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The consumer representation of DNA ancestry testing on YouTube

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The growth of consumer DNA ancestry testing has resulted in questions and critiques being raised in social and research contexts. This study examined individuals discussing their ancestry DNA testing results on YouTube by searching for the two most popular testing companies (23andMe; Ancestry) and the phrase “DNA results.” The finalized dataset consisted of 117 videos, on which directed content analysis was performed. In the videos, individuals used results to clarify, confirm, question, and re-evaluate their previously held conceptions of racial/ethnic identities. Reactions were more positive than negative (88.1% vs. 8.1%), and results more commonly reaffirmed (77.8%) than re-conceptualized (40.0%) one’s racial/ethnic identity. Ancestry testing and personal social media accounts were commonly promoted, demonstrating biotechnological hype where promotion abounds and critiques are scarce. Questions persist around the impact of ancestry DNA testing in reifying a scientifically inaccurate conception of race and what impact YouTube videos might have on audiences.

Keywords: DNA ancestry testing; YouTube; consumers; social media

Introduction

The rapid rise in DNA Ancestry testing (Regalado 2019) has sparked questions, discussions, and critiques around the application of the technology and its impacts in both social and research contexts (Park *et al.* 2019; Zwart, 2009; Caulfield *et al.* 2009; Nelson *et al.* 2018; Wagner 2010; Krimsky and Johnston 2017; Rachul, Ouellette, and Caulfield 2011; Duster 2016). The accuracy of the testing results has come into question (Park *et al.* 2019; Nelson *et al.* 2018; Krimsky and Johnston 2017; Saey 2018; Royal *et al.* 2010; Agro and Denne 2019; Duster 2016) and numerous concerns have been raised around data collection, control,

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use and access (Park *et al.* 2019; Zwart, 2009; Nelson *et al.* 2018; Wagner 2010; Roche and Annas 2006; Fullwiley 2008; Phillips 2016; Duster 2016). Further, it has been suggested that in social contexts DNA ancestry testing could lead to a rise in the strengthening of scientifically inaccurate notions of racial difference (Caulfield 2018; Phelan *et al.* 2014; TallBear 2014; Chou 2017), which research has shown can have detrimental social implications (Byrd and Ray 2015; Outram *et al.* 2018; Tadmor *et al.* 2013; Soylu Yalcinkaya, Estrada-Villalta, and Adams 2017; Duster 2016). Indeed, the idea of a biological or genetic categorization of race has been dismissed from a range of perspectives (Caulfield *et al.* 2009; Nelson *et al.* 2018; National Institute of Health 2007; Smedley and Smedley 2005; Kahn *et al.* 2018; Duster 2016), and in turn, “race” is more commonly posited as a social construct (Nelson *et al.* 2018; Kahn *et al.* 2018; Machery and Faucher 2005; Onwuachi-Willig 2016). And yet ideas of racial essentialism (Soylu Yalcinkaya, Estrada-Villalta, and Adams 2017) as substantiated on biological or genetic characteristics (Sarich and Miele 2004) as well as with cultural characteristics, persist and continue to have significant influence on and ramifications for the public.

It has been observed, for example, that in both Canada and Australia considerably higher percentages of the population are now identifying as Indigenous (Markham and Biddle 2018; Gaudry and Leroux 2017; Leroux 2019; Watt and Kowal 2018), which has widespread social repercussions, notably critique from Indigenous communities (Sturm 2011; TallBear 2013; Gaudry and Leroux 2017) and implications for Indigenous-related policies (Duster 2016; Daniels 2018; Walajahi, Wilson, and Hull 2019; Gaudry and Leroux 2017). There has been a long history in North America of individuals claiming Indigeneity, often with the purpose of socially and/or financially benefitting from those claims (Sturm 2011; Francis 2012; Duster 2016). Modern iterations of this phenomenon, such as the popular cases of American politician Elizabeth Warren and Canadian author Joseph Boyden, include the integration of DNA testing as a means of providing Indigenous “proof,” (Berg and Bradner 2018; Herndon 2019; Barrera 2016; Andrew-Gee 2017) an action which has sparked an abundance of critical perspectives (Keene, Nagle, and Pierce 2018; CBC Radio 2016; Jago 2019). It also been observed that African Americans are increasingly making use of DNA Ancestry testing as part of the modern “roots-seeking” trend popularized in part by media programming, which often features celebrities (Duster 2016; Nelson and Hwang 2013). Other racial classification cases are also evident in North America, for example, the case of Ralph Taylor, who has been pursuing legal action over the failure to qualify as a minority business owner using, in part, the results of a DNA ancestry test (Farzan 2018). Alongside the widespread growth of DNA ancestry testing for the general public (Regalado 2019) has come an increase of popular media commentary addressing the observed problematic cultural conflation of ideas pertaining to “race,” ethnicity, and DNA (Caulfield 2018; Zhang 2018; Kahn *et al.* 2018).

Research has shown that the marketing of DNA ancestry companies promotes ideas of “genetic essentialism” through efforts of “glamourizing” the power of genomic science whereby individuals could use scientific “proof” to align themselves with or distance themselves from socially ascribed identities (Nordgren and Juengst 2009). Commonly foregrounded in this marketing are the slogans related to activating self-knowledge through which one can “discover,” “reveal” or “reinvent” their personal identity (Nordgren and Juengst 2009; Walajahi, Wilson, and Hull 2019; Kragh-Furbo and Tutton 2017). Further research shows the variety of impacts that DNA testing has on individuals. DNA results can play a role in confirming as well as destabilizing preexisting identities, as assessment choices are made by testers when adopting or ignoring particular findings (Roth and Ivemark 2018; Scully, Brown, and King 2016; Nelson and Hwang 2013; Panofsky and Donovan 2017; Harris *et al.*, 2014). It is not, therefore, the case that DNA testing has solely a rigid deterministic impact, but rather that the testing provides identity tools or markers for testers to negotiate or work with (Nordgren and Juengst 2009; Walajahi, Wilson, and Hull 2019; Harris *et al.*, 2014), which may play a role in shaping perceptions around one’s identity as it exists with broader social networks (Roth and Ivemark 2018; Scully, Brown, and King 2016; Nelson and Hwang 2013; Panofsky and Donovan 2017). This process of negotiation varies from individual-to-individual, with some approaching the process as a serious endeavor and others as a leisurely activity (Roth and Ivemark 2018; Scully, Brown, and King 2016; Nelson and Hwang 2013).

In the current DNA Ancestry testing market two major players have emerged: 23andme and AncestryDNA (Regalado 2019). From its onset, 23andme deployed novel marketing strategies, such as “spit parties” – providing the saliva needed for DNA testing – which were held during popular events (i.e. New York Fashion Week and the World Economic Forum), and at which celebrities would participate in, and, importantly, perform DNA testing (Kragh-Furbo and Tutton 2017). The “spit party” performance was then replicated by members of the general public who recorded videos of their “spitting” and shared the content on social media sites such as YouTube (Kragh-Furbo and Tutton 2017). Numerous scholars have noted how personal genomics and social media, like YouTube, intertwine, as both involve exploring and connecting oneself – and an idea of oneself – with broader networks and communities (Kragh-Furbo and Tutton 2017; Harris *et al.*, 2014; Levina 2010; Nelson and Hwang 2013).

The objective of this study was to examine how individuals discussed their Ancestry DNA testing results on YouTube, which is one of most used social media platforms and most visited websites in the world (Khan 2017), and which earlier research identifies as a “largely understudied resource for understanding ... how the public is engaging with, science, genetics, biology and bodies” (Harris *et al.*, 2014, p. 73). Unlike the genetic testing YouTube research done on “spitting” or “unboxing” videos (Kragh-Furbo and Tutton 2017), or health and illness videos (Harris *et al.*, 2014), our research sought to explore the post-test

DNA Ancestry YouTube videos featuring individuals discussing test results in the context of ancestral heritage, similar to a study performed specifically for the demographics of African Americans (Nelson and Hwang 2013). Our primary objective was to analyze the representation of perspectives around the topics of “race,” DNA testing, and the sharing of DNA results in this context. Because we acknowledge “race” to be a problematic term, the word has been placed in quotation marks, and as the methods detail, other terms have been established for analysis in order to address the blending that occurs between “race” and “ethnicity” (i.e. Roth and Ivemark 2018). This medium and its particular communicative characteristics play an important role in this context. YouTube benefits greatly from the free labor content produced by YouTubers (Burgess, Green, and Rebane 2016; Postigo 2016; Morreale 2014; John 2013), and research has shown that the creation of YouTube videos are often geared towards creating viral content, or for initiating and growing personal brands, both of which can serve as potentially lucrative if large audiences are generated (Postigo 2016; Morreale 2014; Tarnovskaya 2017). This analysis, therefore, is tailored to the discursive environment of YouTube and includes a consideration of the presence of promotional material, including products or individuals’ social media accounts.

Methods

We performed a directed content analysis (Hsieh and Shannon 2005) that used inductive and deductive methods and was informed by methods previously used by our team (Rachul and Caulfield 2015; Rachul, Rasko, and Caulfield 2017; Marcon, Bieber, and Caulfield 2018). First, to build a data set of videos whose content included individuals discussing their DNA Ancestry testing results, we focused on the top 2 companies: Ancestry and 23andMe, as research shows these two companies dominate the DTC DNA ancestry testing market (Regalado 2019). Preliminary YouTube searches using our search inquiry [“company name + DNA results”] with other popular companies: FamilyTree DNA, My Heritage DNA, and Living DNA, reinforced these findings. To capture a potentially diverse range of videos and to maintain reproducibility, we executed our searches of “Ancestry DNA results” and “23andMe DNA results” using the 4 available filter sorting options provided by YouTube: Relevance, Upload date, View count, and Rating. On August 8th, 2018, we captured the first 20 unique YouTube URLs provided by the search results, and repeated for each filter. The search resulted in 160 videos (80 videos for each company).

To ensure consistency and accuracy in coding over various iterations, all videos were downloaded. Videos were excluded if they were a duplicate, produced by a testing company, or could not be downloaded. Sponsored videos produced by individuals were included. We also excluded videos if they were only a Part 1 or Part 2, included results but no sound, or did not include any results. During analysis, a video over 2 hours long was also excluded on the basis of being a considerable

time-length outlier as the average length of videos was 8 minutes and 51 seconds. The finalized dataset consisted of 117 videos, in which 135 individuals appeared.

To analyze the videos, we developed a coding framework informed by previous research on ancestry and DNA testing (Roth and Ivemark 2018; Scully, Brown, and King 2016; Nelson and Hwang 2013). The coding framework was divided into three main sections: video metadata, video characteristics, and video content. Metadata for videos included title, length, publishing date, category, and the numbers of subscribers, likes, dislikes, views, and comments. Video characteristics, in either the video itself or the description box (d-box) – which appears under a YouTube video –, included demographic information of the individuals featured in the video such as gender, age (as a soft approximate between younger, middle-aged, and older), nationality, as well as stated “racial ethnicity” (if provided) and the perceived “racial ethnicity” based on general visual characteristics (if not provided) as: White, Black, Latino, Middle-Eastern, Asian, or Indian. The concept of “racial ethnicity” was acknowledged as a problematic one for our analysis, and here we are referring to these terms as they relate to the most often used socially constructed categorizations. The blurriness between terms of “race” and “ethnicity” as observed in the videos were combined in the term “racial ethnicity.” Other video characteristics included the presence or mention of testing companies, sponsored content, product promotional content, and self-promotional content. Self-promotional content included content in the d-box or video asking viewers to “subscribe,” “follow,” or “friend” on social platform media accounts, posting links to other social media accounts, and/or asking viewers to like or comment on the video. The promotional aspects of the video were included to capture the degrees with which YouTubers were actively trying to generate attention around their content and/or social media account(s), often a central component of YouTube video generally (Postigo 2016; Morreale 2014; Tarnovskaya 2017). Indeed, issues of creating economic value around DNA testing through YouTube have also been raised by previous research (Kragh-Furbo and Tutton 2017, Harris *et al.*, 2014).

The video content section of the coding framework was designed to capture individuals’ perspectives on their ancestry testing experiences and why they had created a video to share their results. As such, the coding framework included questions designed to capture how the results were being presented, the impact the results might have on individuals, whether some results were discussed more often or with greater importance than others, whether individuals described actions that they may or may not take depending on the results, whether individuals drew comparisons between the DNA results and physical appearance and/or socio-ethnic cultural aspects, and lastly, a general sense of whether the experience was positive or negative for test takers (Table 2). Capturing all metadata and then coding for video characteristics, in addition to video content, allowed for analysis to be performed on whichever salient traits emerged.

Coding of the videos was conducted by two coders who first tested the framework with a random sample of 20% of the videos. Any questions raised regarding

coding consistency were clarified before coding began. After commencing, coders regularly met to ensure consistency on aspects perceived to be potentially ambiguous. Following this stage of the research, the two coders performed an internal audit on 20% of the videos to ensure coding uniformity.

Ethical considerations

Numerous ethical issues have been raised concerning research on social media content (Taylor and Pagliari 2018; Benton, Coppersmith, and Dredze 2017), and in light of these concerns and suggested protocols, the following considerations were made for this research. All YouTube videos included in this study were analyzed as discursive texts made publicly available, as was done with similar research (Harris *et al.*, 2014; Kragh-Furbo and Tutton 2017). As such, no analysis on users' accounts, outside of this singular video production, was performed, including during data collection. The videos included in the data set were made publicly available, which carries particular significance on a site like YouTube where the option for a private channel exists through which users, if they desire, can control and restrict access to content. Inclusion of user names will not appear in this report or in related presentations. Sharing of the data set, which includes URL links to videos, should occur only in cases where academics wish to verify findings or replicate the study.

Results

Metadata overview

The finalized data set of 117 YouTube videos featured a total of 135 people. The complete metadata and summary data are displayed in [Table 1](#). The videos were largely published in the years of 2017 and 2018, (97, 82.9%), and were primarily categorized by the videos' producers as "People&Blogs" (59, 50.4%); "Howto & style" (22, 18.8%); and "Entertainment" (16, 13.7%) as opposed to, for example, "Science and & Technology" (4, 3.4%) or "Education" (2, 1.7%). Sixty-one (52.1%) videos focused mainly on the company Ancestry, while 59 (50.4%) videos focused mainly on 23andMe. In a few videos, additional DNA tests were also discussed as a main focus, and other DNA tests were mentioned or discussed but as a secondary focus in 27 (23.1%) videos. The 117 videos, with an average length of 8:51 minutes, included content – and came from channels – demonstrating a mix of high and low levels of audience engagement with regards to views, comments, likes, dislikes, and subscribers. See [Table 1](#) for complete data.

Video demographics

Videos featured considerably more women than men (88, 75.2% versus 47, 34.2%), and most people fell into the middle-aged category (aged approximately 20-40),

with an almost equal number of younger and older people featured (15, 11.1% and 12, 8.9% respectively). Regarding “racial ethnicity,” 99 (73.3%) individuals in the videos explicitly categorized their “race,” and the remaining 36 (27.6%) were inferred through coding. Because of the accuracy issues when guessing “racial ethnicities,” these results are only presented as a summative picture and conclusions are not drawn from these data. The most common “racial ethnicity” in the videos was White, 72 (53.3%), followed by Black, 50 (37.0%), Latino, 25 (18.5%), East Asian, 18 (13.3%), and Indigenous, 13 (9.6%). See [Table 1](#) for a complete breakdown.

Promotional discourse

Combining the information provided by video producers in the d-box and the video’s content, a total of 6 (5.1%) videos were sponsored by companies. Product promotion was quite common in d-boxes, with 50 videos (42.7%) containing product information such as descriptions and/or links to products. Most videos contained self-promotional content, with 87 videos (74.4%) having self-promotional material either in the d-box and/or in the video content. The vast majority of these videos, however, had self-promotional material included in the video content (i.e. asking viewers to like or comment on the video, follow the channel, follow other social media accounts, etc.) with only 5 videos (4.3%) having self-promotional material in the d-box but not the video itself.

Video content

Main findings overview

Displayed in [Table 2](#) is a summary of the results from the complete coding frame, including the comparison between videos with and without self-promotional content. Approximately half of the people in videos (78, 57.8%) provided reasons for doing the DNA tests. In half of these cases (38/78, 48.7%) the reason was a succinct and brief explanation, for example, “being interested” or “wanting to know,” while in the other half of these cases (40/78, 51.3%) the reasons included more-detailed explanations. These latter cases commonly featured a theme of missing information in the familial lineage, which included instances of lying and/or withholding information among family members; not having complete information about biological parents, grandparents, or extended family members; and because of this having, for example “a burning desire to find out more,” or feeling incomplete and therefore wanting to know “the whole picture.”

Another dominant theme was the desire to solidify a sense of self through the testing, which included, for example, individuals wanting to know about potential Indigenous DNA roots, their overall percentage of DNA linked to Africa, the breakdown of their “whiteness,” and generally to learn more about “who” or “what” they are. For example, one individual stated that “doing testing shows

Table 1. Ancestry DNA YouTube results videos: metadata and overview data (Total videos $n = 117$, total people in videos $n = 135$).

Publication date		Audience engagement						
Year	#of videos (%)		Views	Subscribers	Comments	Likes	Dislikes	
2014	2 (1.7)	Average (mean)	184,477	241,594	840	3,688	248	
2015	2 (1.7)	Average (median)	6,728	1,600	112	205	11	
2016	16 (13.7)	Max	2,816,174	8,000,000	12,136	72,000	3,500	
2017	32 (27.4)	Min	16	0	0	0	0	
2018	65 (55.6)							
		Video length		People in videos	# of videos (%)			
		Average	8:51	Gender	Age ^a			
Category of video tag		Max	26:43	Men	47 (34.8)	Middle-aged	102 (75.6)	
People & Blogs	59 (50.4)	Min	1:08	Women	88 (75.2)	Younger	15 (11.1)	
Howto & Style	22 (18.8)					Older	12 (8.9)	
Entertainment	16 (13.7)					n/a (unclear)	6 (4.4)	
Film & Animation	8 (6.8)							
Science & Technology	4 (3.4)	Information included in video's description box (d-box) or title videos (%) #of						
Gaming	3 (2.6)	Sponsorship	Self-promotion ^b	Product-promotion ^c	Ethnicity	Nationality		
Education	2 (1.7)	Yes	5 (4.3)	75 (64.1)	50 (42.7)	17 (14.5)	16 (13.7)	
Comedy	1 (0.9)	No	112 (95.7)	42 (35.9)	67 (57.3)	100 (85.5)	101 (86.3)	
News and Politics	1 (0.9)							
Travel & Events	1 (0.9)	Information coded from the video content (people, $n = 135$) people (%) #of						
		Sponsorship	Self-promotion ^d	Ethnicity		Nationality		
		Yes	14 (10.4)	96 (71.1)	Disclosed	99 (73.3)	Yes	57 (42.2%)
		No	121 (89.6)	39 (28.9)	Inferred ^c	36 (26.7)	American	35 (25.9)
							British	6 (4.4)
							Canadian	3 (2.2)
							Australian	2 (1.5)
							11 others	1 (0.7)
Tests discussed (Main focus)								
Ancestry	61 (52.1)							

23andMe	59 (50.4)
My Heritage	5 (4.3)
FamilyTree	1 (0.9)
Unclear	2 (1.7)
Other tests mentioned	
yes	27 (23.1)
no	90 (76.9)

Ethnicity breakdown (race as sole or part of mix) people (%) #of	
White	72 (53.3)
Black	50 (37.0)
Latino	25 (18.5)
East Asian	18 (13.3)
Indigenous	13 (9.6)
Middle-eastern	7 (5.2)
Indian	3 (2.2)
North African	3 (2.2)
Jewish	1 (0.7)

^aAge was subjectively approximated to be in one of 3 categories: “Middle-aged” being young to older adults (approximately 20–40), “Younger” being (>20), “older” being (>40).

^bSelf-promotion included the inclusion of one’s social media accounts (e.g. Instagram, Twitter, etc.) or any personal URL website.

^c“Product-promotion” included the mentioning of specific brands with or without the use of hyperlinks.

^dSelf-promotion in the video content included asking viewers to like or comment the video, subscribe to the channel, or follow the individual on other social media sites.

^eUnlike ethnicity disclosed by video producers, inferred ethnicity was subjectively determined by coders based on the appearance of individuals in the video.

Table 2. Complete coding data of the 135 individuals in 117 Ancestry DNA YouTube results videos, including those with and without self-promotional discourse.

Coding Question: “Does the person/people ...”	All (<i>n</i> = 135)		With self- promotional discourse (<i>n</i> = 96, 71.1%)		Without self-promotional discourse (<i>n</i> = 39, 28.9%)		Percentage difference between promo and no promo % difference
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	
1 ... discuss why they decided to do ancestry testing?	78 (57.8)	57 (42.2)	62 (64.6)	34 (35.4)	16 (41.0%)	23 (59.0%)	23.6
1i. If yes, is the reason because of (a) just “interested” or (b) a more complex explanation?	(a) 38 (28.1) (b) 40 (29.6)		(a) 31 (32.2) (b) 31 (32.2)		(a) 7 (17.9) (b) 9 (23.1)		
2 ... discuss why they decided to make a YouTube video about sharing the results?	43 (31.9)	92 (68.1)	31 (32.3)	65 (67.7)	12 (30.8)	27 (69.2)	1.5
3 ... reveal the results?	135 (100%)		96 (100%)		39 (100%)		0.0
3i. All of the results or just focus on some?	All) 115 (85.2) Some) 20 (14.8)		All) 80 (83.3) Some) 16 (16.7)		All) 35 (89.7) Some) 4 (10.3)		
4 ... explicitly state that some results aren’t important (worth exploring) or that some results are much more important?	12 (8.9)	123 (91.1)	8 (8.3)	88 (91.7)	4 (10.3)	35 (89.7)	1.9
5 ... have positive emotional responses to the results?	119 (88.1)	16 (11.9)	85 (88.5)	11 (11.5)	34 (87.2)	5 (12.8)	1.4
6 ... have negative emotional responses to results?	11 (8.1)	124 (91.9)	8 (8.3)	88 (91.7)	3 (7.7)	36 (92.3)	0.6
7 ... state any specific actions that they will take based on their results?	45 (33.3)	90 (66.7)	36 (37.5)	60 (62.5)	9 (23.1)	30 (76.9)	14.4
8 ... discuss how others might perceive them based on their results?	8 (5.9)	127 (94.1)	7 (7.3)	89 (92.7)	1 (2.6)	38 (97.4)	4.7
9 ... evaluate past actions in their life based on their results?	17 (12.6)	118 (87.4)	14 (14.6)	82 (85.4)	3 (7.7)	36 (92.3)	6.9
	43 (31.9)	92 (68.1)	31 (32.3)	65 (67.7)	12 (30.8)	27 (69.2)	1.5

10 ... physical attributes in relation to their results?							
11 ... raise socio-cultural aspects (tastes, trends, or abilities) in relation to their results?	25 (18.5)	110 (81.5)	17 (17.7)	79 (82.3)	8 (20.5)	31 (79.5)	2.8
12 ... use other languages or cultural slang associated with these results?	22 (16.3)	113 (83.7)	19 (19.8)	77 (80.2)	3 (7.7)	36 (92.3)	12.1
13 ... discuss the impact that the results might have on their sense of self and/or actions they might take in the future in either of the following ways: a. The results won't have any impact? b. The results will have a major impact?	19 (14.1)	116 (85.9)	15 (15.6)	81 (84.4)	4 (10.3)	35 (89.7)	5.3
	(a) 5 (3.7) (b) 14 (10.4)		(a) 3 (2.2) (b) 12 (8.9)		(a) 2 (5.1) (b) 2 (5.1)		
14. Overall, does the video demonstrate someone reconsidering or re-conceptualizing their racial and/or ethnic identity?	54 (40.0)	81 (60.0)	39 (40.6)	57 (59.4)	15 (38.5)	24 (61.5)	2.2
15. Overall, does the video demonstrate someone reaffirming their racial and/or ethnic identity?	105 (77.8)	30 (22.2)	76 (79.2)	20 (20.8)	29 (74.4)	10 (25.6)	2.8
16. Was the test criticized (i.e. being inaccurate, offering a poor service, etc.)?	21 (15.6)	114 (84.4)	16 (16.7)	80 (83.3)	5 (12.8)	34 (87.2)	3.8
17. Was the idea of doing ancestry testing criticized (lacking value, a waste of time, etc.)?	13 (9.6)	122 (90.4)	11 (11.5)	85 (88.5)	2 (5.1)	37 (94.9)	6.3

that you have an ancestral home” and another stated that the motive for DNA testing is “to find out if we actually are who we think we are.” We generally observed that a large number of people in the videos expressed nervousness or tense excitement when learning of the results. Fewer people (40, 31.9%) explicitly discussed their reasons for making a YouTube video. Here, the most common theme was simply the desire to share one’s findings. In just a few cases, people had stated that other people’s results videos inspired them to make their own.

The vast majority of people (115, 85.2%) discussed all of the testing results (highest as well as lowest percentages) as opposed to only some, and only a small portion of people explicitly stated that some results were not as important as others (12, 8.9%). Overall, people exhibited considerably more positive reactions (i.e. enjoyment, optimism, wonder) to their results (119, 88.1%) than negative reactions (i.e. stress, bewilderment, sadness) (11, 8.1%). It was more common for people to find – or, at least, perceive that – testing results reaffirmed their “racial/ethnic” identity (105, 77.8%), rather than having to reconsider or re-conceptualize (54, 40.0%). Some videos included both, that is, users discovering results which confirmed previously held conceptions and also discovering results of previously-unknown information, which testers found significant.

There was a range of responses where people discussed particular percentages. For some, small percentages were dismissed as insignificant or too small to be important. For example, one person said, “I won’t claim a Spanish side because of only 2%,” another said she would not “play up” a 1% Polynesian, and another said “I can’t really identify with anything less than 1%.” In other cases, individuals found these small percentages more impactful and intriguing. One individual expressed “shock” at being 2% “Native American,” another individual stated that having a result of 0.1% Ashkenazi Jew is “really interesting,” while a third said that “2.1% North Western European” is “huge for me. That’s small, but not all that small.”

There were mixed responses to results that conflicted with preconceived ideas about personal ancestry. Some individuals were surprised to find results of Native American ancestry when it was not expected, and others expecting to see Native American ancestry expressed shock or dismay at not finding any. In this regard, some individuals noted how common it was for claims of Indigenous ancestry to circulate through family’s histories, and the results (indicating either a presence or absence of Indigenous DNA) forced individuals to confront these ancestral histories. For example, an individual who received 0% “Native American DNA” said, “I have been raised to know Native American culture so much ... that’s all I’ve known ... it’s influenced so much of the things I buy ... the stories gets passed down from generation to generation ... it kind of killed me a little bit ... I can’t say that anymore.” Another individual, without a “dot (of Indigenous DNA) in there” said, “so many blacks believe that they have NA connections, but the tests aren’t showing that.” Conversely, a young man who, prior to discussing his results, stated that he wanted “to be able to claim my white and my black

card” received a result with a high percentage of Indigenous DNA and claimed that he would now “identify as Native.”

Some individuals were hoping for a larger percentage of African DNA than the results showed. One individual, for example was upset to receive a result with a high percentage of European DNA, stating that she “didn’t want to be that European ... Europeans just ruined everything.” She later stated, however, “I’m still happy. I’m 100% black as hell.” Others used the percentages found in results to justify previously held claims to African or European heritage. For example, one individual used a result of 20% African DNA to confront her YouTube channel subscribers who had criticized her for calling herself partially black, and, a man identifying as “black and mixed” used a 33% European result to justify this identification. In one case, an individual stated that “slavery is involved in these numbers ... it brings up a lot of emotions. The roots of that have an impact.” Another individual stated that she was starting “to feel proud of (her) heritage and then realized that it wasn’t that.” This same individual, however, was pleasantly surprised to learn of a DNA connection “to an 11th century king of Denmark.”

It was rare for people to discuss how they might be perceived by others because of the test (8, 5.9%), and people did not commonly evaluate past actions based on the results (17, 12.6%), for example, in describing relationships with coworkers or, in another case, when explaining that the claiming of Syrian heritage was met with skepticism from others. Some people discussed the impact the results would have on their sense of self moving into the future (19, 14.1%). Here, there were instances that could be deemed quite serious as some individuals felt that they had been lied to or deceived by family members and/or passed-down family stories, and as a consequence would be confronting various individuals in the family or re-evaluating and re-exploring information around previously-held conceptions. Others felt comforted by clarifying some unknown aspects of their family histories because of having, for example, a parent who was adopted. Indeed, there were 14 people (10.4%) who expressed the sentiment that the results would have a major impact on their future lives.

Commonly evident in the videos were instances of people positively and playfully discussing their results by using other languages or cultural slang (22, 16.3%), making observations with regards to physical attributes (43, 31.9%), or by highlighting particular socio-ethnic aspects of their lives (25, 18.5%). These socio-ethnic aspects predominantly focused on one’s tastes for certain foods and fashion choices as well as, in a few cases, one’s abilities such as singing and dancing. There were also some cases where individuals used the results as a means of explaining or justifying an affinity towards a particular aspect of a particular culture, for example, a Dutch television program, Japanese anime, “Americanness” or “Jewish culture.” One individual stated that she had a large number of Senegalese friends and “knew (she) had to have some Senegalese somewhere in my blood,” which was confirmed by the results.

Lastly, a noticeably salient trait in the results discussions, besides one being “shocked,” “surprised,” or “fascinated” by having certain DNA percentages from certain regions, was individuals discussing the actions they were going to take, or were thinking about taking, based on the results (45, 33.3%). In this regard, 4 major themes were evident: travelling to countries, doing further research into the culture and history of regions, doing further ancestry or DNA testing on either themselves or other family members, and lastly, contacting family members – both immediate and distant – to meet or to discuss results. As displayed in [Table 2](#), discussing actions to be taken based on the results was the most common discursive characteristic across all individuals in the videos.

Promotional content and critical perspectives

Comparing the numbers of individuals in videos containing self-promotional discourse (96, 71.1%) versus those that did not (29, 28.9%), showed some notable differences. See [Table 2](#). Individuals in self-promotional videos more commonly provided reasons for doing ancestry testing (64.6% vs. 41% (23.6% difference)), stated actions they would take based on the results (37.5% vs. 23.1% (14.4% difference)), and discussed results using other languages or cultural slang (19.8% vs. 7.7% (12.1%)). In short, individuals in self-promotional videos provided greater or deeper narratives around their testing procedures. Further, though to a lesser extent, the individuals in self-promotional videos evaluated past life actions and criticized ancestry testing with greater frequency than individuals in videos without self-promotion. Because there were only 14 (10.4%) individuals in sponsored videos, extensive comparative analysis between sponsored and non-sponsored content was not conducted. It was observed, however, that none of the sponsored videos contained any criticism of the testing company or the idea of ancestry testing broadly.

The criticisms from individuals around the specific test (21, 15.6%) focused on what they perceived to be testing inaccuracies, a lack of DNA specificity (with regards to particular regions), and cost. A total of 13 individuals in videos (9.6%) raised criticisms around the idea of ancestry testing generally. Here the predominant sentiment was that receiving DNA results was not all that valuable, especially, in some cases, because of the cost. This sentiment was exemplified in remarks such as, “Overall these DNA tests are inconclusive. If you don’t have an ethnicity crisis, or if you’re not adopted, I wouldn’t really take it ... it’s fun I guess” and “I don’t really believe in breaking yourself down into percentages.” A few videos included individuals who had tested with more than company and who criticized the disparity of results. A few individuals were concerned with what the accumulated data from testing might be used for. Only one video included a complete breakdown of how the testing procedures worked, including the companies undisclosed limitations in obtaining results, and why he felt ancestry test takers were problematically equating ethnicity with DNA and aligning DNA results with the specific borders of Nations, and not broad geographical regions.

Discussion

Using DNA results to explore identity

The 117 DNA ancestry result videos published on YouTube showed individuals publicly exploring their “racial” and familial identities. The results served varied purposes for individuals by helping them clarify, confirm, question, and re-evaluate their previously held conceptions of “racial” and socio-ethnic identities. In some cases, individuals appeared pleased and/or relieved to have previous conceptions affirmed, and in others, individuals appeared shocked, surprised or even alarmed at the results. Overall the experiences displayed in the videos, however, were considerably more positive than negative.

As evidenced by the varied reactions to smaller percentages, in addition to cases where individuals spoke at greater length or appeared more impacted by some results than others, individuals, in various degrees, cherry-picked percentage value impacts based on their association and/or attachment to particular regions. Given that one’s public identity is a perpetual negotiation between oneself and the perception of others, the desire or affinity for certain characteristics undoubtedly plays a role (Scully, Brown, and King 2016; Nelson and Hwang 2013; Khan 2017). In this context, as was observed in previous research (Nelson and Hwang 2013; Roth and Ivemark 2018), the DNA results ultimately become malleable tools used by the YouTubers to amplify the negotiation of identity in a public sphere regardless of whether done playfully or seriously. The cases where individuals discussed a desire for testing results to be more accurate with regards to percentages of specific nations perhaps demonstrate a limited understanding of human migration and what exactly DNA. Also somewhat unclear is exactly how significant an impact these results will have on individuals going forward.

The YouTubers in our dataset undoubtedly see some value in performing the tests and sharing the results with audiences. Approximately 10% of testers raised some critiques around the value of the testing, but all of the individuals, with one exception, saw enough value in the tests to explore their results, discuss interesting findings, and share the results with others. One can only speculate as to whether additional critical perspectives were held but not included in videos – perhaps because including critiques might have been viewed as devaluing video’s content. With 77.8% of individuals finding reaffirming results and 40.0% finding contesting or reconceptualizing results, individuals used these results as a means of performing some sense of “racial/ethnic” identity through the testing. Indeed, specific cases were evident of individuals expressing some dismay at not having any Indigenous DNA or lower than expected percentages of African DNA, or in contrast, of individuals expressing satisfaction of having the testing results confirm the presence of desired DNA. As such, questions still persist around whether DNA testing promotes the reification of problematic racial categories and stereotypes (Phelan *et al.* 2014), especially considering the scientific understanding of race as biological fiction (Caulfield *et al.* 2009; Nelson *et al.*

2018; National Institute of Health 2007; Smedley and Smedley 2005; Kahn *et al.* 2018; Machery & Faucher, 2005).

There is a long history in North America of individuals, particularly of white European descent, claiming Indigeneity, often as a means of obtaining some social or financial benefit (Sturm 2011; Francis 2012; Duster 2016). And research currently shows that an increasing number of individuals in North America and Australia now self-classify as Indigenous (Markham and Biddle 2018; Gaudry and Leroux 2017; Leroux 2019; Watt and Kowal 2018). Survey research in North America and Australia has documented how some individuals are eager to find Indigenous DNA and claim some Indigenous heritage as a means of adopting new identities, for profit, to justify a feeling of differentness or uniqueness, to feel more connected to their place of inhabitation, or to alleviate some of the negative sensations of colonialism (Duster 2016; Roth and Ivemark 2019; Watt and Kowal 2019). Despite extensive research and commentary illustrating why using DNA testing as a means to claim or justify a link to Indigenous culture and heritage is problematic (TallBear 2013; TallBear 2014; Keene, Nagle, and Pierce 2018; CBC Radio 2016; Jago 2019), this research shows cases of individuals doing just that. Similar instances of disappointment and satisfaction were observed with respect to African and European DNA. And so while individuals might not use DNA testing results as straightforward “determinism” but instead filter and negotiate results through identity aspirations and social appraisals, which Roth and Ivemark call the “genetic options theory” (2018), YouTube becomes, as noted in similar research (Nelson and Hwang 2013) a useful tool to perform this negotiation with others.

Uncritical messaging, replicating marketing, and becoming marketing agents

Previous research has highlighted how companies’ marketing materials strive to instill an idea that DNA ancestry testing can play a role in shaping identity by framing the testing as a means of “discovering” or “revealing” oneself (Nordgren and Juengst 2009; Walajahi, Wilson, and Hull 2019; Kragh-Furbo and Tutton 2017). As biotechnology companies move towards increasing commercial activity, questions have been asked whether consumers engaging novel biotechnologies more often become subjects empowered in practices of “self-formation” or in contrast become objects of marketing strategies (Zwart, 2009; Caulfield 2018). This study shows that marketing strategies appear to be having some influence on video producers, at least in YouTube videos we analyzed.

Overall, YouTube videos in our dataset presented the process of DNA ancestry testing as intriguing, exciting, fun, and educational. Some critiques of DNA testing were present, but the videos with some critical content, with one exception, also portrayed the testing processing as having some benefits and value. Indeed, of the 135 individuals in the videos only 13 (9.6%) raised any concerns around the

value of ancestry testing, and even those critical of ancestry testing's value still made YouTube videos to discuss their results with audiences. Though not included in the coding frame, it was often observed that individuals would explicitly recommend ancestry testing, at times highlighting what they liked about specific companies' products.

In describing their own testing experiences, the video participants often provided detailed explanations of the processes involved in the testing (i.e. spitting in the tube, navigating the results platform, etc.), which included detailing the companies' instructional materials as well as touching on some of their marketing strategies. The spitting performance of the "spit party," for example, was a central component of 23andme's launch initiative (Kragh-Furbo and Tutton 2017). Also, as discussed in the results, a third of the individuals in videos listed actions they would take following testing. Interestingly, the described actions including connecting with distant family members, exploring family histories, and traveling to countries based on results. Although extensive and detailed research was not performed on AncestryDNA or 23andme's marketing materials, these actions described by the YouTubers do mirror some aspects of marketing produced by the companies. For example, some of 23andMe promotional videos on YouTube, feature family member connecting and reuniting, which the company labels "DNA family stories" (23andme 2019), and AncestryDNA's website (<https://www.ancestry.ca/dna/>) includes the idea of increasing knowledge of family and familial connections, and using the tests to fill in missing gaps of family history. Both companies also have marketing material which promotes the idea of traveling to countries after taking the tests (see, for example: Ancestry 2016; <https://www.23andme.com/en-ca/dna-ancestry/>, <https://blog.23andme.com/ancestry/travel-as-unique-as-your-dna-with-23andme-and-airbnb/>).

Biotechnology hype

Our findings reveal that YouTubers in our study used DNA testing results to explore their socio-cultural identities, in some ways which mimicked the marketing strategies of the DNA testing companies, and in a manner which exhibited very few critical perspectives. The 117 DNA ancestry results videos we analyzed, therefore, stand as a strong source of uncritical hyping of the biotechnology (Caulfield *et al.* 2016; Caulfield and Condit 2012). That is, when the current state of scientific developments or current use of scientific tools is exaggerated or distorted to a level where the scientific underpinnings are no longer accurate. While it is difficult to determine with precision the degree to which individuals are impacted by learning of their DNA material, previous research shows that in addition to broader social impacts, some individuals have changed their "racial identity" categorization in census reporting after receiving DNA testing results (Roth and Ivermark 2018). Here on YouTube, individuals enthusiastically shared and discussed their results, at times with substantially large audiences. With such a large number of videos (87,

74.4%) containing self-promotional content, the dynamic created is one of cyclical or reciprocal promotion, whereby YouTubers benefit from the DNA technology by creating content for potential audiences. In doing so, these YouTubers share and reflect on personal results, creating powerful narratives in the process while also effectively act as advertising agents for the companies' products. The result is a commodification of biological material (Kragh-Furbo and Tutton 2017; Harris *et al.*, 2014) through an overlapping reciprocal cycle of promotion and product advancement where critical perspectives are seldom explored concerning what DNA is, what limits and concerns exist around DNA ancestry testing, and what implications the growing rise of DNA testing might have on societies. Certainly, the companies could play a role here, as noted by other scholars (Walajahi, Wilson, and Hull 2019), by presenting the limitations of their testing abilities with greater transparency, thus helping individuals interpret the DNA science with greater accuracy.

There is a growing interest and uptake in DNA ancestry testing (Regalado 2019). Questions persist about the degree to which this testing reifies scientifically inaccurate ideas of "race" and biological difference (Caulfield 2018; Phelan *et al.* 2014; TallBear 2014; Roth and Ivemark 2013), and this study demonstrates that some individuals are intrigued and motivated to perform DNA testing and to discuss their results with the online public through YouTube. While YouTube videos certainly play some role in influencing audiences (Hawke *et al.* 2019), it is worthwhile to consider, at least in this case, whether, the discourse plays a greater role in shaping viewers' perspectives towards YouTube and the stars of YouTube videos or the biotechnology itself. Regardless, the idea of a personal DNA self is worthy of exploring and discussing for a great number of individuals – and YouTube is a platform where this can and does take place.

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Data can be made available upon reasonable request.

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