Research for Customer Insight of

Genetic Testing & Communication Strategies

by

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# Abstract

Compared to the overseas market, China’s genetic testing market remains relatively small and immature. However, it is expected to grow exponentially in the following decade. Under the circumstances, this research has two objectives. First, I attempt to explore the reasons behind the low purchase intentions of genetic testing service in China while there is a relatively high level of awareness. The second goal of this research is to compare the effectiveness of different communication strategies and thus identify the most effective approaches for local companies to change consumers’ preferences. To achieve these goals, I collected data from more than 850 consumers who varied in a number of demographic characteristics including age, household income, educational background, and location of residence. The results suggest consumers are most concerned with the accuracy of the test and privacy of their personal information. Further, the “social proof” and “authority” (Cialdini, 2007) are the most effective tools to overcome purchasing barriers in China’s market supported by empirical evidence.

*Keywords: Direct-to-Consumer, Genetic Testing, China Genetic Testing Market,*

*Consumer Research, Communication Strategies*

# Introduction

Direct-to-consumer genetic testing is the method of marketing genetic tests directly to consumers without the involvement of a professional healthcare provider. This is an emerging market with an accelerating growth rate. While many Chinese consumers are aware of the novel concept of DTC genetic testing products, the penetration rate is quite low in China and the market is relatively immature compared to overseas markets. Local companies lack enough information on how potential customers perceive this novel technology and product, thus facing challenges in shaping effective communication strategies.

This research will focus on the research question ***“How can direct-to-consumer genetic testing products in China overcome identified main barriers and achieve long-term business growth with effective communication strategy?”***

To address this question, this thesis aims to provide insights into:

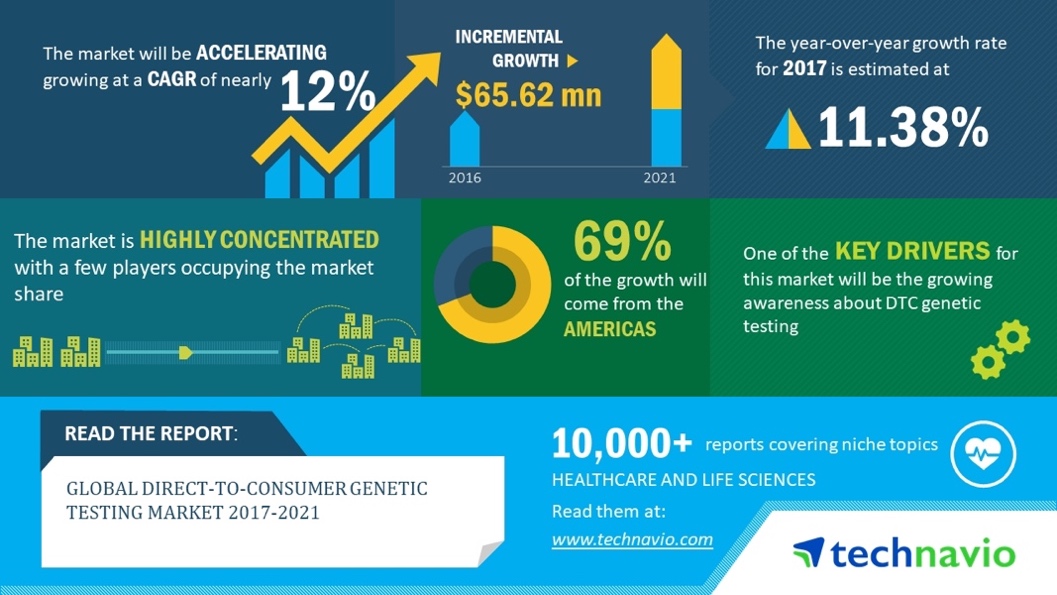
1. What is the main barrier to DTC genetic testing in China?
2. What are the optimal communication strategies local companies may adopt to eliminate doubts and persuade potential consumers?

This research collected data from two rounds of self-designed questionnaires reaching over 850 respondents in mainland China in total. The results suggested accuracy and privacy are the top concerns to be addressed. Further, based on the six principles of persuasion raised by Robert Cialdini in his book, this research would examine the current communication and advertising strategies (2007). Through empirical evidence, this research aims to prove that the most effective “weapons of influence” are social proof and authority, and provide applicable recommendations based on derived customer insights to future product development and promotion.

# Research Background & Practical Relevance

Thanks to the rapid development of genomic technologies, clinical genetic testing has become a common medical practice. In the past, the only channel to receive such service was the professional healthcare institutions, which requires much time and cost. Direct-to-consumer (DTC) genetic testing emerged around the early 2000s (Allyse et al.,2010) and has gained much popularity around the globe. There are mainly three steps required to conduct such analyses: order, spit, discover. Consumers can order a kit from the company’s website, collect a saliva sample by him/herself, and return the completed kit by mail. The results will be available within a given period and can be accessed through the website and sometimes the company’s APP. As advertised by 23andme, the whole process is achieved *“All from home. No blood. No needles. Just a small saliva sample.”*

According to the market research report released by Technavio, the global market size of DTC genetic testing products is expected to accelerate at a CAGR of 12% during the forecast period. And the main driver for growth is the growing awareness of this product around the globe.



**Exhibit 1 Global Direct-To-Consumer Genetic Testing Market**

Compared with the overseas markets (North America, Europe, etc.), China's DTC genetic testing market is relatively immature. Most local companies were established around 2014-2015 and the current consumer base is around 2.2 million in China (iResearch, 2019). The penetration rate is around 1.1% in Tier-1 cities and is lower in less-developed areas. In the US market where the growth has been the fastest, the penetration rate is 8.1% in 2019 and the consumer base is 26.5 million. However, the China genetic testing market is expected to grow exponentially and reach a consumer base of 20 million by 2022, mainly due to the expected increase in perpetration rate.

China has a large potential consumer group but has not been reached properly. In the early stages of the industry's development, the products are more easily recognized by individuals who are highly educated, health-conscious, and technology enthusiasts. The population holding undergraduate degrees and above in China are steadily growing over the years. Further, with the increasing awareness and attention to health conditions, the cost of medical and health care for Chinese residents has also increased. While the overall potential consumer group is continuously expanding, genetic testing has not become a common practice.

Currently, local Chinese companies in the industry have created various positioning and marketing messages. Some companies claim this technology allows consumers to know about themselves better (ancestry etc.). From this perspective, the testing is more like entertainment, without practical relevance. On the other hand, some position the product as a tool to determine the risk of developing specific diseases or disorders, thus helping consumers to make better health-related decisions. For example, if the report suggests a higher chance of getting diabetes, he/ she should be more aware of consuming food high in sugar and fat. The difference in positioning would no doubt lead to a difference in perception of the product by potential consumers. Especially when consumers have doubts about the reliability of the test results, the current conflicting messages lead to further confusion and hurt the credibility of the products.

Only by first properly positioning the product among the potential consumer base can companies achieve long-term business growth. Companies can then leverage the findings to reposition the product and improve communication strategies to eliminate the doubts consumers have and drive more purchases. For such an emerging market, the companies with the most accurate and relevant customer insights will hold an unbeatable competitive advantage. The practical relevance of this research, therefore, lies in the key insights it can provide to companies as well as the industry.

# Literature Review

While there lacks research on Chinese consumers’ perception of DTC genetic testing products, there are several past pieces of literature that provide useful insights to this thesis. In addition to survey-based consumer insights, several genetics-related institutions and commissions have published documents to offer constructive recommendations on dealing with consumers’ perceived risks of DTC testing products.

As suggested by Karen Norrgard, in addition to the convenience offered by DTC genetic testing, fears of “genetic discrimination” make DTC testing attractive as individuals are more seeking more independent ways to gather medical information about themselves. Further, consumers are more active in participating in their own health-related decisions, and getting information from their DNA sample is a novel way of doing so. According to the research conducted by Roberts et al. in 2017, prior to testing, consumers were as interested in ancestry (74% very interested) and trait information (72%) as they were in disease risks (72%). Among disease risks, heart disease (68% very interested), breast cancer (67%), and Alzheimer's disease (66%) were of greatest interest before testing. After receiving results, 59% of respondents said test information would influence the management of their health. Overall, genetic testing results were perceived as useful tools that may influence future health-related decisions.

On the other hand, in general, the DTC model creates concerns for potential consumers mainly in the credibility of tests, the security of own DNA sample use, and the privacy of personal genetic risk information (Borry, Cornel, and Howard, 2010). In 2019, Simon-Kucher & Partners surveyed 184 consumers from 28 countries on their perceptions and knowledge of ancestry, predictive, carrier status, and nutrigenomic tests as part of the online “Direct-to-Consumer Genetic Testing” study. While over 85% of the participants have heard of DTC genetic tests, only about 5% have purchased the kit themselves. The main obstacle this study identified is high cost, accuracy, and privacy concerns. The study also claims that the most crucial factor in the consumers' decision to purchase is "advice from a physician", over 75% see this as the most convincing reason among others including “family history of a specific disease/ condition” and “recommendation from friend/ family”.

In terms of the advertising strategy, it is suggested by the HGC 2007 report that advertisements for genetic tests should only be available through a qualified health professional, and no direct-to-public advertising is allowed to avoid misleading consumers. However, due to the current missing regulations in China, local companies are at liberty to advertise on various channels, including TV and online social media platforms. One of the most well-known advertisements is the series produced by WeGene, one of the market leaders in China’s DTC genetic testing market (Exhibit 2). The overall message of this series is that genes can "speak" to consumers and tell the underlying truth. Different aspects of the test results are portrayed, including ancestry testing, predictive tests, and nutrigenomic tests. While trying to grab the attention of potential consumers, the advertisement failed to show the seriousness and professionalism of such products. One clip of the video features a young woman who asks, “Am I the descendants of Uchiha Sasuke? (a fictional character in Japanese anime *Naruto manga.* This series of advertisements led to a heated discussion on Chinese social media, criticized for its poor positioning and communication. The company tries to cater to the "entertainment" needs of consumers but went too far. This is one of the many examples where local DTC genetic testing companies execute poorly to eliminate the concern of consumers, but instead, deepening it with inappropriate positioning and advertisements.

To craft effective communication strategies, this research borrowed the concepts of six key principles of persuasion from Robert Cialdini’s *Influence: The Psychology of Persuasion.* In this book, Cialdini explained the six “weapons of influence”, each built on a psychological principle of persuasion. The six principles include reciprocity, consistency, social proof, authority, scarcity, and liking. After careful examination of each principle under the background of this research, I will mainly discuss “social proof” and “authority” among the six and how companies may leverage these two to better communicate to potential consumers. “Social proof” refers to people’s tendency to emulate others’ behavior when faced with uncertainty. When consumers are uncertain, they are more likely to use others’ actions to decide how they should act (Cialdini, 2007). Therefore, this concept is applicable to consumers’ reaction to innovative products like DTC genetic testing. “Authority” also has great power in influencing decision making under doubts and uncertainty. As suggested by the book, information from a recognized authority such as a professional figure provides a "shortcut" for deciding how to act. Especially given the perceived risks attached to testing, consumers are more likely to seek advice and assurance from professionals. In the later part of this research, I will provide more detailed suggestions on persuading potential consumers of genetic testing products.

# Research Methodology

This research will incorporate and synthesize findings from desktop research, self-designed questionnaires, and in-depth interviews.

Key data of this research were collected through two rounds of self-designed questionnaires, with different aims designed to provide answers to the research question from multiple dimensions.

1. First-Round Questionnaire

The first-round questionnaire was distributed in December 2019, reaching 540 respondents in mainland China. The questionnaire was distributed and completed by respondents online. This questionnaire reached 29 provinces with a variety of different tiers of cities. Over 60% of the respondents are between 26-40 years old and over 75% are full-time employed. In terms of educational background, around 70% received a bachelor's degree and around 10% hold a master's degree. The first round of the questionnaire was designed to focus on identifying triggers and barriers of purchasing DTC genetic testing products, especially the concerns potential consumers may have. The questionnaire included questions about respondents’ demographic characteristics (age, sex, education background, household income, etc.) and psychographic characteristics of respondents (values, attitudes, interests, and lifestyles, etc.). Both univariate and bivariate analysis was conducted on collected data to provide an overview of the market and identify the key targeted customer groups.

1. Second-Round Questionnaire

The second questionnaire was sent out in March 2020, reaching 310 responses online in total. The overall demographic characteristics distribution of the second questionnaire was kept similar to that of the first one. The objective of the second round of the survey was to evaluate how potential consumers respond to different types of advertisements. Respondents were asked to report their level of willingness in learning more about DTC genetic testing products and in purchasing before and after each round of exposure to advertisements. The two advertisements used as examples in this research are from WeGene and 23mofang, two of the most well-known companies in China’s genetic testing market.

The second round of the questionnaire also collected qualitative data of respondents' immediate impressions after seeing the advertisements. Text mining results generated word clouds based on the frequencies to reflect the general attitude in responses.

# Results & Analysis

### First-round Questionnaire

**High awareness but few have purchased: Chinese consumers are most concerned with accuracy and privacy**

While over 98 percent of respondents claim to know what DTC genetic test is, only around 10 percent have purchased DTC genetic testing products, another 20 percent are planning to purchase but lack the information to choose the right purchasing channel. 13 percent of respondents claim that they have no interest in buying, out of privacy concerns; and the majority of 57 percent are waiting until the technology matures. Overall, the results suggested that while there is relatively high awareness in the Chinese market, many consumers are holding back the purchase due to various concerns. Further, the willingness to purchase such products depends highly on the future development of the technology, suggesting a low level of confidence and trust in current offerings in the market.

More than 40 percent of respondents hold doubt towards such technology, either believing the accuracy of such tests is unreliable or the benefits are overrated by media. Accuracy and privacy concerns are the top ones of consumers and thus must be the focus of future communication strategies. There is no way for consumers to check whether the test results they receive are accurate. The accuracy of the results has further implications: wrong or misunderstanding of the information would potentially lead to misjudgment in the health-related decision. In addition, given the specialty of genetic information, the companies need to build credibility in protecting consumers’ privacy.

Over 75 percent of respondents acknowledge that genes play an active role in affecting one's health conditions, while other factors such as living environments, lifestyles, and medical conditions, co-work to determine the health of individuals. In addition, the top 3 aspects that respondents are eager to learn about are “how can genetic testing help to improve health?”, “how to guarantee the accuracy of test results?”, and “what is the current development status for domestic and oversea markets and where is the future heading towards?”.

**Channel: Chinese consumers prefer professional channels and recommendation from friends/ family**

The most common channels for general consumers to learn about DTC genetic testing are mainstream mass media (TV, newspaper, magazines, etc.) and local social media platforms (Weibo, Zhihu, Douban, etc.). Over 45 percent of respondents have seen commercial advertisements on the internet or TV while less than 30 percent have received related information from doctors and professional medical institutions. On contrast, nearly 70 percent of respondents claim that they are more likely to purchase DTC genetic tests if they receive a recommendation from the public hospitals. Recommendation from professional gene/ biotechnology companies (40%) and private clinics (33%) would also potentially encourage more purchases. These results suggested local companies should continue to make efforts in educating potential consumers about the reliability of DTC products. To achieve this, companies can think of ways to communicate through professional channels and keep the emphasis on their commitment to scientific standards, thus increasing the credibility of the products.

In addition to professional channels, one other channel to be noted for local companies is word-of-mouth. 42 percent of respondents claim that “recommendation from friends/family” would increase their chances of purchasing products. In comparison, the Simon-Kucher & Partners' survey, 26 percent of respondents perceive recommendation from a friend/ family as a key motivation to use a DTC genetic test (2019). The results showed that Chinese consumers rely more on recommendations from close friends and family members. Local companies can thus utilize word-of-mouth marketing by implementing referral programs with incentives to encourage consumers who have purchased to share their experiences and recommend to friends and family.

### Second-round Questionnaire

**WoM Marketing: Proved to increase interest and purchasing intentions**

To provide quantified data to support the effectiveness of Word-of-Mouth marketing, the questionnaire asked respondents to share their attitudes towards genetic testing products by rating willingness levels to learn more and purchase respectively on a scale of 1-10. The overall average level of willingness to learn more about the product was 6.30 and the willingness to purchase was 5.09. Suppose they have received a recommendation from friends/family who have purchased the product, the previous results raised to 6.63 (p-value < 0.05) and 5.58 (p-value < 0.05) respectively, both witnessing a statistically significant increase. This difference was more significant in tier-2 and tier-3 cities where the initial average willingness levels are lower. It is evident that WoM marketing has a positive effect on increasing potential consumers' interest in learning more and the likelihood of purchasing. Implementing a referral program as mentioned is especially an ideal choice for companies to raise penetration rates in lower-tier cities.

**WeGene Advertisement: Creative but not effective, leading to confusion**

The first advertisement evaluated in this research is the series “Gene speaks” produced by WeGene in 2016. This advertisement was launched across a number of platforms, mainly targeting young consumers through video websites and social media. The plot of this advertisement involved a phone booth where people could make calls and ask questions about themselves. Answers were provided with genetic testing results, however, several questions were out of entertainment purposes with no practical relevance. This thus led to heated discussion online and some criticized this advertisement to be “unprofessional and misleading”.

A person holding a sign

Description automatically generated

**Exhibit 2 Screenshot of WeGene’s advertisement**

The positioning of genetic testing in this series was a "mysterious fortune-telling machine". As shown in Exhibit 2, one girl in the advertisement wanted to know whether she was the descendent of a fictional character from Japanese anime *Naruto manga.* While the purpose was to show that genetic testing can revel ancestry information, the way of communicating that in this advertisement received negative feedback from consumers. Other questions asked in this series included "Do I have a bad temper", "Why can't I lose weight?", "Am I going to be bold 10 years later?”, all involved dramatic acting.

The average level of willingness to learn more about the product after watching the WeGene ad was 5.89 and the willingness to purchase was 4.98, both lower than the baseline willingness. The decrease in willingness to learn was significant (p-value < 0.05).

Further, text analysis suggested the overall attitude towards this advertisement was negative. The most mentioned words in respondents’ answers were “confused”(“看不懂”), “boring” (“无聊”), “funny” (“搞笑”). Most respondents claimed to have not understood how the product worked. Several respondents mentioned that the fictional setting of this video, while interesting, actually weakened the credibility of genetic testing as a science-based product.

**23Mofang Advertisement: Receiving positive feedback by creating personal relevance**

The second advertisement was based on a real-life scenario, featuring Papi, who is one of the most popular KOLs in China. The video was first published on Papi’s own channel on bilibili.com and YouTube, reaching over 2 million views in total. The plot of this advertisement was more straightforward thus leading to little confusion. Further, it helped viewers to understand how genetic testing results can be used to make better decisions regarding health. For example, for someone who has weak alcohol metabolism, he should consume less alcohol.

A screen shot of a person

Description automatically generated

**Exhibit 3 Screenshot of 23Mofang’s advertisement**

According to the survey results, this advertisement significantly raised viewers’ interest in learning more about the product (avg=6.94, p-value<0.001) and willingness to purchase such products (avg=6.09, p-value<0.001). Further, the overall attitude towards this ad was positive. The most mentioned words were “interesting”(“有趣”), “convenient” (“方便”), “useful” (“实用”). The results showed the advertisement was able to convey the key benefits of the product through real-life scenarios and successfully attracted the attention of potential consumers.

# Conclusion & Discussion

### Key Findings

Through data collection and analysis, this research successfully reached conclusions regarding the research question. The main barrier of DTC genetic testing in China is consumers’ distrust of current offerings, resulting from concerns in test results’ accuracy and protection of individual privacy. To shape consumers’ perception of the products, companies need to shape current communication strategies.

Firstly, companies should invest more in building and strengthening the professional communication channels. They may build mutually beneficial relationships with healthcare professional institutions and individuals. With efforts from both sides, seminars and podcasts can be held to provide consumers with a better understanding of the genetic testing technology and its application in making health-related decisions. This would leverage the influence of “authority” to achieve better results in persuading consumers. As suggested by Cialdini, people tend to use the information from authority figures as the guidelines of action under doubts (2007). Especially for the genetic testing market, the novel concept of DTC product poses a high level of uncertainty of consumers, thus leading to doubts and reluctance to make purchases.

One interviewee mentioned some potential consumers while having interest and purchasing intentions, lack trustworthy channels to learn more about the products, the companies, and their credibility. “I think companies are responsible for filling the information gap consumers are facing.”, he argued, “In China market, there are no established regulations thus making the whole industry in the grey area; consumers are not going to buy something they do not trust.” Under these circumstances, when companies make an effort to bring in authority figures, they are helping to narrow the information gap. In the long run, the return on investment is higher than any advertisement that focuses on driving short-term sales.

Secondly, companies can leverage word-of-mouth marketing by implementing referral programs with incentives. With a current relatively low penetration rate, one of the most cost-efficient ways is to encourage consumers who have purchased the product to make recommendations to friends and family. According to survey data, this is a feasible and effective way to raise potential consumers’ interest and willingness to purchase. Word-of-marketing also can be seen as leveraging the principle of “social proof" to increase persuasion power. The "social proof" principle suggested that people are more likely to use others' actions to decide how to act themselves (Cialdini, 2007). The similarity is another working condition under which the principle operates more powerfully. Receiving a recommendation from friends and family has greater influence because consumers share more similarities with them than with celebrities etc.

Further, the “social proof” principle also provides insights on how to produce effective advertisements. The key to raise interest and leave an impression is to create relevance through content. In 23Mofang's advertisements, consumers were able to realize the key benefits of the product because they were spelled out in an everyday life scenario that consumers can relate with. Instead of positioning the product as a mysterious fortune teller machine, 23Mofang took a different approach, and consumers buy in the messages both figuratively and literally.

Past research suggests humor can serve as an effective element in advertisements to create attention and awareness, often enhance the liking of the advertisers, and in turn purchase intentions (Eisend, 2008). However, according to this research, it is evident that the humor element does not apply to all situations. Given the novelty of this product, consumers’ trust in this product is crucial to purchase decisions. In this sense, humor weakens the credibility of the genetic testing product as a technology-based professional tool. For consumers with little background knowledge in this field, this kind of advertisement leads to confusion and doubt. In the beginning introductory marketing phase, a better approach to communicate is to stress the credibility of the company as a professional biotechnology “lab”, which can ensure the accuracy of test results.

For genetic testing products, purchasing the kit is the beginning and after-sale consumer journey is equally important. One of the interviewees who have purchased the product said she expected more after-sale services. For example, consumers may look for help in interpreting test results, recommendations on dietary options, or suggestions on changing daily routines to reduce certain health risks. In short, consumers who have purchased such products expect to make more informed decisions to improve their health conditions in the long run. If companies can offer support by strengthening the connection to healthcare providers to make personalized plans, more health-conscious consumers will undoubtedly be more willing to purchase the product as the first step of taking proactive care of their health. In future advertisements, companies should be more straightforward in explaining the test results’ impact on individuals’ lives.

To conclude, this research has successfully identified the main concerns Chinese consumers have regarding DTC genetic tests. While there is high awareness, the increase in penetration rate is key to future development. The optimal strategies lie in the companies’ ability to leverage authority and social proof to better deliver key messages and benefits to potential consumers. Lastly, it is critical to realize the goal is not only on driving purchases in the short run, rather, but it is also to make long-term effort to shape consumers’ perception and the landscape of the whole industry in China.

### Limitations

One limitation to be noted here is that data was collected through online self-report questionnaires. Consumers’ responses may, therefore, differ from how they actually think and behave. Past research projects have shown that certain biases are inherent with self-report, including both unintentional and intentional reporting biases (“Declared vs Revealed data”, 2020). To resolve this issue, future research can incorporate a range of physiological and neuroscientific techniques such as tracking consumers’ eye movements while watching advertisements. Due to the budget constraint, this research did not utilize such technological tools. Application of these techniques will no doubt add validity of collected data and provide future insights in the future.

Another limitation of this research was the relatively small sample size. Given the size of the potential market in China genetic testing, future studies should aim to reach a larger group of respondents to generate more generalized and applicable conclusions. With a larger sample size, more layers of customer segmentation can be done to provide insights on precision marketing based on demographic and psychographic characteristics of potential consumers.

# References

"Commercial Genetic Testing: Well Known But Rarely Used". Simon-Kucher & Partners.com, 2019, https://news.cision.com/simon-kucher---partners/r/commercial-genetic-testing--well-known-but-rarely-used,c2955577. Accessed 14 Dec 2019.

"Global Direct-To-Consumer Genetic Testing Market 2017-2021". Technavio, 2019, https://www.technavio.com/report/global-direct-to-consumer-genetic-testing-market?utm\_source=usa1&utm\_medium=bw\_wk37&utm\_campaign=businesswire. Accessed 14 Dec 2019.

Allyse, Megan A. et al. "Direct-To-Consumer Testing 2.0: Emerging Models Of Direct-To-Consumer Genetic Testing". Mayo Clinic Proceedings, vol 93, no. 1, 2010, pp. 113-120. Elsevier BV, doi:10.1016/j.mayocp.2017.11.001. Accessed 14 Dec 2019.

Borry, Pascal et al. "Where Are You Going, Where Have You Been: A Recent History Of The Direct-To-Consumer Genetic Testing Market". Journal Of Community Genetics, vol 1, no. 3, 2010, pp. 101-106. Springer Nature, doi:10.1007/s12687-010-0023-z. Accessed 14 Dec 2019.

Cialdini, Robert B. *Influence: The Psychology Of Persuasion*. HarperCollins, 2007

"Declared Vs Revealed Data". *Noldusconsulting.Com*, 2020, https://www.noldusconsulting.com/blog/declared-vs-revealed-data. Accessed 23 Mar 2020.

Eisend, M. (2008). A meta-analysis of humor in advertising. Journal Of The Academy Of Marketing Science, 37(2), 191-203. https://doi.org/10.1007/s11747-008-0096-y

Hudson, Kathy et al. "ASHG Statement\* On Direct-To-Consumer Genetic Testing In The United States". Obstetrics & Gynecology, vol 110, no. 6, 2007, pp. 1392-1395. Ovid Technologies (Wolters Kluwer Health), doi:10.1097/01.aog.0000292086.98514.8b.

Human Genetics Commission UK. More Genes Direct: A Report On Developments In The Availability, Marketing And Regulation Of Genetic Tests Supplied Directly To The Public. Department Of Health, 2007.

Norrgard, Karen. "DTC Genetic Testing: Empowerment Or Endangerment". Nature.Com, 2019, https://www.nature.com/scitable/topicpage/dtc-genetic-testing-for-diabetes-breast-cancer-698/#. Accessed 14 Dec 2019.

Roberts, J. Scott et al. "Direct-To-Consumer Genetic Testing: User Motivations, Decision Making, And Perceived Utility Of Results". Public Health Genomics, vol 20, no. 1, 2017, pp. 36-45. S. Karger AG, doi:10.1159/000455006. Accessed 14 Dec 2019.