the historical**

The blurring between historical and present is perceived in the anachronistic approach in the presentation in which all cultures regardless of when they occurred in time somehow are represented in the body of the consumer. This approach creates a conduit for consumers to construct an identity, connecting themselves to a collective group identity and their ancestors, through embracing all cultural traditions regardless of the fact if their ancestors engaged with them (e.g. eating prinsesstärt) or not. Moreover, there is a clear lack of regard for the influence of cultures of indigenous populations, migration, and immigration. The critique of GAT company’s business model (Moneer et al. 2021) is seen perhaps most clearly by the example of 23andMe. The various cultural activities presented to embrace and enact one’s ethnic identity are advertisements for business partners. Moreover, results presented by GAT companies appear to be targeted at
individuals who have limited knowledge of their ancestral cultural background, perceiving the anachronistic nature and the cultural activities suggested as “authentic” and valid suggestions. Whereas for others such as the “Swedish” author and others who have a personal experience with the places and cultures their ancestors referred to in the GAT results, it presents a clash of knowledge and brings into question the validity of the GAT as a whole. This echoes user responses presented by Bobkowski, Watson, and Aromona (2020), who in their attempt to decipher results became more doubtful of its validity.

GAT results have relayed narratives that project sameness/difference in several ways. First as a primordial identity associated with the “scientific” genetic material. GAT companies differ not in the scientific procedure to extract the genetic information but in their interpretation which in many ways produces a less reliable report. The second narrative follows the logic of genetic groups as seen in MyHeritage and 23andMe. These groups are based on connection – a sameness of geography which yet maintains a notion of personal (possibly differing) ethnicity. While geography is key to connecting individuals, the digital space of the website acts as an in-between space where past and future, self and others are negotiated with the potential for change. The lack of flexible understanding in the results surrounding migration, diverse ethnic/racial populations, and the changing political borders in the definitions of groups and geopolitical regions is problematic. The inclusion of cultural traditions and historical information as instructional evidence for the genetic scientific “truth” confirms this lack of sensitivity. As the examples of “Scandinavia” and “Finland” revealed, overlapping and appropriation of cultural “stuff” between categories do not simply testify to the interaction between groups, but to the co-inhabitance and frayed edges of the group identity (Grosz 2001; Ellsworth 2005). Revealing that while scientists, and arguably humans in general, relish creating categories and organization of people into groups, these are far from rigid, staid configurations. Rather, the narratives of sameness/difference, presented by GAT results, argue for an interconnected dynamic web that ebbs and flows.

Concluding remarks
This article has shown the dissonance of consumers’ genetic identity narrative(s) presented by GAT results and emphasizes the problematic nature embedded within genetic ancestry testing. Consumers seeking answers and authentic belonging are provided with an array of dichotomies and selective categorical information. The results of this study expose the frayed edges of identity through the blurring of temporalities, social spheres, and boundaries of groups and self. The results ask who and what cultures, (historical) places are excluded and what does this mean for the individual consumer’s search for answers and identity? It is critically important, then, to understand that while GAT companies present the resulting
narrative as scientifically grounded, consumers should consider that narrative as just one story out of many possible stories of their genetic history.

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No potential conflict of interest was reported by the author(s).

**Ethics**
This article is included in the larger research project entitled *Vid korsning mellan släktforskning, plats, och identitet* (English title: At the crossroads between genealogy, place, and identity) that has undergone and received approval from the Swedish Ethical Review Authority [https://etikprovningsmyndigheten.se/](https://etikprovningsmyndigheten.se/). # Dnr2019-05944.

**Notes**
1. I.e. not X chromosome or Y chromosome.
2. Historically includes countries on the Scandinavian Peninsula: Norway and Sweden but has developed to include Denmark.
3. The first option offered at the top of the main page after the consumer logs in.

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