Thinking “Outside the Box”:
Multiple Methodologies for the Study of Home Pregnancy Test User Experience

by

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ABSTRACT

Increasing numbers of biomedical products have become eligible for over-the-counter sale in contemporary American consumer culture. What was once the realm of the clinical has moved into the realm of the domestic, with the consumer as the interpreter of health issues and communication. This dissertation examines the user experience with the marketing and design of packaging of home pregnancy tests. Studies indicate that more than one-third of women of reproductive age in the U.S. have used a home pregnancy test, yet the test is marketed to a specific demographic of user: one who is white, affluent, and married. How are users’ experiences affected, and how do different methodological frameworks yield results for the study of these user experiences?

In this project, I conduct a series of methodological case studies to show how each reveal various aspects of the user experience of home pregnancy testing. I begin with a case study of three brands of home pregnancy tests, using visual-material rhetorical analysis to uncover the cultural values implicit in packaging. I then move to two case studies involving the results of a National Institutes of Health survey of pregnancy test users. I employ a thematic analysis framework to analyze demographic information about users and to contextualize their narratives. I also conduct corpus linguistics and semantic network analysis with the same data set to model patterns in language. From these varying approaches, each with different underlying assumptions, nuanced aspects of the user experience with the product and its communication emerge. For example, the user’s life circumstances change from initial to subsequent pregnancy test purchase and use so as to suggest more desire for a positive result with subsequent
testing, yet many users across these categories express some degree of discomfort when purchasing this product.

I conclude with suggestions based on this research for more ethically informed pregnancy test marketing, and outline avenues for future research for evaluation of home pregnancy test user experience. I finally discuss the implications of multiple methodological approaches for transdisciplinary humanities project design, implementation, and evaluation, with emphasis on the digital and medical humanities.
DEDICATION

I dedicate this dissertation to all of my family, friends, colleagues, and mentors who have supported me throughout this process. Particularly, I am grateful for the unwavering support of my partner and dearest friend, Ryan. I also dedicate this to my son, Ian, whose curiosity about technology—and more importantly, the people who use it—amazes and delights me, and fuels my desire to teach and learn.
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Chapter 1

Home Pregnancy Testing in the United States: Histories, Studies, and Research Methodologies

American Cultural Values and the Home Pregnancy Test

The home pregnancy test as a consumer product is inextricably bound to the cultural milieu in which it is marketed and sold. In the United States, the home pregnancy test is a child itself of the 1970s and the Sexual Revolution, during which increased attention was paid to research in reproductive technologies. In 1976, the U.S. Food and Drug Administration granted approval to Warner-Chilcott’s e.p.t. (“Early Pregnancy Test,” now “Error Proof Test”) and three other brands for distribution of the home pregnancy test directly to American consumers (National Institutes of Health [NIH], 2003a). While the testing apparatus has changed over time (from a kit of test tube and droppers in the 1970s to the familiar “stick” test of today), the science has remained relatively the same: home pregnancy tests detect the amount of the hCG hormone (which is only found in the human body during pregnancy) in urine (Leavitt, 2006). After F.D.A. approval, Warner-Chilcott and other companies sought to attract women to the purchase of the test through print advertisements in magazines with readership of women of childbearing age. Ads such as e.p.t.’s in Mademoiselle in April 1978 provide evidence to indicate that companies were marketing toward all women who suspected they were pregnant, whether or not they would continue the pregnancy after a positive result. The ad states that the test offers “privacy and not having to wait several more weeks for a doctor’s confirmation, which gives you a chance, if pregnant, to start taking care of yourself…or to consider the possibility of early abortion” (as cited in NIH, 2003a). The
1970s was the last time the politically charged word “abortion” was used in any industry-created communication related to this product.

The 1980s ushered in a changed cultural climate for the marketing and sale of the home pregnancy test, a climate that holds steady today. Leavitt (2006) observes that marketing materials for the test began to emphasize “1980s ideals about family values,” in which the nuclear family with married parents was emphasized in advertisements for home pregnancy tests (p. 331). Additionally, as the accuracy of the results of the test became more widely believed, the focus of marketing efforts shifted to “reality advertising” with the emotional component of the testing—and the focus on the catharsis of knowing the result—taking center stage. The home pregnancy test, by the end of the 1990s, was marketed with heavy appeals to pathos. While the desired result of the test was not always positive, the user was always portrayed as getting the result that she wanted (p. 332). Not visible is the user who does not receive the desired result, or any consequences to the knowing of the result.

In twenty-first century American culture, two profound changes have additionally taken place which have altered the manner in which home pregnancy tests are packaged and sold, and render these practices increasingly important for closer scholarly study. The first change is the surge in the number of overall home health products sold at retail. A plethora of home health goods and services are now readily available for retail purchase versus clinical use or prescription. Yet, users’ consumption practices are undertheorized and generally understudied (Childerhose & MacDonald, 2013, p. 1). Marketing these products is big business. In 2012, 228 million dollars of home pregnancy tests were sold in the United States (Grose, 2013). The second change is the increased visibility in all
media of an older, more affluent, trying-to-conceive pregnancy demographic. As the vice president of marketing for First Response told the New York Times, “hopeful positives buy more boxes and use more sticks” (Newman, 2010). Hopeful home pregnancy test users also enter into a web of lucrative pregnancy product and service tie-ins, and, as a result, home pregnancy test manufacturers are heavily focused on this demographic of user. “Hopeful negatives,” or users who are not trying to become pregnant, are not directly targeted in pregnancy test manufacturers’ marketing strategy. To illustrate this with an example, the home pregnancy test company Clearblue Easy credits its front-runner status on the market from its #Clearblue Confirmed campaign on Twitter, in which celebrities post pictures of their own positive pregnancy tests (along with the promotional hashtag) to celebrate the result and the brand of test that provided it (Grose, 2013). The two changes outlined above, when taken together, create a felt difficulty for feminist researchers in the areas of technical communication and rhetoric. More and more biomedical products and services, such as the home pregnancy test, have become eligible for sale over-the-counter (OTC), so what was once the realm of the clinical has now moved into the realm of the domestic, with the consumer as interpreter of health and medical communication. Studies indicate that more than one-third of women of reproductive age in the United States have used a home pregnancy test; it is “among the most commonly purchased diagnostic kits in the United States” (Wallace et al., 2009, p. 363). Yet simultaneously, the home pregnancy test is marketed to a specific demographic of user, rendering invisible those users who fall outside of this demographic. How is their health decision making affected?
While scholars in many areas of the humanities and social science have traced the home pregnancy test through history and the cultural shifts traced above, the field of technical communication has yet to study the rhetorical functioning of the design of packaging of home pregnancy tests. Such study should reveal how health and medical communication may more ethically attend to diverse user experiences with this product. Although a genealogy of the pregnancy test reveals certain cultural factors that shape its marketing, no studies in rhetoric and technical communication have broached how disparate users may be affected and how design of packaging may shape the user experience with the purchase of the test. Despite much attention in history, cultural studies, women’s studies, and health and medicine, the health and medical communication of the home pregnancy test remains largely unstudied. There is particularly a lack of empirical research into the study of this communication (although some data does exist in public health and medical studies). Moreover, theoretical methodological work often does not interface with the empirical, often because disciplinary boundaries are drawn along particular methodological lines. As a result of these divisions, no calls to action have been issued to technical communicators with the specificity needed to design a more ethical user experience for this product. This lack raises several research questions.

**Research Questions**

1. What does a visual-material rhetorical analysis of home pregnancy test packaging and its information design principles reveal about the cultural values implicit in the marketing of this product?
(2) In what ways does a thematic analysis framework (Boyatzis, 1998; Saldaña, 2009) to study a set of user narratives of the home pregnancy test\(^1\) reinforce or challenge the findings in (1)?

(3) What does the digital humanities method Text-Based Modeling (corpus linguistics and network text analysis) offer to a study of the same set of user narratives? In what ways, and why, does it depart from the results of the other methods outlined in this study?

(4) What underlying assumptions in the various methodologies employed in this project exist so as to affect what findings are presented through each method?

(5) Can connections be made across methodological approaches in order to draw any recommendations for a more inclusive and user centered approach to the purchase of home pregnancy tests? Why or why not?

Review of Literature

**Pregnancy Testing in Medical and Scientific Scholarship**

Recent studies in health policy and medicine related to the home pregnancy test address two main concerns: the accuracy of home pregnancy test results, and the use of the home pregnancy test for pregnancy diagnostics instead of a professional medical service provider. Recent studies have questioned the validity of the promise made by many pregnancy test brands’ advertising as to the accuracy of the test result within a certain time frame. Johnson, Cushion, Bond, Godbert, and Pike (2015) conducted a recent study which concluded that many manufacturers’ test results are not as accurate as

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\(^{1}\) The set of user narratives utilized in this study was collected by the Center for History and New Media (CHNM) at George Mason University and available for historical and educational use through the Office of NIH History online. This data set will be discussed further in Chapter 3.
the claims made by their marketing, and that laypersons reading the test results interpreted the results incorrectly more often than clinical technicians reading the same results. These results led the authors to conclude that “consistent regulatory standards describing performance requirements for all home-based pregnancy tests are urgently needed” (p. 400). Grenache (2015) further connected the consumers’ reliance on marketing claims to make purchasing decisions and the need for manufacturers to more responsibly and reliably produce a product that can perform according to the accuracy claims espoused in its marketing.

Further complicating the issue of accuracy of home pregnancy test results is the readability of the instructions inside of the home pregnancy test kit. Wallace, Zite, and Homewood (2009) observed that 30% of reproductive-aged women in the U.S. have “less than basic or basic health literacy skills,” citing the National Center for Education Statistics (p. 363). They then sought to test the user-friendliness of home pregnancy test instructions given this data. Their readability study involved 13 sets of home pregnancy test instructions that they subjected to several computational readability formulas, including the User-Friendliness Tool. Ultimately, they found that “relatively small changes in home pregnancy test instructions could ultimately result in improved patient understanding, thus reducing the incidence of invalid or incorrect results” (p. 367).

The second concern in recent health and medical studies is that of use of the home pregnancy test as a replacement for professional medical services. Multiple studies such as Shew, Hallerstedt, Sieving, Smith, and Fee (2000); Coons and Brinkman (1990) and Rahman and Berenson (2013) focus on adolescent and college age users of home pregnancy tests, in large part to ascertain how many of these younger women may be
using home pregnancy tests rather than the medical professionals for reproductive
decision making. Rahman and Berenson (2013) conducted a study to test the hypothesis
that adolescent and young women users of home pregnancy tests are at increased risk of
STDs and unplanned pregnancies. They additionally draw a connection between multiple
home pregnancy test use, unanticipated pregnancy, and socioeconomic status and found
that the position of the user farther below the poverty line, the greater the risk of
unanticipated pregnancy. Shew et al.’s (2000) study of adolescent users found that 34%
of the sexually active adolescent girls in their sample had taken a home pregnancy test,
and of those who had not taken one, 13.5% said that their reason was that they were
embarrassed to buy the test. Additionally, 560 of 564 girls indicated that they knew about
home pregnancy tests as a result of advertising or friends, with 86% reporting television
and 73% reporting store displays as a basis of knowledge. Coons and Brinkman (2013)
studied college age women and found that 1 in 6 had taken a home pregnancy test. While
these medical studies are focused on the possible implications of home pregnancy testing
on the healthcare decision making of younger women, they also help to illuminate
demographics of users of home pregnancy tests that are not visible from the
contemporary marketing materials of these products. These studies also provide valuable
data about how marketing of home pregnancy tests affects the experience of testing for
these users of the product. Much of this data is reported but not analyzed due to its lack
of relevance to the central research questions in these studies. However, it is of great
potential value for scholarship in the medical humanities and health and medical
communication.
Feminist Approaches to Technology, Ethic of Care, and Social Justice

Feminist studies of technology—from design, to production, to distribution, to use—provide needed cultural commentary to what is discussed in the medical and public health studies above. A body of literature now exists that considers how technology is socially shaped and reflects the cultural conditions in which it is made and used. As a result, technology reflects gendered social relations (Wacjman, 1991; Cockburn, 1992). Wacjman (1991) argued that in the case of reproductive technologies, such as the Pill, women have experienced both gains and losses in terms of freedoms, in that these technologies may be more effective over other options, but come at costs to overall health and the burden of primarily responsibility for contraception. Overall, “in this area as elsewhere, technologies operate within and reinforce pre-existing social inequalities” (p. 78). Extending this analysis to the home pregnancy test, Layne (2009) evaluated user narratives with the home pregnancy test[2] against the libratory language associated with the home pregnancy test—“a private little revolution” as home pregnancy test advertisements in the late 1970s celebrated (Leavitt, 2006). She concluded that home pregnancy tests are not a feminist technology in that “in some ways they disempower women by de-skilling them, devaluing their self-knowledge, and enticing them to squander their buying power on frivolous consumer products” (Layne, 2009, p. 61). The concern that reproductive technologies such as the home pregnancy test diagnostic kit are replacing women’s ways of knowing her own body, and hence contributing to the

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[2] Layne’s study included the same set of NIH narratives that are used in this project. An analysis of the methods employed in Layne’s study may be found in Chapter 3.
“medicalization,” “mechanization,” and “masculinization” of human reproduction, is a repeated feminist critique of contemporary reproductive technologies of the medical-industrial complex (Layne, 2009; Wacjman, 1991; Seigel 2014).

Feminist approaches to technology extend to the role of women in technical communication, as both communicators and users. As Durack (1997) explains, historically there has been a bifurcation between workplace/work/productive technology (male) and domesticity/unpaid labor/reproduction (female). As a result of this bifurcation, women as technical communicators, women as users of technology, and reproductive technologies have all been silenced. Since the 1990s, several feminist scholars have sought to make visible the role of women in technology—whether as designers, users, interpreters or technical communicators—and technologies related to reproduction (Koerber, 2000; Sauer, 1993; Cockburn, 1992).

There is now an abundance of technical communication circulating in American culture related to what were once considered female pursuits, yet it is only recently that a technical communication scholar has addressed how prenatal care technical communication (the pregnancy manual) maintains the binary articulated by Durack (1997) by focusing on health care system maintenance and assimilation rather than user centered experience and critical engagement (Seigel, 2014). An essential component of Seigel’s methodology is the use of her own lived experience through pregnancy and childbirth. Focus on user experience is critical in social justice contexts because, as Simmons (2007) argues, the less powerful in a system can uncover the power issues that undergird a prevailing institutional discourse (p. 15). Koerber (2005) shows in her study of infant-feeding discourse and practice how highly individuated each mother’s situation
may be vis-à-vis breastfeeding, and as a result, a rigid “hierarchical-machine” model of technical communication for this activity by medical professionals disempowered many mothers in that the communication failed to align mothers’ choice to breastfeed with their lived experience. Instead, it read too mechanistically, and women could or did not follow it, despite their desire to breastfeed (p. 313). This finding echoes medical studies of home pregnancy test accuracy cited above in that users of the home pregnancy test clearly do not wish for an inaccurate reading or result; yet, the technical communication (and in this case, often the technology itself) is failing many of them.

The preceding paragraph represents a growing trend in technical communication and rhetoric—the braiding together of focus on user-centeredness, an ethic of care to the user, and social justice concerns. An ethic of care to the user is a position that has many different formulations, yet extends directly from feminist scholarship in technology (Dombrowski, 2000). The user-centered movement in technical communication focuses on concerns for the user experience. Porter (1998) argues for an ethic of care that is “embedded in the technical communicator’s role as user advocate and in the stance of user-centered design” (as cited in Scott, 2013, p. 223). Technical communication scholars such as Salvo (2001) have attempted to discern what it means for design to actually be user-centered, as he writes: “Widespread adoption of usability as part of the design process, of course, does not ensure user-centered design. Usability can be appropriated and diverted from genuinely including users in the design process to representing users as things rather than as people who have a stake in technological design” (p. 275). Salvo (2001) advocates for dialogic ethical principles (informed by rhetorical theorists Bakhtin and Levinas) that support collaborative design between user and technical communicator.
This approach replaces notions of gathering user data, or usability studies, to inform technical communicators’ work; these kinds of studies reinforce a binary between the expert technical communication producer and the novice end user. Salvo’s position uncovers a tension between those committed to ethics and social justice in technical communication, and the current frameworks in industry for design, production, and marketing of consumer technologies.

**Methodological Approaches to the Study of Health and Medical Communication**

In the August 2013 issue of *Communication Design Quarterly*, Walton and Jones claim that they see “one of the major research questions that will drive the field of technical communication during the next 5–10 years is, ‘How can technical communication scholars navigate increasingly cross-cultural, cross-disciplinary, and cross-organizational contexts to support social justice through better communication?’” (p. 31). Health and medical technologies present one area in which technical communication must navigate such contexts, and several studies have addressed how the communication may be improved to better advocate for disenfranchised or marginalized groups, including users of technology. Scott’s (2004) study of in-home rapid HIV testing employs the methodological design of rhetorical-cultural analysis; specifically, the cultural circuit. Scott argues that such a model offers “critical attention to the broader cultural relations inherent in technical discourse” (p. 199). The cultural circuit model is a Venn diagram with overlapping categories of production, representation, distribution, reception/interpretation, and application/rearticulation, all in the context of the outer “web of social, material, and ideological conditions” (p. 203). By tracing a technological communication artifact through the cultural circuit heuristic that Scott designs, it is
possible to make recommendations to technical communicators to contribute to a more ethical practice in the production and re-articulation of documents that accompany technology such as the in-home rapid HIV test. In the case of that artifact, Scott’s cultural circuit analysis revealed that certain sets of values were imbued in the technical communication documents, that client-users had no role in document production, and that certain design features “might enable some interpretative practices and disable others” (such as use of client counseling) (p. 212-213). With this analysis, recommendations were made for alterations to the technical documents accompanying the test. It is important to mention that Scott sees the cultural circuit heuristic as a pedagogical method for student engagement in the cultural critique of technical communication; however, he also uses the method in the scholarship, as do other scholars doing research at the intersection of social justice, health and medicine, and technical communication (Scott, 2003; Seigel, 2014, Koerber, 2005).

Other technical communication and rhetoric scholars have used usability studies in order to determine how users interact with health and medical communication. Jansen, Berg, Buurman, and Smits (2006) studied smokers and non-smokers to determine whether visual versus textual warnings about the dangers of smoking had greater impact on each group of users. Their study indicated that both groups were more significantly affected by graphic images of the effects of smoking on the cigarette packaging than text warnings alone. This study is not unlike the focus group methodology often employed by marketing firms when making packaging or advertising decisions. But as the medical studies involving human subjects outlined above describe, human subject usability testing is problematic when it involves pregnancy testing, due to the unique and time-sensitive
nature of the user position. For this reason, methods involving human subjects and home pregnancy tests have tended to be focused on narratives collected after the user experience with the test.

Outside of the field of technical communication and rhetoric, nursing researcher and cultural anthropologist Childerhose and MacDonald (2013) conducted a qualitative study using a pre-existing data set of user narratives\(^3\) and several blogs to theorize the domestication of biomedical products as work conducted by the consumer. This pre-existing data set utilized by the study is a publicly available set of 89 home pregnancy test user narratives, “Your Stories,” collected by the Center for History and New Media at George Mason University (CHNM) from 2003 to 2005 and published to the National Institutes of Health (NIH) website entitled “A Thin Blue Line: The History of the Pregnancy Test Kit” (NIH, 2003b). Researchers have mined these narratives as evidence to reflect various theoretical considerations or cultural critiques regarding the tests, such as that of the importance of lived experience and narrative in the history of medicine (Leavitt, 2006); the domestication of medical technology (Childerhose & McDonald, 2013) and the home pregnancy test causing the de-skilling of women (Layne, 2009). However, methodologically, these studies did not engage in rigorous qualitative analysis so as to draw conclusions more widely and systematically across the data set. A more systematic approach may reveal much different findings about the users’ experiences. Additionally, the focus of the questioning was not specifically on health and medical communication, but more broadly addressing the entirety of the user experience of home

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\(^3\) This is the same set of user narratives taken up by Layne (2009) and analyzed in this study in Chapter 3.
pregnancy testing. Therefore, more scrutiny might be given to this data set to investigate how the design of technical communication affected these home pregnancy test users’ experience, and that scrutiny could involve more rigorous qualitative data analysis.

**Organization, Scope, and Purpose of Project**

This is a project about home pregnancy testing, but in order to break new ground in design of health and medical communication, this must be a project about crossing disciplines, methods, and the academy/industry divide in order to make impact in this arena. The goal of this transdisciplinary dissertation project is to analyze the design of home pregnancy test packaging through the lenses of multiple methodological perspectives in order to motivate a broader and more impactful conversation about ethics and social justice in the specific context of the user experience of home pregnancy testing. As the literature review above indicates, there are researchers working in several different fields of study, employing different methods, looking at various aspects of home pregnancy test use within the purview of their discipline or field of study. However, the medical researchers are not in conversation with the cultural critics, and both are not in conversation with the technical communicators and marketing professionals who package the home pregnancy test. This dissertation focuses on the shared concern for the user of the home pregnancy test that exists across the disciplines and attempts to bring these various voices together, in the spirit of the emerging medical humanities. This being said, the medical humanities as it is traditionally defined tends to include the arts, humanities, certain social sciences, and medicine, and makes no mention of technical communication (Chiapperino & Boniolo, 2014). This dissertation project argues that technical
communication and rhetoric provide a fundamentally important site of critical practice for the medical humanities.

Chapter 2 of this project, “A Rhetorical and Cultural Analysis of the Design of Pregnancy Test Packaging,” is a case study of three brands of home pregnancy tests’ packaging. Through this case study, two findings are offered. First, the information design principles of these communications, uncovered and analyzed through Schriver’s (1997) design heuristics and other visual methodologies, expose their system-centered design (focus on the system of the industrial medical complex rather than user centered). This finding is then integrated into a larger rhetorical-cultural analysis, with the aid of recent studies in public health and medicine related to users of pregnancy tests (Scott, 2003; Seigel, 2014; Childerhose & McDonald, 2013). In this chapter, I also incorporate feminist approaches to cultural criticism of the home pregnancy test and other reproductive technologies (Layne, 2009). This chapter concludes with a discussion on online health forums as a site of “alternate action” for improved ethical and dialogic health communication.

This case study, and its analytic framework based in rhetorical, visual-material, and cultural theory, presents findings about the nature of home pregnancy test packaging and its role in the overall user experience of home pregnancy testing. The chapter articulates a broad claim about the type of user (white, affluent, trying-to-conceive) who may be privileged through the visual iconography and textual production inherent in this packaging. This theoretical work, derived from study of these specific cultural artifacts, is

4 This work was recently published as “Social Justice in Technologies of Prenatal Care: Toward a User Centered Approach to Technical Communication in Home Pregnancy Testing,” in the ACM SIGDOC 2014 Conference Proceedings.
meant to be in conversation with the findings in subsequent chapters of the dissertation, in which different methodologies are employed. While Chapters 2, 3, and 4 are each designed to be a self-contained article, Chapter 2 will also supply the rhetorical and critical theoretical framework that is used throughout the rest of the dissertation project. This chapter also reveals the exigency for the project, as it addresses the ethical implications of packaging a product such as the home pregnancy test in such a way as to potentially inflict harm on certain demographics of users. That being said, the findings from the case study in Chapter 2 are also triangulated through the qualitative analysis of the NIH survey data in Chapter 3 and 4. The goal with these multiple case studies and multiple methodologies is to triangulate to confirm conclusions made across data and methods (Spinuzzi, 2013, p. 129).

Chapter 3, “Trying-to-Conceive versus Hopeful Negative: Analyzing the User Experience of the Purchase of Over-the-Counter Pregnancy Tests,” is a case study involving the thematic qualitative analysis of the previously discussed NIH survey data in order to discern what kinds of experiences with the purchase of home pregnancy test exist. If Chapter 2 (the visual and rhetorical analysis of the design of packaging) analyzes the design of packaging of the home pregnancy test, Chapter 3 is intended to analyze the user and the social context of that technical communication. The set of data analyzed is a collection of 89 home pregnancy test user narratives from the National Institutes of Health survey, made publicly available on the NIH website (NIH, 2003b). As mentioned

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5 But beyond discernable “conclusions,” a second goal is to analyze and critique the limits of these methodologies based upon each method’s underlying assumptions about meaning making and knowledge construction.
in the literature review, this data set has been used in previous studies of the home pregnancy test (Childerhose & MacDonald, 2013; Layne, 2009; Leavitt, 2006). However, there are several reasons why this data set still has much to offer for new and insightful work into the user experience of home pregnancy testing. First, this project is focusing solely on the design of packaging and how the design of communication affects user experience, which is an area previously unexplored in analysis of this data set. Furthermore, this set of data has not yet been analyzed with rigorous qualitative data analysis. Instead, in the studies mentioned above, narrative is used to reinforce a critical theoretical method. This is not stated to malign such work, but build upon it: this chapter presents a rigorous qualitative data analysis, including a discussion of the data set itself—its collection method, affordances and drawbacks as a data set for the studies previously mentioned and for this project. After a discussion of the data set itself, the specific qualitative coding and analysis method is discussed, as well as why others were specifically not chosen, in order to illuminate the connection between the nature of the research questions posed and how the decision of a specific methodological approach affects its answer. Here, I will show examples from previous studies involving the data set, as well as several other methods applied to this data set, to show the different potential findings based upon the different ways in which the same data is interpreted. The significance of this work is to show humanists how decisions in the study design affect what knowledge is made, or in the spirit of “thinking critically about what you are doing and why, confronting and often challenging your own assumptions, and recognizing the extent to which your thoughts, actions and decisions shape how you research and what you see” (Mason, 2002, p. 5). This exercise inspired the decision in
this case study to use the NIH data set previously utilized by other studies; to compare and contrast what is seen based upon how the data set is read, analyzed, and interpreted.

The method ultimately chosen and employed for this particular case study is descriptive coding for first cycle coding and subsequent thematic analysis (Boyatzis, 1998; Saldaña, 2009). NVivo computer-assisted qualitative data analysis (CAQDA) software and MS Excel are used to organize codes, categories of codes, and to draw models from emergent categories and their relationships. This process reveals demographic information about users and themes in use of the home pregnancy test and user experience that both reinforce and complicate findings in earlier studies where data is selectively used and interpreted. This complication is most profound with regards to the “trying-to-conceive” versus “hopeful negative” narrative / counternarrative discussed in the rhetorical analysis chapter. In short, this case study reveals that this narrative / counternarrative relationship is more complex, with many users who discuss more nuanced desires vis-à-vis becoming pregnant. This nuance creates a different set of ethical considerations for the packaging of the home pregnancy test than that discussed in Chapter 2. At the same time, the demographic data indicates that a different user profile may have responded to the NIH survey used for the data set in this case study.

Chapter 4, “Understanding Home Pregnancy Test Purchasing through Text-Based Modeling of User Narratives” supplements the analysis of the data set used in Chapter 3 by building a corpus from that data and employing a computational methodological approach called Text-Based Modeling. From the corpus, a lexical profile is created with the software WordSmith Tools, a profile that reveals certain patterns in language in the user narratives. These patterns form a model of use for first-time users of pregnancy tests.
versus experienced test takers, in their demographic composition and their mindset vis-à-vis use of the home pregnancy test. This analysis—much like in the case study in Chapter 3—both reinforces some findings from Chapters 2 and 3 and complicates others. A young, unmarried, and less financially secure home pregnancy test user emerges from the lists of each survey question’s collocates (words that occur together in the corpus more often than expected by chance) as the hopeful negative user, versus an older, more experienced, trying-to-conceive user. Despite this, the majority of both types of users indicate a positive or neutral response to home pregnancy test taking and purchase. However, this finding is based upon the sentiment of the language utilized out of context. When put back into larger, extended phrases, the sentiment of these phrases is less clear, calling into question the use of corpus linguistics for prescriptive findings without triangulating the methods with other qualitative approaches such as the descriptive coding and thematic analysis utilized in the case study in Chapter 3.

The Text-Based Modeling approach is designed to drill down to the level of the behavior of domain-specific language: here, the language of users of the home pregnancy test in the surveys. The focus on explicit text in a computational method offers certain kinds of understanding about data sets, and obfuscates other kinds of understanding that requires other approaches to find. This chapter will review and explore the use of computational linguistics in humanistic scholarly inquiry (Kretzschmar, 2009). As indicated above, this chapter suggests that a computational humanities method such as Text-Based Modeling offers a corpus-driven discovery process that leads to the employment of other qualitative methods. As ubiquitously stated in research methods primers, a research method is chosen based on “specific questions to be addressed and the
context of the research” (Miner & Jayaratne, 2014, p. 298). What this case study of the NIH user narratives shows is that a computational approach can offer a diagnostic that can offer direction as to which qualitative methodology to thereafter employ. A lexical profile can in effect aid in the non-linguistic qualitative researcher’s choice of research question and coding method for the type of case study such as in Chapter 3. As a result, this chapter argues that computational methods may supplement the process of other qualitative study, and that rather than critiquing the method for its limitations (which it is certainly possible to do), it is also possible to see Text-Based Modeling as an inductive tool to enrich humanistic inquiry undertaken with other methodologies.

Chapter 5, “Implications of a Multiple Methodological Approach,” concludes the dissertation by reflecting on how methodological approach and study design affects the overall findings of the project. The choice of method we employ as researchers does affect the nature of research we pursue, and reveals underlying assumptions about ourselves as researchers. This conclusion will analyze the findings in this study as evidence of how humanistic inquiry is shaped and affected by methodology. If the goal of the research project is to study the design of packaging for the home pregnancy test as one aspect of the scaffolding of an inclusive and user centered experience for the home pregnancy test in the United States, we move toward that goal with a reflective look at how research is assembled in these three case studies, and what the underlying assumptions embedded in those case studies are. This project is imbued with a desire for action for the future: to offer suggestions to study and improve the design of packaging of the home pregnancy test in a way that can more ethically attend to all users of the home pregnancy test. That being said, the project revealed that ethical research practices and
triangulation of artifacts and methods may not lead to a uniform set of recommendations, at least in the scope of this dissertation project. This chapter closes with a discussion of the potential contributions and limitations of the project’s findings, both in terms of the home pregnancy test and in terms of methods employed in humanistic inquiry such as undertaken in this project. Finally, next steps for the future of this research project are outlined.
Chapter 2

A Rhetorical and Cultural Analysis of the Design of Home Pregnancy Test Packaging

Introduction: Social Justice in Health and Medical Communication

In recent scholarship, technical communication researchers increasingly pose two questions: “What implicit moral or ethical assumptions exist in the contexts of health and medical communication? If we are aware of these assumptions, what practices can technical communicators engage in to promote social justice in these contexts?” In the health care system, users from every race, culture, gender, class, ability, and age enter and engage with that system situated in unique ways that technical communicators may or may not attend to when creating materials related to scientific tools. As this essay pertains to prenatal health care, risk communication regarding the fetus and the mother must be negotiated, and the technological system inherent in prenatal care may privilege risk management for the fetus as opposed to the mother (Seigel, 2014). As a result, many users of medical tools such as home pregnancy tests may experience disempowerment or perceived lack of agency and choice as they enter that technological system. For example, girls and women who are fearful of being pregnant would feel alienated from pregnancy tests’ packaging that caters to “trying to conceive” couples by directly advertising to them, and offers instructions for risk management to the fetus and no other options for women who may not desire to continue with the pregnancy.

When considering technical communicators’ ethic of care to users, it is critical to be aware of the situated contexts in which users encounter these tools and make decisions about their use. As some users may have more situated knowledge or privileged positionality upon encountering these tools, the technical communication that
accompanies them becomes, in effect, the equipment of equality (Banks, 2006). From a social justice perspective, this is “work that examines the importance of the role of technical communication for activist groups and other stakeholders involved in affecting change for disenfranchised and marginalized populations” (Walton and Jones, 2003, p. 31; citing Scott, 2003). The home health and medical industry as an institution has the power through its technical communication to affect a just means of distribution of social goods to all users, including users who are not normatively recognized. It is with these concerns in mind that this case study is presented.

**Case Study and Methods**

In this case study of three brands of home pregnancy tests’ packaging, two findings are offered. First, the information design principles of these communications, uncovered and analyzed through Shriver’s (2013) design heuristics, exposes their system-centered design. This finding is then integrated into a larger rhetorical-cultural analysis, with the aid of recent empirical studies in public health and medicine related to users of pregnancy tests (Scott, 2003; Seigel, 2014; Childerhose & McDonald, 2013). What this analysis reveals is that the communication that accompanies the home pregnancy test—perhaps a woman’s first exposure to the institutional system of prenatal health—circulates messaging that the technical communicator offers a specific ethical stance: that of providing risk communication to protect the fetus and promote pregnancy and entrance into the prenatal health system, while the user must learn to share that stance, even if she arrives as a user without the means or inclination to enter the industrial medical complex. This messaging may be received as a privileging of certain users of the home pregnancy test in such a way as to silence other situated knowledges of gender, class, and race;
particularly disregarding adolescent and impoverished users who may not seek the same result as the user who is trying to conceive with the affordances of health insurance and other forms of social and economic privilege. Finally, after a rhetorical-cultural analysis of the packaging, the article concludes with recommendations for a user-centered approach for the re-design of these tests’ health and medical communication in order to promote social justice (Salvo, 2001). Particular attention is paid to participatory user models such as those found in online health forums, with corresponding analysis of their design features.

It is important to note that scholarship around design of packaging is almost exclusively concerned with principles of “effectiveness” that privilege visual aesthetics and marketability. Klimchuk and Krasovec (2013) define packaging design as “the connection of form, structure, materials, color, imagery, topography, and regulatory information with ancillary design elements to make a product suitable for marketing” (p. 39). Schriver’s (2013) heuristic for information design in technical communication takes note of the rhetorical function of these design features, stating that “[e]xperienced technical communicators recognize that they may perceive content differently than their audiences, who typically bring different knowledge, background, experience, or culture to bear during interpretation” (p. 388). Schriver’s first phase in her heuristic, named “Grouping Content into Rhetorical Clusters,” focuses on visual elements such as spatial grouping to make design more “purpose-driven” (p. 390), and this begs the question, “purpose for whom?”. The risk for the study of information design is the tendency to default into teaching the technical communicator how to design for readability toward a particular narrative of the technical communicator, rather than a more reflexive rhetorical
functioning. The two other phases for Schriver’s information design heuristic are “Organizing Clusters Visually to Show Contrasts” and “Signaling Structural Relationships,” focusing on layout in the former and layering of content and typography in the latter. While Shriver’s description of each phase includes considerations of rhetorical function for design decisions, it is important to recognize the ease with which design can become aesthetic over rhetorical. Kimball (2013) accentuates this concern in his discussion of how information design principles can become a kind of “lore,” tricks of the trade or even a “good eye,” picked up with little consistency and much ambiguity (p. 5). Most importantly, he asks how this “lore” interfaces with the current user-centered design movement. The juxtaposition of information design principles that are taught to designers of health and medical communication and the user experience is critical to the design of this case study.

Information Design Principles in Three Home Pregnancy Test Brands

Schriver’s heuristic discussed above offers insight into how technical communicators currently design the packaging for home pregnancy tests. To begin, the front of each packaging represents the dominant “rhetorical clustering” decision made by the designer. Schriver (2013) defines a rhetorical cluster as “a collection of coordinated text elements (visual, verbal, or mathematical) that is designed to guide the reader in engaging with the content (p. 398). In Figs. 1-3 below, the front covers of the packaging of three brands of pregnancy tests (First Response, Clearblue Plus, and Target brands) are represented. These three tests all represent the “basic” level of each brand, with a purchase price ranging between six (Target) and eight (Clearblue) or nine (First Response) U.S. dollars. On each, the rhetorical cluster on the front reveals a genre pattern
with three major components: the brand name with its brand design, an image of the product (the test itself), and a narrative of the temporal element of the product’s use (how soon the user might perform the test). In product design, this genre pattern is called a primary design panel, or PDP. A PDP’s main function is to display the branding and primary marketing strategy for the product (Klimchuk & Krasovec, 2013).

Schriver’s (2013) three phases of information design (group, organize, and signal relationships) all work synergistically on these PDPs to guide the reader into not only the marketing strategy for the individual product, but also the system of prenatal care of which the pregnancy test serves as an introductory component. There are several design features that connect the two together in a pronounced way in the first two brands’ packaging. The most significant design feature is the use of color to signal the structural relationship among pregnancy, gender of the user, and the foreshadowing of baby. In Figure 1 and Figure 2, the employment of the pink and blue color scheme, a post-World War II Western cultural marker for new baby clothes and nursery design schemes, structures a relationship between the use of the product and pregnancy and childbirth. Pink is also utilized in both packaging schemes, a color that is generally affiliated with girls and women, and products geared toward them.
Figure 1. First Response Pregnancy Test PDP (2014). Photo by the author.

Figure 2. Clearblue Plus Pregnancy Test PDP (2014). Photo by the author.
While the Target brand test does not employ this color scheme (as all of its in-store produced products utilize a uniform packaging scheme with the orange “up & up” branding), it does more obviously choose a visual symbol that facilitates a connection between women users and the product: a white, female hand with a clearly manicured fingernail holding the product (see Fig. 3). The choice of the symbol grouped so close to the product serves the same signaling function; to suggest a female user of the product (and a privileging of a specific demographic of female user, a white user who may have the income to afford her a manicured hand). First Response’s branding functions in a similar way, as the silhouette of a woman in the brand name connects the product to its
intended female user in close proximity in layout (see Fig. 1). The system-centered nature to this approach is visible in the design’s focus on attracting a female user who is signaled toward the product of mother and baby (rather than the process of testing), which would lead the female user into the industrial medical complex.

In the case of the First Response pregnancy test packaging, the connection between the product and the prenatal care system is also visibly represented by an end-packaging placement of an ad for the March of Dimes (see Fig. 4). This promotion contains the brand visual for the March of Dimes, which is a silhouette of a mother holding a baby. The text refers only to “the baby” and “the health of babies,” and directly begins by stating that “[t]he sooner you know you’re pregnant, the sooner you can begin giving your baby a healthy start” (Fig. 4). The placement of this statement on the packaging makes explicit the underlying values of the producer of the test: that a positive result results (or should) in a healthy baby. A user who may receive a positive result yet does not wish to conceive is not taken into account by this packaging decision, and instead is pushed toward pregnancy and the system of prenatal health. This one-sided message is the essence of system-centered technical communication.
As a point of comparison, the Clearblue Plus Pregnancy Test packaging contains a cross-promotion for its ovulation kit product on its end packaging (see Fig. 5). The cross-promotional marketing strategy is intended for the user who is trying to conceive, as shown in the text stating, “Trying to have a baby? Try Clearblue Ovulation Tests!” (Fig. 5). Despite the fact that this statement is phrased in the form of a question, the cross-promotion still serves the same function of attempting to pull the user along further into the process of entering the prenatal health care system. The user may receive a negative result on the tests in this specific packaging, but is urged to try again with the purchase of an ovulation kit.
Returning to the PDP of these tests, the narrative of the temporal use of the test (how soon can the user take this test accurately?) is prominently featured in all three tests’ packaging and PDP. In packaging design theory, this would be called a “brand promise”: what this brand can do that others on the shelf cannot (Klimchuk & Krasovec, 2013). Here, brands compete for the title of earliest and most accurate test. The layout and structure in which this content is clustered affects the manner in which it will be read and understood by the user (Schriver, 2013). In the case of the First Response test, the brand promise is placed at the very top of the PDP, with text that reads, “Only brand that can tell you 6 days sooner than your missed period” with a smaller box underneath that reads “Improved technology” (Fig. 1). The brand promise is clustered with a yellow backdrop with a sunburst symbol embedded in its layout. This brand promise is the most emphasized of the three in terms of “double signaling,” layering layout features such as font, color, and size to emphasis a specific cluster (Schriver, 2013). The “6” is
particularly important, as this is one day earlier than the other two brands, thereby winning the brand promise battle. From a marketing perspective, the user would cognitively recognize that this test could be taken a day earlier, and thus, if timing ranks as important (as the organization of the layout appears to suggest) it would be the most desirable product to the user. However, Clearblue foregrounds its ease of use and accuracy over its temporal narrative in its layout, as its PDP has a top-placed “No brand is MORE accurate” cluster with another “Designed to be the Easiest to Use” text box below, both larger than the temporal narrative of “Results 5 Days Sooner” (Fig. 2).

Finally, the Target brand, in its minimalist design (featuring large amounts of negative white space and plain-font textual messaging without contrasting-colored clustering) merely states “over 99% accurate” at the top and “test 5 days before missed period” in the center of the PDP (Fig. 3).

While the temporal narrative (or ease of use or accuracy narrative, respective to the specific brand) can be construed as a marketing strategy per design packaging theory, it also serves a rhetorical function. Schriver (2013) discusses the user’s cognitive and emotional response to design, and these narratives draw out both responses. At the same time that the user is negotiating cognitively the science of the pregnancy test, or which one is more technologically sound, she is also negotiating the emotional aspects of a potential pregnancy. The emotional and temporal are linked in this experience of home pregnancy testing, as Childerhose and MacDonald (2013) state:

Home pregnancy tests offer women, including minors, a means to confirm pregnancy in private, while avoiding at least temporarily the burdens of clinical and family detection, as well as legal restrictions on a decision to terminate the
unwanted pregnancy. In such cases, home testing kits may buy women in challenging circumstances the time to make a medical and life decision in private. (p. 4; citing Vuckovic, 1999)

Information such as this about the lived experience of the user of pregnancy test shed some light on the interaction between brand promise and emotional response to the content of this packaging. If the home pregnancy test is reliable earlier, or more accurate, or easier to use, it allows for more time to make a difficult decision about the outcome of the pregnancy. This may be why the brand promise is so critically important to its marketing success; however, this rationale stands in contradiction to the systems-centered approach of the packaging design in other respects, as discussed above. While the packaging may circulate messaging in a direction that leads to further entrenchment in the system of prenatal health care, the lived experience of the user may not adhere to that path.

The final design element inherent in pregnancy test packaging that sends the user on this systems-centered technical communication journey is the use of asterisks or other directional language to send the user to other places in the packaging to locate more in-depth technical information. This information is provided in small, hard-to-read font in the margins of the packaging, or inside the package in the instructions for use. This design strategy is evidenced in all three brands’ PDPs. In First Response’s packaging, this strategy may be found after the brand promise (“see side panel for details”) and after the cluster that reads “Over 99% accurate from the day of your expected period” (Fig. 1). The side panel, which includes the data-driven evidence about the brand promise, contains typography that is not visually organized and instead contains small font text
with no layout other than to fill the side panel with text, as shown in Figure 6 below. This text includes technical information about the efficacy of the test and empirical data about use. Its small font makes it difficult to notice and read, reflecting the lesser importance placed upon technical knowledge for the user at the point of purchase.

By comparison, Clearblue creates a chart with this same information on its side panel, a design decision that improves the readability and comprehension of this data. Each day before expected period is correlated with a percentage of users who receive a positive result on that day. The Target brand test offers a similar chart on its side panel, but its asterisk corresponds with a directive to “see insert” (Figure 3).

The conclusion from a design strategy perspective is that a user’s understanding of technical accuracy should take place after the point of purchase. The decision to purchase the specific brand, then, should be made by the design strategies of the PDP, not the actual technical information about the accuracy or reliability of the test. This is particularly interesting because the three tests offer much different data sets regarding accuracy in the week preceding the menstrual period, so if the user reads this data
carefully, it may affect purchase. Of particular note is that the test with the most accuracy according to its proffered empirical data, First Response, does not even list this data in the side panel. It requires opening the package and reading the insert to locate the level of specificity that is found in the charts on the other two brands’ side panels. However, the focus on drawing the user into the system is most exaggerated from a design standpoint in this brand’s packaging, as noted by the March of Dimes end panel and other packaging design decisions, so this finding seems consistent with that circulated value of drawing the user further into the test and the prenatal care system. For all, the use of asterisks and directional language takes the user from PDP to side panel to insert, toward the eventual directive of calling one’s medical professional after the test is administered. The path in the tests’ packaging and instructional design, then, is one of systems-centered technical communication.

Rhetorical-Cultural Analysis of Pregnancy Test Packaging

After this analysis of the pregnancy test packaging’s design principles, it becomes necessary to place this analysis into the larger context to “track the circulation and transformations of [this] communication in order to ethically critique and respond to it” (Blake, 2004, p. 210). In order to do this, J. Blake Scott’s (2004) articulation of a cultural studies heuristic that employs rhetorical and cultural analysis proves helpful. Scott’s heuristic asks a series of questions related to the following: production, representation, distribution, interpretation and uses, and alternate actions. Scott uses this heuristic with his technical communication students so they can “become better aware and more critical of the ways texts are transformed, more aware of the broader conditions shaping them, and more attentive to their multiple effects, especially on users” (2004, p. 215). Scott’s
own study of in-home HIV testing, as well as Seigel’s (2014) study of pregnancy manuals, utilizes such analysis because of the “high-stakes” nature of these technical communications for users, and the larger ethical implications in creating and circulating such communication in our society (p. 210).

With the first tenet of the heuristic, production, Scott (2004) asks: “Who determined the exigency for your text? Or, who defined the problem to which it responds? How could this shaping of the rhetorical situation involve a fuller array of stakeholders?” (p. 215). As the packaging design analysis above demonstrates, the packaging suggests that the problem is defined by producers as whether or not a woman is pregnant, and if so, what to do next. This “what to do next” is defined in the pregnancy test instructions by all three test brands in the case study as “see your medical professional.” On a sliding scale of Target brand being the least suggestive and First Response being the most suggestive (with the March of Dimes advertisement and images of mother and fetus), messaging listed on the packaging indicates that a woman should take all steps to protect the health of the fetus if the test is positive, moving her into the institutional prenatal health system. This messaging is consistent with the theory of philosopher Rebecca Kukla (2005) which she calls the “technic of public pregnancy.” Kukla (2005) writes that a “pregnant woman must be inducted into this technic [of pregnancy]: she needs not only to understand the public standards of self-discipline and bodily regulation by which her pregnancy is to be designed but also to feel personally responsible for meeting those standards” (p. 128). This technic of public pregnancy defines the pregnancy and the fetus in “objective, articulable, and measurable terms: their age and features need to be dated, assessed, and policed using public, standardized tests
and technology” (p. 128). The home pregnancy test is the first standardized test in the technic of public pregnancy, and this narrative ignores the product’s stakeholders who are users who do not wish to become mothers, regardless of the outcome of the test.

This finding is also consistent with the media history described in the Introduction to Chapter 1 of this volume. Marketing and public relations professionals are the clear stakeholders and actors—in conjunction with the manufacturer—who determine the exigency for the packaging of the home pregnancy test. As was described earlier in Leavitt’s (2006) history of home pregnancy testing, this exigency changed in the 1980s from that of a woman’s need to equip herself to make a decision about her own body, to that of the fulfillment of an emotional need-to-know firmly represented in visual iconography of the American nuclear family (Leavitt, 2006). Marketers altered the rhetorical situation of the home pregnancy test by eliminating the representation of other exigencies.

In the second tenet of the heuristic, “Representation,” Scott (2004) asks, “How does the text portray its subjects, especially its targeted audiences, and what are the possible benefits and limitations of those depictions?” (p. 216). Here, we see that the focus in the packaging design is not in a set of choices for the woman user should the test be positive, but a suggestion that if the test is positive, there are steps that a woman can take to promote the health of the fetus. This also represents a “hierarchy of values [that] the text embod[ies] and project[s]” (p. 216). In technical communication, this hierarchy of values—placing the health of fetus as a value over the agency of the woman—creates a vexed usability situation, as Seigel (2014) identifies vis-à-vis pregnancy manuals: “System errors…originate with the maternal body, itself represented as an apparatus that
threatens malfunction…[this is] a unique and problematic situation from the perspective of usability because the user’s body is explicitly part of the technological system being discussed” (p. 10-11). While the benefit to this valuing of the health of the fetus is the possibility of protecting this health from the decision-making of the woman (particularly with regards to smoking, drinking during pregnancy, and so on), it has the corresponding limitation of inciting fear, blame, and coercion in the woman user who has no desire or expectation of becoming a part of this technological system.

The third tenet for analysis, distribution, illuminates the ways that users encounter the text of pregnancy test packaging. Questions of note in the heuristic are “How is the text marketed or sold? How could marketing representations more ethically depict the text and its users?” (Scott, 2013, p. 217). Figure 7 is a photograph of the shelving display for distribution of pregnancy tests at a Target store. The display has three horizontal levels of items for purchase.

Figure 7. Display of pregnancy tests at a Target store (2014). Photo by the author.
The top shelf reads “ways to check fertility with ovulation kits.” These kits are the most expensive of all the items for purchase. The shelf immediately below the ovulation test shelf reads, “Get answers fast with easy-read digital pregnancy tests” (Fig. 7). These are less expensive than ovulation kits, but more expensive than the shelf below, which reads “Dependable and quick results with traditional pregnancy tests” (Fig. 7). The line-of-sight display is that the shelf of ovulation kits, which are marketed for the user that is actively trying to conceive, as they are monitoring their ovulation to best plan for intercourse in order to get pregnant. This product avoids contact with the other kind of pregnancy test user, that of a woman trying to find out if she is pregnant as a result of unplanned pregnancy, and who may or may not wish to remain pregnant. These users move down the shelving display to the two types of pregnancy tests. As a result of Target’s marketing, users of these products face a choice between “easy-to-read” and “fast” digital tests versus “dependable” and “quick” “traditional” tests. The additional expense for the former may influence the user that it is also better, especially because the added expense is for a digital reader on the test’s face, which suggests equating higher technology and better function. The wording on the shelf that one may “get answers fast” articulates a suggestion that plays on the panic and fear of many users. This may prove an unethical distribution strategy because this co-option of the emotional state of the user by the distributor may correspond to that user spending more money on the digital pregnancy test.

Further, feminist cultural critic Layne (2009) argues that the distribution of the home pregnancy test is meant to benefit retailers over users. Citing a Drug Store News article from 1991, she notes that retailers are told by the publication’s authors to create
“one convenient Family Planning Center” in order to increase “the likelihood of multiple purchases among companion products” (Layne, 2009, p. 71, citing Drug Store News 1991). As earlier seen in packaging cross-promotion on individual home pregnancy test boxes, the larger retail environment also supports multiple purchasing of pregnancy-related items. Layne (2009) argues that this ultimately contributes to the undermining of the home pregnancy test as a feminist technology, as the product is of more value to manufacturers, retailers, and the medical industrial complex more broadly than women users. This espoused goal of multiple product purchases by the retailer, combined with the retail environment shown in Fig. 7, raises ethical questions about the representation of this product and its users through both packaging and display.

The fourth tenet of the heuristic is related to a text’s interpretation and uses, and the question pertinent to this case study is “What cultural norms, patterns of behavior, and other conditions might shape the audiences’ interpretation of the text?” (Scott, 2003, p. 217). From narratives collected by the CHNM and NIH in 2003, users of pregnancy tests indicate that “some women resorted to purchasing more than one test brand or product to offset the uncertainty that they had produced an accurate result” (Childerhose & MacDonald, 2013, p. 4). This pattern of behavior indicates that users do not trust the brand promises or their own use of the tests and will buy more than one brand to attempt to achieve a user-created empirical data set. It also suggests that the brand promise assumes a certain kind of well-educated user. As Childerhose and Macdonald (2013) elaborate, “[t]he assumption that consumers are rational, entrepreneurial agents who choose and use products with competence and confidence, and that the information they produce from these tests allows them to make informed decisions about their
pregnancies, is problematic in light of the known behavior of women who use these tests” (p. 4). The patterns of behavior of users are the subject of Chapters 3 and 4 herein, but the selection of evidence supplied in the Childerhose and McDonald (2013) study suggest that women are not confident in how they administer these tests, or how accurate their own experience with a specific test might be, and as a result, audience interpretation and brand promise of reliability cannot be considered to be one and the same. This indicates that the pregnancy test packaging communication is not effectively or ethically meeting the concerns of all users.

**Conclusion: Online Health Forums as “Alternate Actions”**

The last tenet of Scott’s (2003) cultural analysis heuristic is to define alternate actions on the part of the technical communicator that could better ethically meet the needs of the user in light of this cultural analysis. The most clearly identifiable alternate action is to design packaging for the home pregnancy test product that takes into account all types of users and their behaviors, but the question remains, how might these be created? The answer may be found in the ways users themselves are negotiating their concerns for this product online. These online spaces range from online health forums such as WebMD’s member-created Pregnancy Discussion Board in Figure 8 (with a sub-heading “If uve got questions about ur pregnancy come and talk :)”) to user reviews and comments, such as seen on Amazon.com in Figure 9 and Figure 10 below. These spaces are fully user-participatory. Users write and submit their own text and engage with one another in a moderated forum. Users write about their lived experience with the tests, from all user backgrounds: trying to conceive versus trying not to conceive, as well as widely disparate ages and socioeconomic and cultural backgrounds.
Figure 8. Screen shot of WebMD Pregnancy Discussion. Retrieved 5 May 2014 from http://exchanges.webmd.com/pregnancy-questions

316 of 371 people found the following review helpful

More like "third response....", March 16, 2011

By [Anonymous]

This review is from: First Response Early Result Pregnancy Test. 3 tests, Packaging May Vary (Health and Beauty)

I bought these tests because most of the reviews and the manufacturer themselves claim that they are "the most sensitive on the market." I have to COMPLETELY disagree. I took this test a day before my missed period (NEGATIVE), the day of my missed period (NEGATIVE), two days after my missed period (NEGATIVE), and three days after my missed period (NEGATIVE).

I'm already a mom and have been pregnant before, and suspecting that I indeed was again, I decided to try a different test, E.P.T., on the third day of my missed period (immediately after I got the negative from the First Response). I got a VERY faint plus sign using the E.P.T., but a plus sign nonetheless (POSITIVE). To confirm, I tested the next morning with two other brands (ClearBlue and Generic), and also got positive results (this time much clearer and more obvious). For kicks, I tested with another First Response at the same time as I tested with the ClearBlue and Generic, and was appalled to see that it was still negative and obviously incorrect at this point.

I am fairly well educated on the subject of pregnancy and pregnancy testing, and I know all about implantation and the reasons why a pregnancy test can be negative for a few days after a missed period before it turns positive. I understand that first of the morning urine has the highest levels of HCG, and always made sure to test first thing in the morning. What I will never understand is why a test that is supposed to be so "ultra sensitive" didn't pick up on my pregnancy when literally every other test did. I finally got the PAIINTEST positive on the First Response when I used the last test I had this morning, 5 days past my expected period. Bizarre.

I'm just glad that there are other brands out there that could easily confirm my suspicions, despite spending a small fortune on pregnancy tests. :-)

Help other customers find the most helpful reviews

Was this review helpful to you? [Yes] [No] Comments (10)

Figure 9. Amazon.com Review of First Response Pregnancy Test: False Negative.

Figure 10. Amazon.com Review of First Response Pregnancy Test: False Positive.


In order for the technical communication of the home pregnancy test to adapt the design and function of, as well as participation in, these spaces (and thus meet the ethic of care to the user per Salvo (2001)), it cannot simply co-opt other sites. They must allow for space on their own websites, and in the process of creation of packaging and instructions, that all have this kind of open user participation. A problem that currently exists with online spaces sponsored by the brands themselves—easily visible from the brands’ own websites—is that the messaging on these websites tends to reinforce the dominant narrative of “trying to conceive,” or the technic of public pregnancy. The Clearblueeasy.com website, for example, has a “Share My Story” link that features “from-positive-test-to-baby” stories. For this reason, a technical communicator must be wary in soliciting or displaying specific types of narratives, or, utilizing digital ethnography to come to know the lived experience of users, due to the ease with which pre-established company values can confound its collection. It may seem like an easy answer to use a search engine to collect narratives of users, and certainly “data gathering
and data classification have become an integral (some say indispensable) part of warfare, policing, education, health care, finance, travel, and virtually every other aspect of contemporary life” (Lievrouw, 2012, qtd. in Madsen, 2014, p. 70). Yet the design of the websites and the methodology in which narratives and user reviews are elicited can easily affect what data is gathered. For example, pregnancy test user forums tend to be self-organized into categories of trying-to-conceive user forums such as countdowntopregnancy.com or product-owned sites such as Clearblue Easy’s, both of which elicit positive, happy baby stories. Users self-select what sites meet their needs, but participation on a website is a much different act than the purchase of a pregnancy test. Because the latter is a home-based technology that affects the lives of its users, the test brands have an ethical responsibility to provide a product experience, including its technical communication that does not harm or disempower its users.

The ultimate goal for the design of the packaging of pregnancy tests should be to reflect the needs of all users in a way that honors the disparate backgrounds that those users bring to the use of the product. As Seigel (2014) argues in the case of the pregnancy manual, the home pregnancy test also “must articulate (pregnant) women as experts, articulate the [pregnant] body as normal and capable, and articulate prenatal care’s goal as ensuring healthy and empowered women and babies rather than producing normal (nondefective) babies” (144, brackets added). The woman who takes a pregnancy test must be availed of more than one potential option after the administration of the test. Narratives of lived experience, such as found in the NIH study referenced above and on user review sites, must be utilized in a dialogic process to re-articulate how the pregnancy
test experience is packaged and sold. It is only then that an ethic of care to the user may be fulfilled.
Chapter 3

Trying-to-Conceive Versus Hopeful Negative: Analyzing the User Experience of the Purchase of Home Pregnancy Tests

**Price Check on Aisle 3: User Experience at Point-of-Purchase**

Recalling her experience purchasing a home pregnancy test eleven years earlier, Elizabeth\(^6\) wrote:

It was actually easier to purchase then [sic] I thought. I had these ideas that everyone would stare at me, the cashier would make some kind of comment. Or the dreaded, ‘We need a price check on this home pregnancy [sic] test’ over the load [sic] speaker. ;) I was 18 but I looked MUCH younger. My friends would tease that I was only 14, I looked that young. So that is part of why I was so terrified. (NIH, 2003b)

Elizabeth’s terror that she brought to the point-of-purchase of her first home pregnancy test has significant bearing on her user experience with the test, even if her fears ultimately were not actualized and in retrospect, she views the event of purchase as “easy.” User experience, a growing area of study in technical communication, explores the “complete” experience surrounding the use of a product (Grice, 2002, p. 150).

Elizabeth felt discomfort at the point-of-purchase based upon her preconceived beliefs about how employees and patrons in the retail environment might treat her based upon her apparent age. This discomfort is a part of the “comfort dimension” of the user experience. Unlike usability, which measures specific tasks around the use of a

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\(^6\) The author has changed names to protect the anonymity of the survey participants in this manuscript pursuant to IRB approval for this dissertation project. Survey participants had the option of supplying their names in the original CHNM/NIH survey.
technology product, the comfort dimension is much more personal and subjective. As a result, a researcher must ask users directly as to this dimension in interviews, focus groups, or surveys (p. 163). Here, Elizabeth wrote her pregnancy user narrative in an online survey conducted by the Center for the History of New Media at George Mason University and the Office of NIH History, an online survey with results yet unexamined in the area of user experience research, this survey did ask directly about the comfort dimension of home pregnancy testing. This survey and its results are the subject of this chapter.

Reflecting the tradition of assessing usability versus user experience, technical communication researchers have historically focused on the research practice of usability testing by measuring success of tasks performed by users in the use of a technological product or service. For example, in home pregnancy testing, the focus would fall on the use of the actual test or the reading of the instructions. But as Grice (2002) has argued, there are many types of research and methods by which the complete user experience might be studied, drawing upon fields as varied as cognitive psychology, anthropology/ethnography, software engineering, market research, language and literature, and technical communication itself (p. 157). These disparate approaches help technical communication researchers to see how the study of cognition, behavior, science, culture, and language can each work to paint a more complete picture of the use of technology for the benefit of users and for the society in which the technology is embedded.

Research in the study of the complete user experience of the home pregnancy test has been ongoing for decades, but not with regard to the package design and the
experience at point-of-purchase. Various concerns for the health and well-being of the home pregnancy test user in the United States have prompted studies in many fields from public health, medicine, anthropology, history, and women’s studies (Childerhose & McDonald, 2013; Coons, Churchill, & Brinkman, 1990; Grenache, 2015; Layne, 2009; Leavitt, 2006). Appropriate to their disciplines and fields, these studies rely on a variety of methodologies (discussed in detail below), all with their own specific belief systems and values about the kind of knowledge sought and how to seek it.

The CHNM/NIH survey data set of which Elizabeth’s statement is a part has been the substantive focus of several of these studies (Childerhose & McDonald, 2013; Layne 2009; Leavitt, 2006). With 89 collected “electronic oral histories” 7 (Leavitt, 2006), publicly available for educational use on the Office of NIH’s website, this small data set has been a useful barometer of pregnancy test user experience meaning making. From its narratives, scholars have pronounced findings and calls to action. As a rhetorician and scholar of technical communication, I became interested in the methodologies by which the data set was analyzed, and how a different methodological approach might affect the nature of the findings.

In this chapter, I will first discuss the CHNM/NIH data set as to its affordances and limitations as a site of knowledge for the complete user experience. From here, I will analyze the various studies undertaken with the NIH surveys for their methodological approaches and findings. After looking at the previous published work with the CHNM/NIH surveys, I present new qualitative and quantitative data analysis with this

7 The online survey, due to its open fields for response, elicited a more conversational response than a traditional survey. For this reason, the historian for the project referred to them as “electronic oral histories” (Leavitt, 2006 and Leavitt, personal communication).
data set, utilizing descriptive coding for first cycle coding and subsequent thematic analysis (Boyatzis, 1998; Saldaña, 2009). With an eye toward transparency and a discussion of the assumptions inherent in the specific method employed, this process complicates assumptions about home pregnancy test purchase and use. A qualitative and quantitative approach to the CHNM/NIH data set illuminates demographic information about users and suggests patterns in experiences that both reinforce and complicate findings in earlier studies where data is selectively used and interpreted. For example, the data set taken as a whole suggests discomfort with pregnancy test purchasing by both hopeful negative and trying to conceive users, when earlier studies indicate that only the former are embarrassed by the packaging design and retail environment by citing only hopeful negative user’s narratives. The suggestions from this thematic analysis also reveal the need for more empirical research to improve user experience in the comfort dimension in home pregnancy testing.

Ways of Reading, Interpreting, and Knowing “Your Stories”

“Your Stories”: The CHNM/NIH Survey

In November of 2003, the Center for the History of New Media at George Mason University (CHNM) in collaboration with the National Institutes of Health (NIH) launched an online survey through their joint website project, called A Thin Blue Line. A survey, consisting of five open-ended questions, appeared on A Thin Blue Line’s website on a subpage entitled “Your Stories.” The survey was designed for its results to be on display in a digital public history website, as a collection of “personal stories” (See Fig. 11). Participants were solicited through the CHNM’s website and at CHNM events such
as conferences. Figure 11 is an image of the introduction to the survey that participants read before entering their narratives. There was no separate IRB consent form or disclosure other than what appears in Figure 11, although the Office of the NIH historian on the project was certain that all “NIH procedures” were met (Leavitt, personal communication). No other contact was made with participants. The survey consisted of five questions that appear below in Table 1. Below each question, a free response text box field captured the narratives of the participants.


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8 One survey respondent recalled learning on CNN that one could “tell your story” on the CHNM website (NIH, 2003b). Although the “Tell Your Story” page to solicit survey participants is still accessible online today, there have been no published responses to the “Your Stories” page since August 8, 2005.

9 The Clearblue Easy advertisement that appears to the right of the text in Figure 11 is not a promotion in conjunction with the study, but a part of the collection of historical artifacts collected as a part of the digital history collection on the website.
Table 1

*CHNM/NIH Survey Questions*

<table>
<thead>
<tr>
<th>Number</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Please describe your first experience with a home pregnancy test. (What year was it, how old were you, and where were you living? Were you at home, somewhere else, alone, or with someone?)</td>
</tr>
<tr>
<td>2</td>
<td>Was the test easy to purchase and use? Did you use more than one test or brand? Did you feel comfortable purchasing the test?</td>
</tr>
<tr>
<td>3</td>
<td>Did you know what you wanted the result to be? What was your reaction when you got the result?</td>
</tr>
<tr>
<td>4</td>
<td>If you took a pregnancy test before home pregnancy tests were widely available in 1978, please describe your experience.</td>
</tr>
<tr>
<td>5</td>
<td>If you've taken a home pregnancy test more than once, please describe how the experiences were different.</td>
</tr>
</tbody>
</table>

*Note.* Table is adapted from information found in the “Tell Your Story” survey. Retrieved 20 April 2015, from [http://echo.gmu.edu/nih/survey.php](http://echo.gmu.edu/nih/survey.php)

Finally, at the end of the survey, “A Note about Privacy” stated “You may choose to enter your name, to have your name hidden from public view, or not to give your name if you wish. Use the drop-down menu to choose how you would like your name to appear” (NIH, 2003c).¹⁰ There were also optional text fields to provide confidential metadata (age, zip code, sex, race). This metadata does not appear on the public “Your

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¹⁰ There are considerable ethical implications in the option of providing full name for public viewing. Four participants chose this option and disclosed their full names. Alongside other metadata such as zip code, this could have considerable privacy ramifications. I submitted the website (including the survey results) for IRB approval for this study and received that approval. I included in that application that I would change all names for use in my dissertation, as discussed in footnote 6.
“Your Stories” as a Data Set

What appears on the “Your Stories” page is a collection of 89 participants’ responses to the five questions in the survey, followed by the participant’s name if he or she chose to disclose. Each entry is date stamped, and submissions that appear range from November of 2003 to August of 2005. Almost half of the submissions (42 of 89) are date stamped November 11, 2003, in conjunction with the launch of the survey. Participants disclosed dates of home pregnancy test use from 1959 to 2004.12 These first home pregnancy test experiences took place for the users between the ages of 16 to 40-something.13

As Leavitt (2006) mentioned in her discussion of “Your Stories,” this data set is “neither authoritative nor representative, but the personal stories provide insight into the experiences of individual women” (p. 334). As the historian for the Office of NIH History working on the project, she recalled that the intention for the sample size of survey results was “as many as possible” but also admitted “we [CHNM/NIH] did not have the recruitment or advertising capabilities for that [a large sample size]” (Leavitt, personal communication). Because it is unclear how the online survey was promoted on

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11 I have contacted the former director of the CHNM to find out if this metadata is in fact recoverable for educational use, and if and/or how this metadata is stored and protected.

12 The 1959 pregnancy test was actually clinical and not “home,” but still included in the narratives.

13 All participants who disclosed an underage first home pregnancy test experience were over 21 at the time of taking the survey.
the CHNM website, to how many members of a particular audience, it is impossible to calculate a response rate, which assists researchers in determining how representative the results are to the population surveyed (Hughes & Hayhoe, 2008). It might be inferred that the population of users that found their way to the CHNM website would have had a relatively high level of education, as well as Internet access, and access to a computer to complete the survey. However, it is also important to remember that these are narratives of prior lived experiences in which many respondents were in different stages in their lives with regard to age and socioeconomic status. There are still likely limitations with this data set in terms of its representation of home pregnancy test users by race, disability, and even gender, as survey results do indicate that home pregnancy tests are often purchased by partners or significant others of the user of the test. What researchers can reasonably assume is that these respondents had personal experience with home pregnancy tests as of 2005, and were willing and able to participate in this educational and historical online project.

Despite the limitations with the survey data set in terms of its size and representation, it has become, as Leavitt (2006) described, “a window to the voices of women” and “a glimpse into the demographics of the pregnancy-test consumer, a difficult population to assess” (p. 334). Particularly because of the availability of the data set, the legitimacy of the NIH name, and the data set’s pathos-laden narratives (refer back to Elizabeth’s “terror”), selections from these surveys have been quoted and used in scholarly research on the subject of home pregnancy test use in the United States in several fields of study. Each treats the data set in a different manner, and these will be taken up in turn below.
There are a number of concerns about the scholarly treatment of this data set. The first is its treatment as a data set at all, given that its design as a survey was not specifically intended for experimental purposes for empirical research, but instead, for digital storytelling for historical and public educational purposes. This is compounded by the second concern, that the data set’s recurrent appearance in the scholarship on home pregnancy tests inflates its significance as a representational sampling, or may be used to suggest that its results reflect the experiences of all users. Because it is the only empirical data made publicly available for educational use on this subject, it has become an overemphasized and relied upon source of information.

Two possible calls to action can be derived from these concerns. First and most obviously, more data should be collected with a specific experimental design aimed at collecting data on pregnancy test user experience, research that attempts a more representational data set with a response rate from known representative populations. The second, and the call that will be heeded in this chapter, is to analyze the methods in which this data set has been studied and how meaning making has taken place around the data set in scholarly research. From here, new methods of analysis will be employed to re-read this data set against the backdrop of other readings, hopefully with these limitations of the data set rendered more transparent.

**Historical Approach: Leavitt’s “A Private Little Revolution” (2006)**

In historian Sarah Leavitt’s (2006) “‘A Private Little Revolution’: The Home Pregnancy Test in American Culture,” published in the *Bulletin of the History of Medicine*, she traces the history of the home pregnancy test and its impact on the women’s health movement. Her history of the home pregnancy test includes the research
and development of the test, FDA approval, doctors’ perceptions of the introduction of
the test, users’ experiences with the test, marketing of the test, and examples of treatment
of the home pregnancy test in mass media. As the title suggests, Leavitt’s (2006) central
argument is that the introduction of the home pregnancy test in the United States in the
late twentieth century is an “important example of the impact of the women’s health
movement by illuminating an area in which women assumed control of knowledge that
had previously been in the hands of their doctors” (p. 318). Control is the pervasive term
in the history—control for the woman and the user of home health technologies.

In the section of the article “The Consumers’ Stories,” Leavitt (2006) introduces
the CHNM/NIH survey data as one source of many, including medical and literary texts
for the study of reproductive technologies (p. 334). Alongside popular media treatment,
doctors’ opinions, medical books, and other sources, the CNHM/NIH survey data may be
read and interpreted alongside the reading and interpreting of these other texts. These
narratives were read and interpreted for historical and cultural value, then, in the article,
general themes are noted, with selected quotations from the surveys listed as evidence for
those themes. The data set as a whole is discussed in the following statements: that it
spans 25 years of pregnancy testing experiences, responses have “similar tone and
content,” “most respondents” wrote about testing in the 1990s, and “sexually active
women of all ages take pregnancy tests. In the online survey, the youngest was sixteen
and the oldest in her forties” (p. 334-335). Leavitt also suggests that “teenagers had the
hardest time buying a test” without providing evidentiary support, which leaves some
ambiguity over what the difficulty was (inability to purchase or difficulty purchasing due
to embarrassment). Immediately following this statement, Leavitt states that an older
woman also had trouble, and quotes her as saying she had difficulty “sharing a part of my life with the public (or, at least with the people in the grocery store) that I wouldn’t have chosen to otherwise” (p. 335). It is unclear how it is determined how teenagers were adversely affected compared to other purchasers of home pregnancy tests.

Leavitt (2006) provides a discussion of the 1990s and the cultural movement toward more gay couples having children of their own. Evidence of this is the lone response in the data set that mentions a trying-to-conceive lesbian couple (Leavitt, 2006, p. 336). Here, the paragraph is much more focused on providing the cultural history of the 1990s and same-sex parents and childbirth than it is about the survey data. One entry instead provides a narrative to reinforce this cultural and historical tracing.

This is but one example of many cultural trends involving the home pregnancy test that the author describes and then invokes a quotation from a survey response. Another that Leavitt (2006) describes is how in the 1990s the use of the home pregnancy test becomes a symbol of either a triumphant memento of conception of a child, or fears realized of an unwanted pregnancy. Evidence to reinforce these claims is found in the CHNM/NIH user narratives. The memento is shown through one respondent who kept the positive sticks as “treasured items” in baby books, and another who wished she had “saved the wand as my first memento of my son” (p. 334). As a symbol of fears realized, Leavitt points to two user responses in which, to sum up with one respondent’s words, “that damn little test would confirm all my worst fears” (p. 335). As these examples show, the selections from the survey responses help to accentuate each of Leavitt’s cultural claims with a pathos laden first person account of the phenomenon.
Women’s Studies Approach: Layne’s “Feminist Technology” (2009)

Linda Layne (2009) challenges the position of the home pregnancy test as revolutionary or liberatory as described in the women’s health movement. In her “The Home Pregnancy Test: A Feminist Technology?” published in Women’s Studies Quarterly, she uses the CHNM/NIH surveys, as well as newsletters of two pregnancy loss support organizations, to argue against the classification of the home pregnancy test as a feminist technology, and to make suggestions for the improvement of the home pregnancy test to “better serve women” (p. 61).

The methodological approach Layne (2009) uses to examine the data is quite similar to Leavitt’s. Although Layne is working from a lens of feminist theory, procedurally, she quotes directly from the survey results throughout the essay to substantiate factual claims or cultural criticisms about the home pregnancy test. These include descriptions of the home pregnancy test apparatuses, men as purchasers and men’s involvement in pregnancy testing, women users who fear public exposure of their pregnancy testing by purchasing a test in a store, trying-to-conceive women without fear of public exposure, and women’s knowledge of their own bodies as pregnant without the aid of a pregnancy test. These examples from the survey results are dispersed throughout the text alongside examples from medical texts and popular media narratives of home pregnancy testing (Layne, 2009).

The conclusions that Layne (2009) draws, that home pregnancy tests “in some ways [they] disempower women by deskilling them, devaluing their self-knowledge, and enticing them to squander their buying power on frivolous consumer products” (p. 61) are not directly drawn from evidence from the CHNM/NIH survey data, but instead, are
claims of cultural criticism derived from a variety of other scholarly and historical and cultural sources. However, the introduction connects them directly to the examination of the survey results (p. 61). In this manner, the lack of a description of a method used to examine these surveys, and the lack of a described connection between the examination and the results, renders these conclusions tenuous to a reader looking to understand the essay’s logic beyond its feminist STS theoretical frame.

**Anthropological Approach: Childerhose & MacDonald’s “Health Consumption” (2013)**

Janet Childerhose and Margaret MacDonald’s (2013) article, published in *Social Science & Medicine*, is titled “Health Consumption at Work: The Home Pregnancy Test as a Domesticated Health Tool.” The authors use the home pregnancy test as a case study to demonstrate a theoretical approach that bridges consumption studies and medical anthropology to better understand the rapid increase of sales and consumption of the home biomedical product (p. 2). As a social science article, it includes a methods section that gives a thorough description of the data set and its history, then states that the authors “began reviewing the [CHNM/NIH] stories in December 2003, when the exhibit went ‘live,’ and conducted a thematic analysis of them between November 2006 and March 2007, which we coded manually” (p. 8). The authors do not elaborate on their chosen coding method or what type of thematic analysis was undertaken. Beyond the CHNM/NIH surveys, the Childerhose and MacDonald (2013) study also included a second data set, a selection of blogs and vlogs of pregnancy test stories that were chosen from website searches of selected terms pertinent to the study.
In the main discussion in the article, the authors reveal a theme in the survey data to be the “‘work’ required by women using the test to produce a positive or negative result—and the occasional troubling ambiguity of the results” (Childerhose & MacDonald, 2013, p. 3). Three directly quoted statements from survey participants—on difficulty of use of test kit itself, from testing to reading the results—follow as evidence to support this thematic finding. This is the only theme that is substantiated by the survey results directly. The other main thematic finding, that of users repurposing the home pregnancy test as an announcement and memorialization of pregnancy (saving tests as mementos), is substantiated by the other data set (p. 5). The authors’ theoretical framework of consumption studies directly influences both themes that are explored in the discussion section of the article: consumption as work and domestication of technology through meaning making. The theory drives the findings much more than the data, although each data set provides evidentiary support for one of the findings.\(^\text{14}\) In short, all three of the studies using the CHNM/NIH survey data rely on quotations from responses as selective examples to support chosen frameworks of interpretation.

**Re-reading “Your Stories”: Case Study Design and Methods**

After reviewing these prior studies, I now revisit the CHNM/NIH survey data with a qualitative approach associated more readily with survey research. I analyze the data from a perspective in which it has not yet been subjected in order to compare the

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\(^\text{14}\) This statement is not meant as criticism for the methodological approach, but more to situate the use of the survey data in a primarily theoretical project. The abstract and introduction to the article claim explicitly that the goal for the project is to “suggest new approaches to theorizing the social and cultural elements of goods and services for health” (Childerhose & McDonald, 2013, p. 1).
results of this study to others that derive from different methodological and epistemological frameworks. Despite the fact that these earlier studies relied on a qualitative survey data, the research goals were more theoretical\textsuperscript{15} than empirical. This is in line with the disciplinary aims of the researchers and the epistemologies that guide their research. Hughes and Hayhoe (2008) argue that the concept of researcher as filter is an important one in that “every researcher applies filters and constantly makes decisions about what data is important and what is not. When researchers do not acknowledge these filters, and when readers of research are not sensitive to the fact that some data has been filtered out before even being shared with the reader, they lose the ability to analyze the results critically” (p. 6). The spirit of Hughes and Hayhoe’s claim drove the design and method of this study. The CHNM/NIH survey data has been presented in a limited way by prior studies—approaching individual narratives as evidence to focus on specific aspects of the data that were selected by the researcher.

This case study was devised to attempt to be a “re-seeing” through the lens of qualitative and quantitative survey research methods under the umbrella of Boyatzis’ (1998) thematic analysis methodology. Boyatzis’ method includes four stages: (1) sensing themes; (2) doing it reliably; (3) developing codes; and (4) interpreting the information and themes in the context of a theory or conceptual framework (p. 11). The strength of this method lies in its versatility and as a “vehicle for increasing communication,” in order to speak to researchers in various fields, utilizing a number of

\textsuperscript{15} The definition of theoretical in use here is Reeves’ (1998) description of theoretical research as that which has the goal of explaining phenomena. These can also be the goals of empirical research, although empirical research will test hypotheses in the context of their application (cited in Hughes & Hayhoe, 2008).
different methodologies (p. 5). Because this study is both quantifying the survey results and also comparing those results to other methods employed in previous studies, it is a good choice for an overarching methodological approach here. However, I introduce this study with the understanding that the original creators of the survey, who saw this project as an educational and historical digital storytelling project, anticipated no experimental design, nor can one be imposed on this data after the fact. This statement points to a methodological difficulty in conducting empirical research with narrative that was not intended for such purpose.¹⁶

In this study, I employ two first cycle coding methods to the CHNM/NIH data: attributive and descriptive. With the attributive coding method, I sorted and labeled all of the supplied demographic data in the surveys. I used the following attributive codes: date of first test, age at first test, relationship status at first test, with whom living at first test, desire for outcome of test at point of purchase, comfort with first test purchase experience, and indication of subsequent test taking. Using computer assisted qualitative data analysis software (CAQDA), I then subjected these Attribute Codes to data reduction, meaning that I placed the coded data in categories such that it could be quantified.

Data reduction is a “critical part” of social science research method that involves the selection of certain data and/or the categorization of data into “something comprehensible and useful” (Smagorinky, 2008, p. 397). All studies that visualize qualitative data employ data reduction to a certain degree. Here, demographic data was

¹⁶ I discuss the implications for transdisciplinary research involving digital oral histories in Chapter 5.
placed into categories, such as age groups, relationship statuses, housing situations, etc. For example, if a respondent wrote about having a boyfriend at the time of pregnancy testing, this relationship was coded “dating” instead of “single,” “engaged,” or “married.” This process of reading and interpreting data is another kind of “researcher as filter.” The categories in this study are further shown in the results section of this chapter.

After this process, I then analyzed the reduced data by creating charts and pivot tables, so that I could identify correlations and patterns of interrelationship with other attribute and descriptive codes. For example (and discussed further below), CAQDA can quickly put into conversation the results of all users’ ages and desired results of their first pregnancy tests. This is a benefit of using CAQDA (versus coding by hand) and attributive coding; the ability to easily and quickly measure and visualize patterns between selected Attribute Codes (Bazeley, 2003). Attributive coding and subsequent analysis provides context to the text; the stories told in the survey data. It places those stories within a specific date, time, age, and place, and can reveal “organizational, hierarchical, or chronological flows from the data, especially if multiple participants with differing perspectives are involved” (Saldaña, 2009, p. 57; citing Rubin & Rubin, 1995). The goal is twofold. First, as a researcher I can place a sample narrative from the survey responses within its demographic context. So, if a survey respondent writes that she was hoping for a negative result of the pregnancy test, I can quickly cross-reference and see her age and relationship status. I can simultaneously use those demographics to supply a larger context to the users’ experiences documented in the survey responses. That is, I can quantify all of the ages and relationship statuses of all users who indicated that they sought a negative result on the test.
Alongside Attributive Codes, I used Descriptive Codes in first cycle coding. Descriptive coding is a method by which a short phrase is used to identify a topic (versus the message, or the content itself) that is identified in a passage of qualitative data. It is occasionally referred to as topic coding (Saldaña, 2009). In this study, I used an inductive approach to descriptive coding, such that I coded emergent topics as Descriptive Codes as they appeared in the data. Eight descriptive topics were coded in the first cycle of coding (first test brand information, first test cost information, decision making at first purchase, emotional state at first purchase, retail environment at first purchase, multiple tests at first purchase/use, subsequent test taking experiences, and discussion of survey process itself). I used these Descriptive Codes in tandem with the Attribute Codes listed above to perform subsequent analysis and interpretation of the data.

Results

Reported Demographic Information

As the survey questions in Table 1 show, survey respondents answered questions that could potentially reveal demographic information about their age, marital status, with whom respondents were living, initial date of home pregnancy testing, and desired result of first pregnancy test. While not all respondents chose to answer all aspects of each question, coding for each demographic item offers a better understanding of the sample of survey respondents in this data set. Figure 13 below illustrates the ages provided at the time of respondents’ first pregnancy test use. Over half of the respondents disclosed their age as 25 years old or younger at the time of their first pregnancy test use (55%, or 49 of
89 respondents). Eleven respondents did not disclose their age at the time of first pregnancy test use.

**Figure 12. Disclosed Age at First Pregnancy Test Use, CHNM/NIH Data.**

With regard to relationship status, 38 of 89 respondents indicated that they were married at the time of their pregnancy test use (see Fig. 13). While 6 of 89 responded that they were single, 32 of 89 indicated that they had a boyfriend or were seeing someone at the time of their first pregnancy test use (“dating” on Figure 13). Nine respondents did not indicate their relationship status.

**Figure 13. Relationship Status at First Pregnancy Test Use, CHNM/NIH Data.**
From the information provided by respondents, with whom the respondents were living at the time of first pregnancy testing could be obtained for 64 of 89 respondents (see Figure 14). A significant number did not respond because there was no direct question in the survey that asked this question, although the survey asked if users took the first pregnancy test alone or with others. From this question, 64 answered with enough information to discern with whom they were living at the time of their first pregnancy test use. Of these 64, 27 were living with a spouse (with or without children). Very few (5) reported living with the person with whom they were dating.

![Figure 14. Respondents’ Living Companions at Time of First Pregnancy Testing, CHNM/NIH Data.](image)

The survey directly asked for the date of first pregnancy test use in the first question (Table 1). Twenty respondents gave a date of 1990 or earlier. Most (69%) responded between 1991 and 2005, with 61 responses in that time frame. Eight respondents did not indicate the date.

Finally, the survey asked for the respondents to indicate the desired result at the time of use of their first pregnancy test. As Figure 16 demonstrates, results were fairly
evenly divided, with 37 of 89 desiring a positive result and 41 of 89 indicating that they desired a negative result. Eight respondents indicated they had mixed or uncertain feelings about the result, and three did not respond to the question or indicate a position on their feelings.

Figure 15. Initial Date of First Pregnancy Testing, CNHM/NIH Data.

Figure 16. Desired Result Indicated by Respondents for First Pregnancy Test at Time of Use, CHNM/NIH Data.

For these demographic representations, the “DNR” (did not respond rate) varied between 3% (in Figure 16, desired result of initial testing), to a very high 28% (in Figure 66
14, with whom respondent was living at initial testing). In Figure 14 particularly, the data and its visualization are not as meaningful due to the high failure to response rate. The relative rate of failure to respond should be taken into account when reading these visualizations, and as a researcher I did not rely on the cumulative data to suggest findings in instances where the DNR rate was high.

**Interrelationships between Demographic Information and Descriptive Codes**

These attributive codes on their own do not offer as much as they do when combined to consider their interrelationships. Included here are five sets of interrelationships. Figure 17 shows the data for respondents’ relationship status together with the respondents’ desired result for the outcome of their first pregnancy tests. Not surprisingly, those that responded that they were single or dating had a much larger desire for the result of their pregnancy test to be negative. All 6 of 6 single respondents indicated that they desired a negative result, and 27 of 32 who were dating indicated that they had mixed feelings or desired a negative result. Figure 18 then looks at the interrelationship between respondents’ ages and relationship statuses, and identifies a pattern between younger aged respondents and single and dating relationship statuses. In the survey sample, there were no respondents who identified themselves as single over the age of 24 at the time of taking their first pregnancy test. Additionally, 25 of the 32 respondents who indicated their relationship status as dating were under the age of 24. Figure 19 then compares the relationship between age and desired result, and while Figure 17 and Figure 19 are not exactly the same, they offer a similar pattern. In this survey sample, the older the respondent is, the more he is she is likely to be married and desire a positive outcome on their first pregnancy test use.
Figure 17. Relationship between Desired Result and Relationship Status, CNHM/NIH Data.

Figure 18. Relationship between Respondent Age and Relationship Status, CNHM/NIH Data.
Figure 19. Relationship between Age and Desired Result, CHNM/NIH Data.

For results specific to the point-of-purchase user experience, I examined the attributive demographic data above with a descriptive code, “ease/comfort in first purchasing experience.” After coding each respondent’s description of his or her comfort with purchasing the test, the relationship status of the respondent was then evaluated in light of that result. Figure 20 shows this result. Important to this finding was the response of a “qualified yes” to being comfortable with purchasing a first pregnancy test. “Qualified yes” meant that the respondent initially responded yes to the question, but then qualified the answer with a “but such and such” so as to imply that he or she was actually not comfortable at all or to some degree. The results also suggest that respondents may have bifurcated to some degree ease of purchase and comfort in purchasing, such that “ease” was interpreted as lack of tangible obstacles blocking purchase, and “comfort” is solely an emotional component. For example, one respondent responded, “Yes the test was easy to purchase. I just hate that everyone in the store stares at you as you exit the checkout” (NIH, 2003b). While she did not directly say that she was uncomfortable, she qualified her yes answer with a condition. These mixed answers complicate the comfort
level at purchase analysis. Interestingly, the most “qualified yes” answers (7) were provided by married respondents. Five of six single respondents answered that they were not comfortable buying their first pregnancy test. If “qualified yes” responses are taken as some degree of discomfort, then the results are fairly evenly divided between comfort in purchasing for both dating and married respondents.

![Figure 20. Relationship between Relationship Status and Comfort in Purchasing First Test, CHNM/NIH Data.](image)

The relationship between age and comfort in purchasing first test is more pronounced, in that over half who were uncomfortable purchasing the test were under the age of 21 (21 of 36 respondents who indicated discomfort). Discomfort levels declined as age rose, although “qualified yes” responses are dispersed throughout age levels.
The survey asked respondents whether or not they used more than one test or brand at the time of first pregnancy testing. The wording of this question is ambiguous because pregnancy tests often are packaged as multiple tests in one package, so it could be interpreted to mean “Did you use all three sticks the first time you bought a pregnancy test?” or “Did you purchase multiple brands of pregnancy tests and use different brands at first use?”. Despite this, those who indicated that they purchased or used multiple kits were coded as “multiple kits purchased” and I explored whether there was a relationship between multiple kit purchase at first pregnancy testing experience and desired result of their first pregnancy test. Results indicate that there is a lack of relationship (see Figure 22), in that at first testing most respondents only used one test, no matter their desired result. Evidence in the “subsequent testing experience” descriptive coding category indicates that this relationship may change with subsequent testing, but because the survey did not ask for this specifically, those results are inconclusive.
The method for data analysis in this study allows us to re-see the CHNM/NIH sample of home pregnancy test users in a manner that raises questions about the trying-to-conceive / hopeful negative home pregnancy test user binary discussed in Chapter 2 and utilized by promoters of the home pregnancy test (Newman, 2010). From the coding and analysis undertaken in this project, categories of “messy” responses emerged. These were responses that could not be subjected to data reduction, or categorized into a yes/no framework. With the CHNM/NIH data set, these were most readily apparent when analyzing the “desired result” and “comfort at first purchase” categories. While these results may not at first glance appear significant in these visualizations above, their recurrence suggests two themes: the complexities of feeling on the part of some users (8 of 86 who reported their feelings, or 9%) in their desire to become pregnant, and the conflicted feeling of some users (12 of 82 who reported their feelings, or 15%) in their
comfort in the retail environment to purchase their first pregnancy test. As earlier noted and shown in the figures above, these themes eluded an interrelationship between demographic factors such as age or relationship status.

The results of this study suggest that it cannot be assumed that a user who is trying-to-conceive is comfortable with purchasing a pregnancy test as a natural by-product of being comfortable with the notion of pregnancy, as Layne (2009) argues. Childerhose and McDonald (2013) discuss the erasure of the hopeful negative and their feelings by the manufacturers’ imagery of happy mothers (as do I in Chapter 2), but in the attempt to make visible this fear, we may also have erased the experiences of women who are trying-to-conceive, or unsure of their feelings, who feel equally as uncomfortable in the retail environment purchasing pregnancy tests. Reading these categories together, a different theme emerges. Recall Elizabeth’s “terror” with purchasing the home pregnancy test. From the quote provided above, it would appear that she would be a hopeful negative. This selection of text from Elizabeth’s survey is offered as representative of the discomfort at point-of-purchase, with no discussion of her intent to have a baby. In fact, she writes, “Yes. I wanted it to be positive. I told myself it would be "ok" if it was negative because we were young, we had plenty of time. However once the thought of us having a child was there, I wanted us to. I was thrilled when the test came up positive [sic] but scared at the same time. How would my fiance' [sic] react? Would he be thrilled?” (NIH, 2003b). Elizabeth’s discussion of her desires for pregnancy reveal complexities that the trying-to-conceive / hopeful negative binary discussion do not take into account.
What this finding also suggests is a feeling on the part of home pregnancy test users to somehow reflect the cultural ideal of a purchaser at point of purchase (what is reflected in the packaging materials as shown in Chapter 2), and the fear of not conforming to this ideal is indicated across demographics. For example, one anonymous respondent wrote, “They were (I have bought a few) easy to buy but the looks given by the people when I bought them made me feel uncomfortable. I felt like it was obvious I was single and pregnant and alone” (NIH 2003b). The looks that she was given signify that in her mind, she did not look married and expecting, but pregnant and alone. A hopeful negative user wrote this particular statement, but those who desire to be pregnant also feel this discomfort, or indicated that they know of the potential for discomfort. As one married user wrote of her first home pregnancy test purchase, “I got a couple of tests on sale at CVS Pharmacy where there was an easy-to-find section and a good selection. I used the same brand and was comfortable purchasing the test (it helps to be in your 30s and wearing a wedding ring!)” (NIH, 2003b). The cultural ideal is explicitly acknowledged by this user, as well as several others who wrote to express their empathy for those who did not meet the ideal as they did.

User knowledge of cultural mores around pregnancy as a theme is further accentuated in the “qualified yes” comfort statement addressed earlier. In some ways, the user may be wrestling with what is expected publicly and her current position. One respondent wrote about the fear of being found out: “The test was very easy to purchase. I kind of hoped I wouldn't be spotted at the drugstore where I was making the purchase. It was very early on (in what I hoped was the start of a baby) and I didn't want anyone guessing what we were up to until it was ‘safe’ to tell people that we were expecting. I
just used one brand, and other than not being spotted, felt comfortable buying it” (NIH 2003b). The user wants to write that she is comfortable at purchase even if she was in fact not. This may be in part to adhere to the desire to fit within the norm: she was trying-to-conceive, but only wanted the public knowledge of this when the pregnancy was far enough along that was proper or safe to announce the pregnancy publicly. This user’s rationale falls into a category found in this study that problematizes the notion that trying-to-conceive users feel no embarrassment. This also raises questions about the legitimacy—even from a marketing perspective, much less an ethical one—of the conspicuous design of packaging scheme that is designed for the trying-to-conceive user, as shown in Chapter 2.

**The First Home Pregnancy Test Purchase versus Subsequent Purchases**

An important aspect of the structure of the survey design was the focus on the experience of first pregnancy testing. While the last question does ask about subsequent testing (see Table 1), respondents focused their writing energies on responding to the first three questions, which all dealt with the first experience with a home pregnancy test. As a result, the findings in this study place a greater emphasis on this first testing user experience.

This emphasis offers a unique opportunity to compare the first testing purchase experience to subsequent purchases by the same pregnancy test user. If, as claimed by First Response’s Vice President of Marketing, “hopeful positives buy more boxes and more sticks,” clearly the marketing focus of pregnancy test manufacturers will be the

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17 Earlier studies using the CHNM/NIH survey data did not analyze the responses by question, so this emphasis is unique to this particular study.
trying-to-conceive user (Newman, 2010). What the results of this study show is not that this is incorrect, but that when isolating the point of first purchase, the experience is not so easily characterized. There is a difference between first purchase/use and subsequent purchase/use, such that the lack of differentiation fails to account for user experience in a material manner. As shown in Figure 16, 49 of 89 respondents wrote that they desired either a negative result or had mixed feelings about pregnancy. Of those 49, 35 purchased only one pregnancy test kit, occasionally citing cost. One respondent in this category (that of negative result sought and one kit purchased) wrote, “It was easy to purchase (since I went to a pharmacy where NO ONE knew me!) but not so easy to use [...] I only used that one brand...can't remember which one...because it was the least expensive and I was broke” (NIH, 2003b). This response also indicates the user’s desire to avoid discomfort by going to a retail environment in which she was certain of anonymity.

When comparing the responses of the first three questions to the last question about subsequent use, a pattern emerges, that of a user purchasing her first pregnancy test at a younger age, desiring a negative result or mixed feelings as to a result. This first time purchaser in the sample set more likely than not purchased only one pregnancy test kit (Figure 22). Then, subsequently, at a more mature age, many trying-to-conceive respondents took many tests until this result is obtained. The trying-to-conceive user in the sample often had a first testing experience not unlike the hopeful negative narrative discussed in Chapter 2. For example, Heather wrote, “On my fisrt [sic] use, I wanted it to be negative. I was in college, planning on studying abroad, and not married. Pregnancy would put an end to all that and force a marriage I wasn't ready for” (NIH 2003b). Then, in her subsequent use response, she follows up: “Once we were married and trying to
have children, it [pregnancy testing] was a nervous and joyous occasion. We conceived after 6+ months of trying. Unfortunately, we lost the baby at 7 weeks gestation. Then, to our surprise, FOUR weeks later, we were blessed with a second pregnancy that resulted in a beautiful baby boy 6 months later” (NIH 2003b). The subsequent test responses include narratives of trying-to-conceive users’ miscarriages such that this category became an emergent theme in the study. Home pregnancy testing is an inextricable part of that journey, as Heather’s narrative reflects.

The end result of this analysis is that the marketing strategy of First Response is vindicated in the responses of this survey to the last question. Those users having difficulty conceiving and desiring to conceive indicate in those responses that they purchased multiple tests until conception. Every home pregnancy test user has a first purchase, but the trying-to-conceive user will have many more down their path to conception. What is not known from the CHNM/NIH data’s small sample size and lack of response rate is how the number of first-time users measures in comparison to the number of subsequent, trying-to-conceive users to form the market of home pregnancy test consumers. Manufacturers may be missing an opportunity to sell more tests to first-time users by failing to create a design of packaging that attends to their concerns about privacy and scrutiny at the point of purchase.

**Conclusion: Addressing the Comfort Dimension**

The user experience of home pregnancy testing could be dramatically improved for many users by addressing what Grice (2002) deemed the “comfort dimension” of user experience, specifically at the point of purchase. This study suggests the importance of improving the purchase experience, as many categories of users (more than have
previously been accounted for, including trying-to-conceive users) expressed discomfort and anxiety about the retail environment and the watchful eyes of others who may see them purchasing this test. These eyes may be employees of the store, such as one respondent described: “I was very very embarrassed to buy the test, but knew I had to know, and would rather face an anonymous drugstore employee than a doctor who would know my name and I hers or his” (NIH 2003b). They could also be the eyes of the public at large, such as in this respondent’s narrative: “I remember feeling extremely uncomfortable buying the tests. I live in a small town and know a lot of people. I refused to go to WalMart because I just knew that I would run into someone I knew. I went out of town to get them both times” (NIH 2003b). The visibility and scrutiny of a home pregnancy test purchase is of concern to many users in this data set, and it suggests further study to address how this causes discomfort and how it may be improved to improve the user experience of this product.

The data and analysis of Chapter 2 and Chapter 3 of this project suggest that the design of packaging of the home pregnancy test reflects the cultural values that pregnancy test users internalize when they go to the retail environment to purchase the test. If the purchaser is concerned that she does not appear to be the normative user to the sales clerk or the public, and that is the principal cause of the discomfort to users, there are two possible solutions to propose. One is to change the packaging and marketing schemes of the product so as not to privilege the culturally normative user, as suggested in Chapter 2. A respondent of the CHNM/NIH survey suggested a second possible solution. She wrote, “The test was each [sic] to purchase and to use. The drug store across the street has them on an open shelf right in front of the register that is hidden in
the underground level of the store” (NIH 2003b). The product placement in the retail environment rendered the embarrassment factor from public visibility nearly moot, as there was no aisle-to-cashier exposure. While the cashier scrutiny cannot be completely eliminated (other than by self check-out, which even still has an employee supervising the station), at the very least this practice minimized the time to completed purchase. The larger question for manufacturers and retailers of the home pregnancy test is whether the elimination of terror such as Elizabeth experienced is of value to them. At the same time, this study calls into question whether the desire to draw in lucrative trying-to-conceive users is effectively met—or whether other pregnancy test purchasers of all types are effectively lost—with imagery and product placement that reinforces the American cultural norm of married and affluent motherhood.

It would not have been possible but for the enlisting of multiple methodologies to intervene and disrupt prior assumptions about how and what we know about the comfort dimension of the user experience of home pregnancy testing at the point of purchase. The visual methods and rhetorical analysis in Chapter 2 yielded suggestions about the ethics of the use of specific design strategies in the packaging of home pregnancy tests. The qualitative and quantitative analysis of the CNMH/NIH survey results provides (albeit in a limited manner due to the constraints of the data set as discussed above) user feedback about the point of purchase experience, with specific emphasis on the first pregnancy test purchase experience, that suggests the problematic nature of the design of packaging, and amplifies the ethical concerns in this marketing strategy, as the trying-to-conceive versus hopeful negative binary may be less of a binary and more of a unified experience, as both categories of users find discomfort in the purchase of home pregnancy tests. Most
importantly, these case studies, due to their size and composition, are more significant in terms of offering these suggestions to present the need for further empirical research into the user experience of home pregnancy test purchasing.

Finally, the analysis undertaken with qualitative and quantitative methods in this chapter illuminates some of the details about the CHNM/NIH survey data that were not yet discussed in the literature, such as the differentiation between first-time user experience and subsequent user experience of the pregnancy test. This brings a more nuanced understanding of this often-cited data set, and more importantly, an indication of how the comfort dimension of home pregnancy test purchasing might be further researched and addressed in the future.
Introduction: The CHNM/NIH Surveys as a Specialized or Mini-Corpus

The recruitment script for the “Tell Your Story” home pregnancy test user survey—conducted by the CHNM and NIH and previously analyzed in Chapter 3—asks respondents to “Add your story to the history of the pregnancy test kit!” (NIH, 2003c). This call for “stories” yielded 89 responses, or user narratives written to five open-ended questions in a manner that so resembled oral storytelling that the historian for the NIH on the project referred to them as “electronic oral histories” (Leavitt, 2006; Leavitt, personal communication). Recurring features in these narratives such as employment of emoticons, superfluous or duplicative punctuation, and capitalization of entire words reinforce this characterization. These features render the responses conversational and pathos-laden. For example, an emoticon punctuates this respondent’s statement: “Of all the tests I took the positive ones were of course more exciting than the negative ones. The negative ones are very depressing! :)” (NIH, 2003b). Another example illustrates the all-caps word use: “Now that the shock has worn off, I am THRILLED to be pregnant and can’t wait to be a mom” (NIH, 2003b). Finally, this response provides an example of multiple punctuation: “The thought of being pregnant at 19 really freaked me out!!” (NIH, 2003b). These features of digital communication (along with, for example, other variations of punctuation use, asterisks around words, and acronyms such as “lol”) are nonverbal social cues used to “build friendly conversationality” (Baym, 2010, p. 61). For these reasons, Baym (2010) refers to digital communication as a “mixed modality” that
“combines elements of communication practices in embodied conversation and in writing” (p. 63). Baym’s theoretical work on the mixed modality of digital communication reinforces the definition of the CHNM/NIH survey responses as electronic oral histories.

The conversational nature of these survey responses—along with the common features that render these responses conversational—brings forth another area for the study of these narratives previously unexplored: to study these digital narratives as natural language and as discourse, or language in use (Gee, 2014). In addition, because these narratives exist together on a publicly available website, they are easily made into a collection of digital files in which a researcher can analyze the language of the narratives electronically. For this reason, I became interested in employing a corpus methodology to study these texts for patterns in the language in use of pregnancy testing by these survey respondents.

A corpus is “a collection of spoken or written authentic texts that is representative of a particular area of language use, by virtue of its size and composition” (Paltridge, 2006). There are two kinds of corpora: generalized and specialized. A general corpus can also be called a reference corpus, and it “aims to represent language in its broadest possible sense and to serve as a widely available resource for baseline or comparative studies of general linguistic features” (Reppen & Simpson, 2004, qtd. in Paltridge, 2006, p. 156). These corpora will be extremely large. For example, the “Bank of English,” a general corpus used to analyze the English language and maintained by HarperCollins Publishers, consists of over 500 million words (Kretzschmar, 2009, p. 146). On the other hand, a specialized corpus is “a corpus of texts of a particular type, such as newspaper
editorials, geography textbooks, academics articles in a particular subject, lectures, casual conversations, essays written by students, etc. It is used to investigate a particular type of language” (Hunston, 2002, qtd. in Paltridge, 2006, p. 157). The research question at hand drives the size and composition of a corpus, as well as practical concerns such as where the most accessible texts may be found (McNery, Xiao, & Tono, 2006). At 28,776 words, the CHNM/NIH survey data is an extremely small collection of texts. Nor did a research question drive the design of the survey that yielded the results. That being said, it has a great amount of utility as a specialized corpus to study discourse of a specific domain, that of pregnancy test use of American users in the late twentieth century. It also has ready availability as a digital collection that was designed for educational and research use. It is quite small (perhaps too small to be considered representative) but this does not mean that a corpus-based approach cannot uncover salient features of the discourse found here. The approach itself, even in a mini-corpus (a corpus of less than 100,000 words) has benefits that go beyond the making generalizations about language.

A mini-corpus such as the CHNM/NIH survey data can be compared to a general or reference corpus to illuminate specific features of the genre or domain of use; here, in respondents’ language about their experiences with the home pregnancy test. But in addition, corpus-based studies, in the creation of a corpus and, as Kim Ebensgaard Jensen (2014) argues, “part-of-speech and syntactic annotation, annotation in terms of sentiment, text structure, topic information and a host of other features would be as useful to linguists and discourse analysts as to literary critics and cultural analysts” (p. 125). It is with this in mind that I approach the creation and analysis of the CHNM/NIH mini-corpus.
Corpus analysis as a methodological approach is capable of doing specific work for this project, and not capable of doing other work. Tony McEnery, Richard Xiao, and Yukio Tono (2006) point out four limitations. First, corpora cannot show us what is not there. Second, corpora cannot provide explanation for the phenomena observed. Third, researchers must ask research questions that are “amenable to corpus-based investigation” (p. 121). These types of questions frequently involve lexical and grammatical studies, as well as genre analysis. Lastly, a corpus can only show us what is contained in that corpus, no matter how representative a corpus may be. Corpus studies invoke many critiques. However, McEnery et al. invoke Stubbs’ (1996) notable saying that this critique is akin to critiquing a telescope for not being a microscope (p. 121). In the case of the CHNM/NIH survey data, McEnery et al.’s commentary is particularly warranted, as the sample size is so small, and clearly not representative for reasons that have been previously discussed in Chapters 1 and 3. Despite this, I will employ a corpus-based approach to inductively look for patterns in the language of these narratives, both to find suggestions as to user experiences here, and to create a plan for future study of the user experience of home pregnancy testing. This plan will include the use of other methods to flesh out the corpus-based discovery process.

As an example of combining methods, increasingly, corpus-based study as a methodology is being used in conjunction with discourse analysis, two methods which were once considered to have a “cultural divide” between them (McEnery et al., 2006, p. 111, citing Leech, 2000). This division has several components, including that corpus studies are primarily representative samples, quantitative, and focused on text, while discourse analysis relies on the integrity of specific language rather than representation, is
qualitative, and focused on context (p. 111). However, the blending of these, or a corpus-based approach to discourse analysis, is gaining traction as a method which, when using a specialized corpus, can allow the researcher to see “patterning of features of specific discourse types and, at the same time, a closer understanding of the textual and social processes involved” (Jensen, 2014, p. 130). An example of a study that combines a corpus-based approach with critical discourse analysis is Sotillo and Starace-Nastasi’s (1999) study of 123 letters to the editor from two newspapers in an American town. These letters were all related to a political campaign and written by the candidates and the public. This study found that there were class and gender differences in the letters in terms of tone and style, such that women were less hostile toward political opposition, and middle class writers were less understanding of working class positions. This study shows how lexical and syntactical results from a corpus approach can inform the contextual results from the critical discourse analysis performed on these texts.

Much as this dissertation project has attempted to compare visual, rhetorical, and qualitative and quantitative methods to better understand the user experience of home pregnancy testing, this hybrid methodological approach of corpus-assisted discourse analysis offers another opportunity for the quantitative and qualitative to complement one another to enrich our understanding of a social or cultural phenomena. Studies involving specialized corpora have incorporated different corpus-based approaches to explore cultural questions much like pregnancy test user experience. For example, Ooi (2001) conducted a corpus-based study of the language of Internet personal ads in the U.S. and Singapore in order to look at how culture and gender may play a role in language in this particular genre. Using WordSmith tools to generate collocates (words that occur together
in the corpus more often than expected by chance) and keyword lists, Ooi (2001) found that American writers used terms that Singaporean writers did not, such as “great,” and that in general men were more likely than women to use the word “fun” while women more frequently used the term “friend.” He concluded this study with suggestions for the study of genre with small corpora in corpus linguistics; namely, how teachers can teach a corpus-based methodology in order to develop students’ computational, linguistics, and analytical skills. In this study, I aim to similarly incorporate a corpus-based approach with a specialized corpus to evaluate the domain-specific language of pregnancy testing in these narratives.

What might a computational corpus-based methodological approach—applied to the same CHNM/NIH data set of user narratives studied in Chapter 3—offer to a study of user experience of home pregnancy test purchase? In this chapter, I create a mini-corpus from the CHNM/NIH survey data, and employ a corpus-based computational methodology called Text-Based Modeling. I describe this method, with particular focus on the processes of concordancing, creating wordlists and keyword lists using WordSmith Tools. I then discuss the results of this method as applied to the CHNM/NIH corpus and present semantic network visualizations of these word patterns. Alongside these results, I discuss the affordances and limitations of these computational methods. After presenting the results from this corpus-based study, I discuss the implications for corpus-driven discovery as an inductive process for further qualitative study by other methods. In essence, the corpus-driven discovery process serves to take the temperature of the data set, or use its language to point us as researchers in the direction of future research using other methods. These corpus-based methods can offer particular kinds of
understanding that others cannot, and yet simultaneously cannot show other aspects of data due to the nature of computational approaches that focus on explicit textual data. The suggestions from the models, then, are suggestions for the creation of new questions to be investigated with other methods, such as the thematic analysis such as undertaken in Chapter 3, for a fuller understanding of the user experience of pregnancy testing.

**Text-Based Modeling as Method**

Text-Based Modeling is a corpus-based method developed for and presented in a workshop in the Spring of 2015 at the Arizona State University IHR Nexus Lab for Digital Humanities and Transdisciplinary Informatics (Hettel & Simeone, forthcoming). This method is a hybrid of a computational corpus linguistics and semantic network analysis for the modeling of patterns in language found in the corpus or a selection of the corpus. The goal is to engage in a discovery process with text, beginning with techniques that use more basic concepts like frequency (how many times a word occurs in a body of text) to more advanced clustering of words in order to be able to “draw out the key elements in the discourses contained in those texts,” as McEnery, McGlashan, and Love (2015) argue is possible with corpus-driven approaches discourse (p. 255). I used the CHNM/NIH data set in this workshop in order to learn these methods and apply them to this project.

The method begins with a creation of a corpus. Given that I focused this study on the extremely specialized domain of the pregnancy test user narratives in the CHNM/NIH data, this process primarily consisted of selecting this data set and converting the data into files that were readily accessible by the corpus linguistics software WordSmith
Tools. After creating a single .txt file with all of the text from the responses from the CHNM web page, I then created separate .txt files for each respondent, and then further divided each survey response by individual question. In this way, I could analyze the corpus of 89 survey responses by individual respondent and by responses to each question. After this was accomplished, the files were ready to be analyzed in WordSmith Tools.

Wordsmith Tools has three main “Tools” (WordSmith, 2014). After entering text files, the software makes concordances, finds the keywords in texts, and generates wordlists from the texts. Concordances are patterns of co-occurrence of certain words in texts, or words that appear together with more frequency than common. Keyword lists show a comparison of frequency of certain words in the source texts to a general or reference corpus. In this study, I used Paul Baker’s (2006) corpus of standard American English as the reference corpus to compare to the CHNM/NIH source data. Baker’s corpus, of around 1,000,000 words, was created to be representative of mid-2000s American English. The benefit of using Baker’s corpus in this study is that the language used in both the Baker corpus and the CHNM/NIH source data is from the same point in time. (Hettel, 2013). Wordlists are exactly what they sound like: lists of the words in source texts (showing how often words appear in the text files, what percentage of the overall words these words comprise, and in how many text files each word was found). I

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18 Normally, this process is much more detailed, involving decisions about, for example, corpus size, sampling units, type of sampling, population units available, and orientation of the corpus by time, geography, and social factors (Meyer, 2004). In this project, my research question (How would a computational corpus linguistics approach bring to the study of user experience as evidenced in the CHNM/NIH survey responses?) drove the use of the same data set as used in other chapters: the CHNM/NIH data set.
used each tool to generate keywords and wordlists for the entire CHNM/NIH corpus, and for each specific question in the surveys across all respondents. I generated concordances based on a search of selected terms related to the user experience of pregnancy test purchasing (test, easy, purchase, buy, bought, brand, result, store, pharmacy).

In order to generate these word frequency lists, I created a “stop list,” or an exclusion list—a list of words to be excluded from the searches. A stop list allows the researcher to exclude words that are not of interest to the study. These often include the top six “function words” in English: the, of, and, to, in and a (Cheng, 2012, n.p.). It is important to choose stop words carefully, because depending on the nature of the study, certain words that might be excluded could have importance. For this stop list, I added function words such as articles and conjunctions, but removed most pronouns from the stop list, as the gendered use of pronouns is important to the action taken by users of pregnancy tests. With this “stop list,” I then ran the three tools described above.

The second portion of the Text-Based Modeling approach, semantic network analysis, involves the construction and visualization of a network from text data. To create this, I first preprocessed the data files in the software ConText, which also involves using a stop word list as discussed earlier. Based on the text data files for the survey results of Question 1 and Question 5 of the survey, respectively, I created a data visualization of the semantic network of these text files by creating keyword lists and collocates from each collection of responses with the software AntConc (a corpus builder, much like WordSmith Tools) and then generating the visualization with the software ORA Network Visualizer. To be able to visualize this network in a way that is meaningful and presents the most significant relationships between words in the corpus
(not just a million dots on a map), I controlled the network visualization with a threshold of five co-occurrences of words appearing within five words of one another in the data. This means that words must have co-occurred at least five times within five words of one another in a sentence. Ultimately I created two data visualizations, one for Question 1 and one for Question 5, that show how co-occurring words in these survey responses form a semantic network.

The semantic network analysis in this study was limited to the responses in Question 1 and Question 5 in order to focus on the change in language from initial home pregnancy test purchase and use and subsequent test purchase and use. Question 1 is focused on the life circumstances surrounding initial purchase and use: “Please describe your first experience with a home pregnancy test. (What year was it, how old were you, and where were you living? Were you at home, somewhere else, alone, or with someone?)” (Table 1). Question 5 is focused on changes to these circumstances in subsequent testing: “If you've taken a home pregnancy test more than once, please describe how the experiences were different” (Table 1). Because network analysis is focused on relationships of actors (here, words in text), and not on the actors/words themselves, I focused this portion of the study to create text network visualizations to analyze how these survey respondents may change their language to talk about these two different types of user experiences across time. I chose Question 1 to compare to Question 5 because that question emphasized the user’s life experience at the time of testing, to see if the visualizations suggest a change in life experience from first to subsequent test use.
Plotting the CHNM/NIH Corpus: From Single Corpus to Multiple User Experiences

Employment of a computational corpus linguistics method generally begins with pattern recognition and the generation of frequency lists, which help direct the researcher’s attention in the corpus (McEnery et al, 2006). I chose to begin with the keyword list for the entire corpus (Table 2). Mike Scott (2001) refers to a keyword list as “the procedure for computing outstandingness” or words that “help to characterize a set of text or a single text in terms of both content and style” (p. 61). Table 2 below shows how the CNHM/NIH corpus is compared to Baker’s corpus (the reference corpus of standard American English), to find the keywords that appear in a more comparably significant way in the CHNM/NIH corpus than in the reference corpus. The WordSmith Tools software program identified 218 words that were more statistically significant in the CHNM/NIH corpus than in Baker’s corpus, according to their “keyness” (degree that the word is “key” in the first versus second corpus) and P value (the probability of the keyness being accidental, using a log-likelihood statistical formula). Keyness and P value taken together show which words are statistically significant in the CHNM/NIH corpus. A keyness score should be high, and a P value low when a word is statistically significant in the corpus that is being studied (“Keyword Analysis”). Table 2 shows the top 20 keywords for the CHNM/NIH corpus using this approach.

To analyze the keylist, I used Halliday’s (1976) three meta-functions of language (ideational, interpersonal, and textual) to find the “aboutness” of the keyword list (Smith, 2006, p. 61; citing Phillips, 1989). It is easy to see that interpersonal words play a large role in the content and style of the CHNM/NIH corpus. The pronouns “my,” “it,” and “we,” as well as “husband,” and “boyfriend” are used with such frequency that the
discourse of pregnancy appears to be greatly focused on the negotiation of the user and the user’s interpersonal relationships and ownership of the pregnancy experience. The pregnancy test experience is described in the ideational words: “test,” “pregnant,” “purchase,” “result,” “buy,” “positive,” “negative,” “brand,” etc. The only textual word in the top twenty list is “very,” which makes sense given the amount of pathos involved in user narratives versus common speech: lines on the test apparatus were “very faint,” or a user was “very relieved” at a result, to give two examples from the responses (NIH 2003b).

The next step in the building of a lexical profile is to analyze the clusters (concordances) and collocates (co-occurring words) that occur in close proximity to these keywords. Concordances put the word (here, the keyword) back into its original phrasing. These are very helpful to gain some context into the use of the word, to see “what company the search-word keeps” (Scott, 2001, p. 51). Collocates, on the other hand, are frequency lists of patterns of co-occurring words. A list of collocates for a keyword will show the frequency that it co-occurs with another word. I chose for this study to focus on the concordances and collocates of keywords that are related to the pregnancy test purchase, and potentially to the design of packaging: “test,” “easy,” “purchase,” “brand,” “result,” “bought,” and “buy.”
Table 2

*Keyword List for CHNM/NIH Corpus*

<table>
<thead>
<tr>
<th>N</th>
<th>Keyword</th>
<th>Frequency</th>
<th>Ref. Corp. Freq.</th>
<th>Keyness</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TEST</td>
<td>438</td>
<td>137</td>
<td>2854.258545</td>
<td>3.56634E-20</td>
</tr>
<tr>
<td>2</td>
<td>PREGNANT</td>
<td>154</td>
<td>19</td>
<td>1102.504639</td>
<td>6.55784E-19</td>
</tr>
<tr>
<td>3</td>
<td>MY</td>
<td>385</td>
<td>2570</td>
<td>868.489624</td>
<td>1.37666E-18</td>
</tr>
<tr>
<td>4</td>
<td>PURCHASE</td>
<td>117</td>
<td>26</td>
<td>793.2324219</td>
<td>1.82796E-18</td>
</tr>
<tr>
<td>5</td>
<td>PREGNANCY</td>
<td>110</td>
<td>36</td>
<td>710.5739746</td>
<td>2.58312E-18</td>
</tr>
<tr>
<td>6</td>
<td>RESULT</td>
<td>134</td>
<td>197</td>
<td>623.4894409</td>
<td>3.90537E-18</td>
</tr>
<tr>
<td>7</td>
<td>POSITIVE</td>
<td>108</td>
<td>109</td>
<td>559.7650146</td>
<td>5.50446E-18</td>
</tr>
<tr>
<td>8</td>
<td>BUY</td>
<td>89</td>
<td>85</td>
<td>467.797821</td>
<td>9.80004E-18</td>
</tr>
<tr>
<td>9</td>
<td>BRAND</td>
<td>73</td>
<td>36</td>
<td>441.8345642</td>
<td>1.17934E-17</td>
</tr>
<tr>
<td>10</td>
<td>NEGATIVE</td>
<td>81</td>
<td>110</td>
<td>386.0532837</td>
<td>1.83343E-17</td>
</tr>
<tr>
<td>11</td>
<td>TOOK</td>
<td>120</td>
<td>448</td>
<td>383.0018616</td>
<td>1.88194E-17</td>
</tr>
<tr>
<td>12</td>
<td>HUSBAND</td>
<td>77</td>
<td>101</td>
<td>370.8278809</td>
<td>2.09347E-17</td>
</tr>
<tr>
<td>13</td>
<td>EASY</td>
<td>74</td>
<td>124</td>
<td>329.7049866</td>
<td>3.09396E-17</td>
</tr>
<tr>
<td>14</td>
<td>IT</td>
<td>413</td>
<td>7430</td>
<td>326.2695618</td>
<td>3.20434E-17</td>
</tr>
<tr>
<td>15</td>
<td>HOME</td>
<td>106</td>
<td>531</td>
<td>287.3650208</td>
<td>4.9187E-17</td>
</tr>
<tr>
<td>16</td>
<td>WANTED</td>
<td>78</td>
<td>318</td>
<td>237.6091614</td>
<td>9.47759E-17</td>
</tr>
<tr>
<td>17</td>
<td>BOYFRIEND</td>
<td>37</td>
<td>14</td>
<td>233.8647461</td>
<td>1.00203E-16</td>
</tr>
<tr>
<td>18</td>
<td>VERY</td>
<td>98</td>
<td>675</td>
<td>215.0653839</td>
<td>1.34767E-16</td>
</tr>
<tr>
<td>19</td>
<td>STICK</td>
<td>31</td>
<td>40</td>
<td>149.956665</td>
<td>5.13101E-16</td>
</tr>
<tr>
<td>20</td>
<td>WE</td>
<td>169</td>
<td>2885</td>
<td>143.9314423</td>
<td>6.02177E-16</td>
</tr>
</tbody>
</table>

*Note:* Table adapted from WordSmith Tools software results using CHNM/NIH survey data in raw text files.
To illustrate this process, I provide an analysis of the clusters and collocates for “easy.” This example reflects a similar process for the other words on this keyword list. At first, it would seem that the appearance of “easy” would suggest that users found pregnancy test purchase and/or use to be easy, based on the questions presented in the survey and the frequency of “easy” in their responses (used 74 times throughout the response text). Looking at the clusters of words, it would appear to suggest that this is true. The top results are, for example, “easy to purchase,” “was easy to,” “easy to use,” “very easy to,” and “was very easy.” However, when analyzing the related words around these clusters, I began to notice what I found and discussed in Chapter 3—the additional use of a conditional clause, such as “but [ ],” or an additive phase, such as “and [ ].” Many of the 74 instances of the “easy to purchase” cluster, when going outside of that cluster further into the sentence or response, qualifies that statement in some way. Additionally, because the manner in which that statement is qualified is not uniform, it cannot show up in a frequency list. This is reiterated in the collocate list, of which “wasn’t” is listed as a collocate for “easy” because they appear together three times. The different ways in which “easy” was qualified in a negative manner could not be computationally aggregated in the same way that I was able to hand code them in the study in Chapter 3. This shows how computational approaches may point a researcher in the direction of a subsequent research question (“wasn’t” appearing as a collocate of “easy”), but it requires different methods to further investigate this pattern (hand coding to find the statements made by respondents to complicate their responses).

Further, the survey Question 2 specifically asked respondents if the test was “easy” to purchase and use (NIH 2003b). The framing of this question presents an
opportunity for confirmation bias, as respondents are likely to recite the language of the survey in their response. All of these factors present difficulties in using the computational corpus linguistics method by itself to interpret this data. The keyword list and associated concordances and collocates does show the specific words that are used with frequency, but does not provide enough context to provide the entire user narrative of ease of use of home pregnancy tests.¹⁹

**Splitting the Corpus Dataset to Uncover Different User Experiences**

Based on the research undertaken in this dissertation project using other methods, I was aware that building a single set of lexical profiles for the corpus was not as generative an exercise, since that would also paint a picture of a singular pregnancy experience. Instead, at this point in the project, I created and analyzed keyword lists by each set of survey responses by question. By comparing the keyword lists of responses of Question 1 and Question 5, it is possible to see how the discourse of pregnancy testing differs from initial testing (Question 1) to subsequent testing (Question 5). What is shown in Table 3 are the keyword lists that I generated for the text files for each question, again compared to Baker’s corpus of standard American English. I have listed in the table only the frequency in the actual texts. These top twenty keywords also have the most statistically significant keyness and P values when comparing these sets of texts to Baker’s corpus. This means that the words that appear in each list occur more frequently in each set of responses than in common use in American English.

¹⁹ This problem provides additional support for the increase in the use of this method alongside another method such as discourse analysis (see, e.g., McEnery et al., 2006, p. 111).
Despite the statistical significance of the keywords appearing in Table 3, it is important to remember that Question 1 and 5 responses had very different prompts, and Question 1 particularly had a much longer prompt that solicited certain demographic information. Question 5, which asked, “If you’ve taken a pregnancy test more than once, please describe how the experiences were different” (Table 1), did not specify any detail, such as age, date, or with whom the person was living. For that reason, the words that respondents use to construct their responses will skew to reflect the prompts. This is evident, for example, in the fact that the keywords for Question 1 have a # sign, which stands in for the age in numerals that each respondent gave in their response. It also may influence the representation of “husband,” “boyfriend,” and “alone” in the keywords to Question 1 responses, because respondents were asked with whom they were living and with whom they took the initial pregnancy test. This is not to say that respondents couldn’t choose to mention these items in Question 5 responses, but that the survey designers were apparently more interested in the respondents choosing their own words and stories about subsequent testing in Question 5, rather than responding to a more detailed prompt for Question 1. This factor should be taken into account in a 1:1 comparison between the two sets of responses.

Upon comparing the two keyword lists, three variances in the “aboutness” of the lists are of interest to this project’s focus on user experience. First, the frequency of the interpersonal word “my” in Question 1 versus Question 5 responses (208 to 77) suggests that the user negotiates an initial pregnancy with much more ownership of the user alone. This is also suggested by the word “we” in Question 5 responses, appearing 50 times there and not appearing in the Question 1 responses with significant frequency. At the
Table 3

*Keyword List for Questions 1 and 5 Responses in CHNM/NIH Corpus.*

<table>
<thead>
<tr>
<th>N</th>
<th>Keyword: Q1</th>
<th>Freq.: Q1</th>
<th>Keyword: Q5</th>
<th>Freq.: Q5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TEST</td>
<td>129</td>
<td>TEST</td>
<td>117</td>
</tr>
<tr>
<td>2</td>
<td>MY</td>
<td>208</td>
<td>PREGNANT</td>
<td>56</td>
</tr>
<tr>
<td>3</td>
<td>PREGNANCY</td>
<td>48</td>
<td>PREGNANCY</td>
<td>40</td>
</tr>
<tr>
<td>4</td>
<td>PREGNANT</td>
<td>41</td>
<td>POSITIVE</td>
<td>38</td>
</tr>
<tr>
<td>5</td>
<td>HUSBAND</td>
<td>49</td>
<td>TOOK</td>
<td>45</td>
</tr>
<tr>
<td>6</td>
<td>HOME</td>
<td>71</td>
<td>RESULT</td>
<td>34</td>
</tr>
<tr>
<td>7</td>
<td>LIVING</td>
<td>47</td>
<td>MY</td>
<td>77</td>
</tr>
<tr>
<td>8</td>
<td>TOOK</td>
<td>55</td>
<td>NEGATIVE</td>
<td>23</td>
</tr>
<tr>
<td>9</td>
<td>BOYFRIEND</td>
<td>23</td>
<td>VERY</td>
<td>35</td>
</tr>
<tr>
<td>10</td>
<td># (NUMBER)</td>
<td>217</td>
<td>TIME</td>
<td>49</td>
</tr>
<tr>
<td>11</td>
<td>ALONE</td>
<td>26</td>
<td>HUSBAND</td>
<td>17</td>
</tr>
<tr>
<td>12</td>
<td>BUY</td>
<td>18</td>
<td>PEE</td>
<td>9</td>
</tr>
<tr>
<td>13</td>
<td>HAD</td>
<td>84</td>
<td>MISCARRIED</td>
<td>7</td>
</tr>
<tr>
<td>14</td>
<td>FIRST</td>
<td>45</td>
<td>BABY</td>
<td>16</td>
</tr>
<tr>
<td>15</td>
<td>IT</td>
<td>119</td>
<td>STICK</td>
<td>11</td>
</tr>
<tr>
<td>16</td>
<td>URINE</td>
<td>9</td>
<td>BRAND</td>
<td>10</td>
</tr>
<tr>
<td>17</td>
<td>PERIOD</td>
<td>19</td>
<td>MISCARRIAGE</td>
<td>6</td>
</tr>
<tr>
<td>18</td>
<td>OLD</td>
<td>29</td>
<td>WE</td>
<td>50</td>
</tr>
<tr>
<td>19</td>
<td>MARRIED</td>
<td>15</td>
<td>TAKEN</td>
<td>15</td>
</tr>
<tr>
<td>20</td>
<td>RESULT</td>
<td>17</td>
<td>HOME</td>
<td>21</td>
</tr>
</tbody>
</table>

At the same time, the frequency of the term “my” in both Question 1 and 5 responses suggest that the experience is quite personal to the user across both types of experiences.
Second, the frequency of the word “baby” in the Question 5 responses suggests that subsequent test takers are more focused on having a child than when they took their first pregnancy test. (At first glance, it may potentially align with the frequency of the textual keyword “it” in Question 1, but the collocates to “it” suggest that users are referring to the pregnancy test itself and not the fetus.) Still, the Question 5 keywords of “baby,” “positive,” and “result,” none of which occur on the Question 1 keyword list, help to suggest a characterization of the subsequent test taking experience for these respondents as one that more frequently involves a discussion of a positive result of test taking, a baby.

The third noticeable variance is in the frequency of miscarriage in the Question 5 keyword list. “Miscarriage” and “miscarried” both appear in the Question 5 keyword list and not in the Question 1 list. This makes some logical sense, as a user would not likely experience this event until after the use of the first pregnancy test, so those taking subsequent tests would be more likely to have experienced a miscarriage after a first pregnancy testing. While a user who is not trying-to-conceive may experience a miscarriage, a user who is trying-to-conceive may experience one more multiple miscarriages on the path to conception. The discourse of pregnancy testing after initial testing, then, includes word choices that invoke the trying-to-conceive user experience, as babies, multiple miscarriages, and time become frequently chosen words not discussed around the initial testing experience. The presence of miscarriage in the discourse of trying-to-conceive was not obvious in the marketing and packaging strategies of the manufacturer discussed in Chapter 2, and did not emerge from the coding scheme in Chapter 3, so the computational method here is important for bringing this issue to the
attention of researchers. As will be further suggested below, this is an aspect of the pregnancy testing user experience that requires more research.

**Visualizing the First and Subsequent Pregnancy Test User Experiences**

While corpus linguistics creates lists in forms of tables and charts as its models, semantic network analysis (or network text analysis) is a method by which a researcher constructs a network from text and visualizes that network in order to better understand the behavior of the words and phrases in the text. Network analysis is much more focused on relationships, as actors (the words in text analysis) “are described by their relations, not by their attributes” (Hanneman & Riddle, 2005). Semantic network analysis is an approach to structured knowledge representation by which to render “evaluations, comparisons or representations [of explicit knowledge in texts] more manageable” (Popping, 2003, p. 91). In this study, after creating the keyword lists and collocates in WordSmith Tools for the responses to Question 1 and Question 5, I chose to conduct semantic network analysis on these same collections of text in order to learn more about the relationships among and between concepts explicitly discussed across first and subsequent test taking experiences.

Figures 23 and 24 are visualizations of the semantic networks for the responses to Questions 1 and 5 of the CHNM/NIH data, respectively. Shown in these figures are labeled nodes (or actors) and the links between these nodes, which together create structures, or semantic networks (Sowa, 1987; cited in Popping, 2003). In these visualizations, the links represent at least 5 co-occurrences of the words that are presented as labeled nodes. Thicker lines represent more co-occurrences, or greater ties between nodes. Additionally, these visualizations were generated to have the nodes sized for
“between-ness centrality,” meaning that the more lines going through that node, the larger the node will appear on the visualization.

Figure 23. Semantic Network Visualization of CHNM/NIH Question 1 Responses.

The visualization of the responses to Question 1 of the CHNM/NIH survey data reinforces the suggestion in the corpus linguistics approach that the first pregnancy testing experience is one in which the user takes a great deal of personal ownership. The node of the pronoun “my” is the node with the greatest betweenness centrality with many substructures in the network connecting through this node. The green substructure helps direct the viewer to the many nodes which “my” has a relationship with, and many form a
dyad or triad: “[told] my boyfriend,” “my parents,” “my own,” “my period late,” “my house,” “my apartment,” and so on. “My” forms a relationship with pregnancy, the test, and the other people mentioned. While “my” still appears on Figure 24 (Question 5 responses), this node has far less betweenness centrality and is disconnected from many other relationships in other substructures. Also missing are many of the other people that appeared in the Question 1 visualization, with only “husband” appearing as an actor in which the user takes a “my” ownership interest. This suggests that the respondent articulated the first testing experience much more in reference to others than in the subsequent testing question. The “husband” as human actor in Question 5 responses also suggests that if Question 5 asks the respondent “What changed?” the appearance of “husband” in the network may reflect a change in relationship status from first to subsequent testing. For this set of respondents, then, the discourse of pregnancy testing for subsequent tests suggests a nuclear family demographic, while initial testing has a more diverse set of domestic relationships. The language of survey respondents purchasing subsequent tests reinforces the findings in Chapter 2 about the packaging of pregnancy tests for the benefit of heteronormative family planning.

The second striking difference from the first to second visualization is the presence of the auxiliary verbs “could” and “should” in Figure 23, and their absence in Figure 24. Further, the unidirectional relationship of these nodes in the “it” substructure suggests that the relationship indicates a desire to discuss alternate outcomes or different responses if the past had been different. The appearance of the substructure “my,” “period,” and “late” also may be interpreted as a situation in which the outcome of the test is uncertain, as the user may be taking the test to resolve the uncertainty inherent in a
late period. None of this uncertainty is explicitly represented by respondents’ language in the Question 5 visualization.

Rather, several substructures and relationships in Figure 24, particularly when taken together, point in the direction of an absence of uncertainty in the language of those subsequent pregnancy testing responses. The substructure “trying,” “get,” and “pregnant,” closed and off by itself, reflects the stable relationship between these terms for the trying-to conceive user. “Found out” is linked to “it” and “positive,” which tells the story of a subsequent test taker using language of “got” “positive” “result” and recalling “when” “positive.” These nodes all function as declarative and not conditional.

Figure 24. Semantic network visualization of CHNM/NIH Question 5 Responses.
This suggests that subsequent test takers in this data set are more apt to be trying to get pregnant.

A last distinction of note is in the language of life circumstances between a first-time user and subsequent user of pregnancy tests as illuminated in the network visualizations. First, in the substructure with the ego, or focal actor (Hanneman & Riddle, 2005) “living” in Figure 23, we see links between “20,” “old,” “years,” “living,” and “home” (which then links to all of the relationships with people discussed earlier). The “living” ego substructure indicates a re-occurring relationship between the age of 20 and the initial testing experience, as well as living with many different people, including at home with parents. In Figure 24, the focus of the relationships in the visualization is much more focused on multiple test taking. For example, in the ego substructure “taken” in Figure 24, a unidirectional relationship between “taken” “many” and also “taken” and “tests” suggests the importance of this multiple test taking activity after initial testing. Studying Figures 23 and 24 together with emphasis on these substructures suggests that the relationships expressed in language at initial testing are more uncertain with more human actors in different interpersonal relationships, while the subsequent test taking experience is more focused on multiple test taking and achievement of a desired test result.

**Corpus-Driven Discovery Processes for Further Study of Home Pregnancy Test User Experience**

After the creation and analysis of models in both corpus linguistics and semantic network analysis, what is the next step with the above-outlined suggestions about the user experience of home pregnancy testing? As I discuss earlier in the chapter, many scholars
have voiced concerns over the use of computational methods such as these on their own to make truth claims about the phenomena in which they study. Even scholars who work in these areas are familiar with these criticisms of their method; for example, McEnery et al. (2006) include an entire unit in their corpus linguistics sourcebook on “Objections to corpora: an ongoing debate.” Jensen (2014) traces the history of exclusion that corpus linguists have experienced in both linguistics departments (particularly in the era “BC,” or before the era of computers, pre-1960s) and more currently, in factions of the digital humanities, where quantitative and automated work is considered antithetical to its “qualitative, interpretative, experiential, emotive, and generative” goals (p. 57). McEnery et al. further mention that even “among those who support the use of corpora there are divergent views on their usefulness for certain purposes” (p. 131). This statement is in and of itself useful: just as Stubbs (1996) argued that one cannot discount corpus linguistics as being a telescope instead of a microscope, it is important to recognize what this approach is useful for, and when it might not be as useful.

A similar conversation takes place in the literature of semantic network analysis. Popping (2003) discusses at length how to address semantic network analysis’ lack of attention as a method to implicit knowledge, which cannot be expressed in text and therefore represented in a semantic network. He argues that “texts contain implicit knowledge, or there exists implicit knowledge between texts. This is knowledge that is not recognized by a computer, but is highly relevant” (p. 96). Popping stresses the importance of human researcher intervention in the computational method to gap-fill when she sees a lack of attention to implicit knowledge. This is not a deficit in the method so much as the understanding that computational tools cannot work alone.
Finally, in this project, there are undoubtedly concerns for the use of the CHNM/NIH survey data as a corpus. Since the survey creators did not create the survey with the intent of this experimental design (or perhaps any kind of empirical research design), the design yields results that have the potential for confirmation bias (if the survey asks, “Was the test easy to purchase and use?” as it does in Question 2, respondents have a greater propensity to answer “Yes, it was easy” or “It was easy, but…” instead of “It was hard.” For text-based computational methods, this alone presents a challenge, because the word “easy” (along with every word in the question of the survey) will appear with greater frequency than original words and phrases of survey respondents. This is in addition to the problems associated with the small size of this corpus that were discussed earlier in the chapter.

As this chapter is titled “Understanding Home Pregnancy Test Purchasing through Text-Based Modeling of User Narratives,” what kind of “understanding” takes place here? I suggest that the combination of corpus approaches and other subsequent or concurrent methods yields an understanding of texts that singular approaches to text cannot. A corpus-driven discovery process can be an inductive approach for humanities researchers to direct them toward next steps in research. Corpus approaches may not be able to take into account what it not explicit in textual data, and they may not provide explanation, but they can, much like a telescope, show us aspects of the data that could not be seen without the computational method. Computational methods such as those used in Text-Based Modeling are capable of “summarizing and presenting” large amounts of text quickly and easily (Hanneman & Riddle, 2005). Combining this
approach with other research methods may be a process that reinforces or complicates what is suggested by these summaries and visualizations.

With this project specifically, I ran the WordSmith Tools computational method slightly before undertaking the qualitative and quantitative analysis in Chapter 3. As a result of analyzing the frequency patterns in the keyword lists from WordSmith Tools, it became quickly apparent that there was further needed research: metadata extraction of these survey results. There was no way to read these survey results with any kind of understanding unless I could read each response with the demographics and situated experience of the survey respondent, as the context is critical to any reading of the text in these responses. This led me to hand code the metadata, which in Chapter 3 I refer to as attributive codes. Taken together, then, the research methods of Chapter 3 and Chapter 4 of this dissertation form a corpus-driven approach to qualitative and quantitative study.

The coding method and thematic analysis undertaken in the study presented in Chapter 3 is but one way to design a corpus-driven approach to further study. Like the Sotillo and Starace-Nastasi’s (1999) study discussed above, which employs both corpus linguistics and critical discourse analysis methods, many other methods could be used and informed by a corpus-driven approach. These methods may differ from corpus linguistics in terms of their goals and beliefs about language, which is reconcilable if a researcher approaches corpus studies with the understanding that it is a discovery process for subsequent research. For this reason, more and more researchers from fields as far ranging as literary studies to sociolinguistics to second language learning and pedagogy have employed corpus-driven approaches to their work (McEnery et al., 2006).
The suggestions from the Text-Based Modeling methodology reinforce and complicate other findings from the other methods employed in this project. The keyword lists and network visualizations create a narrative that reflects the hopeful negative/trying-to-conceive binary that is reflected in the rhetorical and visual analysis of packaging in Chapter 2. This narrative shows a first-time user who is young and uncertain versus a trying-to-conceive user, married, and taking multiple tests to achieve a desired result of a baby. The study presented in Chapter 3 complicates this binary to some degree, in the user experience at the point of purchasing. Both the corpus linguistics and semantic network analysis conducted here could not address the purchasing experience with any meaningful visibility. For example, the word “easy” in the language of the prompt no doubt created a high frequency in the response, but the conditional clauses that followed the use of that word in the responses were too varied to appear in collocate lists for “easy.” Those conditional statements modifying “easy” were also too varied to occur in relationships in semantic networks. A subsequent method, with a human researcher reading and hand-coding those responses, uncovered the pattern of survey respondents expressing discomfort at the point of purchase across user categories. While this example might show something corpus linguistics could not find or do, it is a good example of methods working together to understand more about user experience than could have been achieved alone. Without the corpus linguistics approach pointing to the need for metadata extraction to differentiate user experiences by self-reported demographic data, the discomfort issue would not have been discovered with the subsequent method.
Conclusion: Modeling User Narratives for Future Research

None of these methodological approaches can change the composition of the survey itself or the survey data studied in this project. All approaches first and foremost point to the need for more empirical data collection about home pregnancy test purchase. The need to better understand the purchase experience for pregnancy test users suggested by the 89 user narratives of the CNHM/NIH surveys is critical. This call for future research is underscored by the mere fact that this one survey is so relied upon to make claims about the home pregnancy test in the United States.

There are issues with regards to home pregnancy test packaging and design that are hinted at in the models created in this chapter. For example, we see in the first-time test taker semantic network that first-time users may live with others such as extended family and significant others. We see that they discuss taking the test at home when they are alone. It may be that less conspicuous packaging would be preferential to users who are trying to negotiate use in a domestic space that is not necessarily private. The substructures of language modeled in the semantic network analysis bring forth further questions that cannot be answered without further feedback from users.

Further, the frequency with which miscarriage is discussed by subsequent test takers suggests that the packaging and design do not take into account that the process of trying-to-conceive is also filled with pain, despair, and loss. Because the CHNM/NIH survey did not specifically ask questions related to this, further inquiry into user experience with trying-to-conceive users may yield important information that we currently lack from trying-to-conceive users themselves. This information may
complicate the notion explored in Chapter 2 that the packaging design and marketing scheme of home pregnancy tests reflects the needs or desires of trying-to-conceive users.

The collocate and concordance list for the “brand” in the corpus linguistics study indicate that first-time users mentioned that they often failed to remember the specific brand name. Collocates to “brand” include “remember” and “don’t,” after “one.” (The only brand name listed as a collocate is EPT, and this is stated three times.) Further look into the larger groups of words suggests that many users could not list a brand when asked. This may be because so many years had passed between the initial home pregnancy test and the date of the survey. Also, because the survey question about subsequent use did not ask specifically about brand, there is less mention of it in the Question 5 responses. These collocate and concordance lists suggest that this data set cannot yield more consideration of this issue, and more empirical data is needed to answer questions about the user experience of packaging design with regard to brand.

The goal of conducting further research with these 89 user narratives from the CHNM/NIH is to make certain that the 89 narratives are heard, both at the most micro level as individual users and in patterns of use across these narratives. This is especially important given the propensity of scholars in the literature to generalize claims about home pregnancy testing in the United States from selected statements in the responses. Text-Based Modeling serves to begin a corpus-driven discovery process that helps humanists to better understand these user narratives, both as a mini-corpus with domain-specific language proffered by users about home pregnancy testing, but also for use of the summary and presentation of this language to discover avenues for future research of the home pregnancy test user experience.
Chapter 5 outlines these potential avenues for future research, including future directions for evaluation of the user experience of home pregnancy testing. I take into account the affordances and drawbacks of various methodologies such as those used in this project. In addition, I conclude with a larger discussion of the implications of multiple methodological approaches and disciplinary backgrounds of transdisciplinary research teams for humanities project design, implementation, and evaluation. I particularly focus on implications of multiple-approach project design for the digital and medical humanities. This includes questions raised in this project about the use of oral and digital histories for empirical research.
Chapter 5

Implications of a Multiple Methodological Approach

In this dissertation project, I have interwoven two threads of inquiry: the investigation of the user experience in the purchase of the contemporary American home pregnancy test, and the various methods that we as researchers from the humanities to social sciences employ to conduct such investigations. In this conclusion, I address each in turn to discuss the implications of the use of multiple methodological approaches, each with its own epistemologies and assumptions, on the marketing and packaging of home pregnancy tests, and for humanities researchers engaged in the study of cultural and social phenomena more broadly. More specifically, I first offer suggestions based upon the findings of these methodological case studies for more ethical home pregnancy test marketing and design, and for future directions of home pregnancy test user experience research. I next move toward a discussion of considerations for researchers working transdisciplinarily, focusing on insights from this dissertation project for scholars of the digital and medical humanities.

Suggestions for Ethical Home Pregnancy Test Marketing

In the textbook *Technical Marketing Communication*, Harner and Zimmerman (2002) describe the ethical considerations of technical marketing communicators as “really no different than any other aspect of life. In fact, it can usually be boiled down to two key guidelines: don’t lie [and] don’t steal” (p. 63-64). It is important to note that despite the rhetoric and technical communication scholars who advocate for a more far-reaching ethic of care to users of technology (Dombrowski, 2000; Salvo, 2001), this is a fairly recent shift in the way that technical communicators are trained to design the
communication surrounding technical products such as the home pregnancy test. As a result, social justice concerns that may result from the design of packaging, or from choices about the layout of the retail environment, are not prevailing concerns in the literature surrounding marketing and promotion of products such as the home pregnancy test. However, in Chapter 2 of this dissertation, using visual-material rhetorical analysis, I uncover and analyze the features of this design and packaging for home pregnancy tests that violate an ethic of care to the user, such as the suggestive heteronormative, affluent, and trying-to-conceive user messaging that prevails on the brands in the case study. Further, employing rhetorical-cultural analysis, I argue that the retail environment, based on the conspicuous and confusing in-store display, further creates an environment for a purchasing experience imbued with fear and embarrassment for users of the home pregnancy test.

Based upon this project, I can draw connections across methodological approaches in order to make limited findings for a more inclusive and ethical approach to the purchase of home pregnancy tests. I note that these findings are limited because there are several drawbacks to the use of the CHNM/NIH survey responses as a data set that I have discussed extensively in Chapters 3 and 4. For this reason, I first and foremost see the most important finding of this project to be a call for more empirical research designed to evaluate the user experience of home pregnancy testing. I sketch my own proposed future research later in this chapter. It is critical to be transparent about both the limitations of the study and methodologies employed in it. Disclosing the limitations of a data set based on electronic oral histories, and addressing concerns for the methods by which this data set has been analyzed by other scholars are important humanistic
scholarly endeavors, as they affect how the human experience around these histories is interpreted. But, as Gibbs and Owens (2015) suggest, “Just as the problematic notion of a text has not undermined the hermeneutic process, nor should the notion of data. It is clear that a new relationship between text and data has begun to unfold. This relationship must inform our approach to writing as well as research” (n.p.). The findings here may require further study due to the limitations of the data set, but to throw these data out entirely would be to disregard these lived experiences and the possibilities for ethical action that are suggested by analysis of these narratives through the multiple methodologies employed in this project.²⁰

After performing corpus-driven qualitative and quantitative analysis with the CHNM/NIH data set, patterns emerge in the home pregnancy test purchase experience that—in conjunction with the rhetorical analysis of packaging—indicate a need for the following in order to attend to an ethic of care to the user:

1. **Less conspicuous design of home pregnancy test packaging.** The baby blue and pink color schemes of brands such as EPT and First Response create a conspicuous object for over-the-counter purchase and use at home. Users across demographics reported discomfort with the purchase of the home pregnancy test due to the conspicuousness of the purchase. The CHNM/NIH user narratives suggest, through both semantic network analysis and thematic analysis, that particularly first-time users would

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²⁰ I should also note here that this negotiation is quite audience-specific. A technical communication audience would be predisposed to acceptance of my disclosure of the limitations of the research and then recommendations based upon findings from the study. For the purposes of this project, I choose to offer these but with extensive discussion of the ways in which different methodological approaches and disciplines would consider this data set differently.
benefit from increased privacy from scrutiny of their living companions, which may include parents, siblings, and significant others.

(2) A more sensitive design of packaging that reflects the life experiences of multiple user demographics. The demographic data reported of the respondents to the CHNM/NIH study suggests that the user of the home pregnancy test is not always the trying-to-conceive, married, normative user who is portrayed in the marketing of the product. The surveys reflected that particularly initial users of the product are young, single, and not necessarily seeking a positive result to the home pregnancy test. Moreover, the semantic network analysis revealed subsequent pregnancy test takers may be experiencing miscarriages, such that even if they are trying-to-conceive, the process of conceiving a baby is fraught with fear and disappointment. In all of these cases, the suggestion of a happy, pregnant couple on the packaging and advertisements is not reassuring to many users.

(3) Less conspicuous design of retail environment. From the reproductive products aisle in the store all the way to the cashier, the retail environment for the user is conspicuous. Participants in the CHNM/NIH study may have responded with some degree of confirmation bias with the word “easy” in their responses (as it appeared in the survey question), but many respondents’ conditional use of this term, with words such as “but,” combined with mention of anxiety at the point-of-purchase, reflects a pattern of discomfort with the retail environment. Reducing public visibility (making the “reproductive aisle” closer to checkout and less conspicuously labeled and designed) and reducing exposure to cashier scrutiny (self-checkout) would improve the comfort dimension of the home pregnancy test purchase experience.
Future Directions for Pregnancy Test User Experience Research

The suggestions given for ethical marketing of home pregnancy tests are suggestions based upon a limited data set, and will require subsequent user experience research in order to be generalizable to the American consumer public. In future research, I am interested in exploring three new projects that could assist in the gathering of a representative sample set from which to draw actionable claims. These include survey research with social science-informed experimental design, ethnographic research conducted in the retail environment, and ethical online ethnographic research.

Throughout this dissertation project, I have discussed that the CHNM/NIH survey was not actually a survey in the sense of it being designed for data collection for an empirical research project. This survey was meant to solicit “electronic oral histories” (Leavitt, 2006; Leavitt, personal communication). This was an inexpensive and easy method of accumulating the stories of users for an educational and historical website project. This goal is much different than data collection in social science surveys, which are designed “to produce statistics—that is, quantitative or numerical descriptions of some aspects of the study population” (Fowler, 1984). In Chapter 3, I endeavored to analyze the CHNM/NIH survey responses with the methodology employed by these social science researchers, but without the experimental design. This experimental design, alongside a venue for representative sampling of pregnancy test users, is needed to test the findings in Chapter 3. A social science informed experimental design involves making estimates for sample size, predicting sampling error, designing questions to be good measures (taking into account the types of questions asked, such as multiple-choice when necessary to accumulate quantitative responses more reliably), and considering
ethical responsibilities to respondents (Fowler, 1994). I could design a new survey
questionnaire with more specific questions about home pregnancy test purchasing—
about brands of tests, cost, aspects of the retail environment, and about the aisle, layout,
and cashier checkout. It could also appeal to respondents who have taken a pregnancy
test more recently to the time of survey participation, to avoid an over-reliance on the “I
don’t remember” response that is common in the CHNM/NIH data set (but also
understandable, given the historical dimension of the CHNM/NIH project). I would find
venues for survey participation that would allow for representative sampling, such as free
health clinics and public venues like libraries. I would also conduct the survey in
conjunction with focus groups to get user feedback on packaging with the actual test kits
present at the focus groups. This next step of empirical research should be of great value
to test the suggestions from the CHNM/NIH data and earlier scholarship that uses this
data.

Another avenue of future research is ethnographic research, which can place
results from surveys or focus groups in context (Buch & Staller, 2014). Field observation
can provide important insight into the lived experience of users purchasing the home
pregnancy test, and afford an opportunity for a researcher to look more closely at the
retail environment in which the home pregnancy test is sold. However, the design of this
research is difficult due to the concern for privacy of the purchaser that is outlined in the
study. I am interested in pursuing a workplace study with a pharmacy to explore the retail
practices surrounding reproductive product placement and sale. This may include

21 I have developed this survey and have received IRB approval to administer it. It will be
a part of future research on this project to be continued in Fall 2015.
expanding beyond the home pregnancy test to see how over and behind the counter products, like morning-after pills, contraception, and other diagnostics such as pregnancy tests are labeled, shelved, promoted, priced, and sold. I am interested in pursuing this project according to the principles of feminist ethnographic research, or “research carried out by feminists who focus on gender issues in female-homogenous traditions or nontraditional settings, and in heterogeneous traditional and nontraditional settings” (Reinharz, 1992, p. 55). Feminist ethnographic practices include taking care in choosing a field site and partners as well as protecting the safety and privacy of the users (Buch & Staller, 2014). As with the dissertation project, I have two aims with conducting feminist ethnographic research in the retail environment. First, I wish to test the visual-material analysis conducted in Chapter 2 with social behavioral research to see if users experience these spaces in the ways in which I suggest in that chapter. Further, I wish to bring feminist research to the area of technical communication in order to bring concerns of ethics and social justice to those who create the packaging, signage, and instructions for these home biomedical products.

As I suggest in the conclusion to Chapter 2, ethical online ethnographic research is another method that may be employed to explore how users of home pregnancy tests are interpreting home pregnancy test packaging and the purchasing experience. Given that the websites for the manufacturers tend to reflect the values and messaging of the test packaging, the online help forums on those websites privilege the heteronormative, trying-to-conceive user. Figure 25 illustrates the similarities in the design of the websites and in the brand packaging, with the Clearblue website. As shown, the webpage features the baby boy color scheme, a young couple planning their pregnancy with an ovulation
kit (“Let Clearblue help find your fertile days”), and many young, traditionally feminine women with pregnancy tests in hand, presumably smiling upon getting the result of the test. This does not appear to be a place where a story would be shared that deviates from a story of a happy announcement of a conceived child.


As I discuss in Chapter 2, however, there are many alternative forums where online conversations about home pregnancy test are taking place, including consumer forums such as amazon.com, trying-to-conceive sites, and health forums such as WebMD. Ethnographic research in these spaces may provide a means to observe and interact with users who may not feel comfortable in other physical spaces to talk about
their experiences for privacy reasons. However, after data collection and observation with these online forums, I have discovered that the conversation tends to focus on home pregnancy test use rather than purchase or design of packaging. This type of discussion may involve what time is best to take the test, false positive or negative results, or difficulty interpreting the results of a pregnancy test. Consumer sites such as amazon.com have more consumer watchdog reporting around pricing and labeling, but user sites tend to focus on the test taking and result accuracy (Opel, 2015). This limitation of specific concepts in the user-generated content on web forums reinforces the necessity for designed empirical research studies such as surveys, focus groups, and workplace or field studies.

To close this section, I wish to discuss the possibility of a theoretically informed future project that this dissertation project suggests. The visual iconography in Figure 25 above, as well as on the design of home pregnancy test packaging, is closely aligned with postfeminist cultural values often found in contemporary media culture. Pregnancy test marketing and promotion appears to reflect postfeminist media culture in its ability to erase social or cultural concerns and promote a very specific kind of woman’s lifestyle. As Negra (2008) argues, postfeminist culture often combines “a deep uncertainty about existing options for women with an idealized, essentialized femininity that symbolically evades or transcends institutional and social problem spots” (p. 18). Further, a feature of postfeminist culture is its own postfeminist temporality; a “time panic,” or the notion that contemporary women are always in a race against the clock to “have it all” (Negra, 2008, p. 47). Based upon many responses to the CHNM/NIH survey, the users who discuss trying-to-conceive and/or miscarriage would be particularly susceptible to this kind of
cultural messaging, creating a potential ethical dimension of the study that I have not yet explored. Theorizing the ways in which home pregnancy tests are packaged, marketed, and sold to reflect (or not reflect) these postfeminist cultural values is an important future step to connect the empirical to the theoretical and create new knowledge about the home pregnancy test user experience.

**Considerations for (Trans)Disciplinary Researchers**

This dissertation project design offers some useful strategies for how a humanities researcher can engage with methodologies more commonly associated with social science research. I will first discuss the implications for a humanities researcher who may wish to cross disciplinary boundaries to explore a social or cultural issue from multiple methodological perspectives, and then turn to suggestions for humanities researchers working on teams or projects with scholars from other disciplines.

I designed this project with the notion that monomethodology, or the claim that one method is superior to all others to carry out research, simply cannot work when addressing a complex problem space (van Peer, Hakemulder, & Zyngier, 2007). As a result, we as researchers, when addressing an issue such as home pregnancy test user experience, have several equally valid options. A researcher can choose to work in a single discipline with a single method, and join forces with other researchers from other disciplines, each with their own approaches. The difficulty with this kind of transdisciplinary work is the need for a node or a translator to connect the different methodologies, which I will discuss in more detail below. In this dissertation project, the option that I chose to explore as a humanities researcher is to employ social science and computational methods, in alignment with what van Peer et al. (2007) call “a piecemeal
contribution to the study of culture, one that bridges the gap between the Humanities and Natural Sciences, in the realization that both need other for a better understanding of the world” (p. 7). As these authors suggest, social science methods that search for patterns in human behavior can be particularly effective if harnessed by humanists because “There are many [research] questions that traditionally belong to the Humanities and in which most social scientists are not really versed (or interested)” (p. 31). They specifically mention questions relating to “emotional impact,” which is closely related to the comfort dimension of the user experience. This is why Grice (2002) calls for an approach to user experience in technical communication research that incorporates the humanities. As technical communication has been a field of research historically associated with social science methods, it has only recently begun to focus on issues that are of great importance to humanists: ethics, social justice, and the human dimension of experience with technical communication. Because these are the aspects of home pregnancy test packaging design and marketing in which I was interested in as a researcher, it made sense to employ both humanist and social science methods.

To employ methodologies across disciplines, it is important to understand what certain methods can do and cannot do, and why underlying assumptions of methodological approaches permit what they can do and prohibit what they cannot. In Chapter 4 I discussed Stubbs’ (1996) metaphor about corpus linguistics and the telescope: you would not blame a telescope for not being a microscope. To extend this with a discussion in van Peer et al. (2007), biologists receive training in how to use a microscope and astronomers receive training in how to use a telescope because this training aids them in their areas of research. These authors are not suggesting that
biologists start studying space, but that if biologists were studying plant life on a distant planet, they may need to learn how to use a telescope to see it. The biologists’ research question necessitates the training and use of a new instrument, one that is largely outside of their discipline.

In this dissertation project, I participated in much the same process. In my rhetorical analysis of the design of packaging and the retail environment of home pregnancy tests, I conducted a literature review and relied in that study upon other studies of the CHNM/NIH data that selectively used the user narratives to make theoretical arguments about home pregnancy testing. However, because these studies were theoretical or historical in nature, I felt a need to study this data set using qualitative and quantitative methods, as it is the only source of empirical data on home pregnancy testing that is publicly available, and is so often cited in the literature. To revisit this data set, I needed different instruments, which is how I devised the methodological case studies that comprise Chapters 3 and 4.

In Table 4, I summarize the methods employed by this dissertation and the roles that the human research and computer play in those methodological approaches, and how these roles are shaped by the focus and purpose of the methods themselves. The table, like the dissertation project, moves from the most humanist (rhetorical analysis) to the most scientific (computational corpus-based studies) method employed. As the Table demonstrates, as one moves from left to right on the chart, so do various assumptions about the role of the human researcher, the focus and the purpose of study. Rhetorical analysis is human researcher-driven on all levels: the human researcher chooses what to focus on within an object of study. The human researcher shapes the scope and filters the
subject data to selected features that help to illuminate his or her interpretation of the phenomena studied. In my study, I used Schriver’s (2013) information design principles and Scott’s (2007) rhetorical-cultural circuit as frameworks to guide my interpretation of various features of home pregnancy test packaging and the retail environment. The focus of this study was contextual: while I “read” the packaging as a researcher, I read it rhetorically, placing it in its context for the user and other stakeholders, and following the object along its cultural circuit from design to sale to purchase to use. This focus complements the purpose of humanistic study, which is interpretation of experience.

The second column represents the thematic analysis of Chapter 3, a mixed methods study that combines qualitative and quantitative elements. The mixture of these methods is evident in the hybridity of the roles of human researcher and computer. While I hand coded (manually read and sorted into categories) the CHNM/NIH data set, I then relied upon software, primarily Excel pivot tables, to quantify and demonstrate relationships in that data set. This is a hybrid or mixed method because it relied upon me as a human researcher to read and interpret data in order to reduce it. For example, I read through respondents’ narratives and found their relationship statuses at the time of pregnancy testing, despite the manner in which they may have reported it. With a solely computational method, such as in Chapter 4, the program would only record this feature if the respondent explicitly uses a term to specify a relationship, such as “boyfriend,” “husband,” or “partner.” With a human researcher, it is possible to interpret and code phrases that may not be so explicit but that may be deducted as such; for example, “we were going out at the time.” In this way, the human researcher in the mixed methods approach is still reading for a certain degree of context, much in the way a discourse
analyst would. This process also allows a human researcher to alter the coding scheme or method based on what he or she is finding in the data set, unlike a purely computational method. For example, I saw the need to code for both attributive (demographic information) and descriptive (patterns of experience) codes as I saw the need for metadata extraction. I believe I could better describe the data with a two-fold coding process, which separated the metadata from the more substantive elements I wished to study. This inductive coding process reinforces the underlying assumption of methods such as these, which is that they can describe or explain (versus understand or interpret) a phenomenon by uncovering patterns in behavior.

Table 4.

*Dissertation Methods by Key Attributes*

<table>
<thead>
<tr>
<th>Dissertation Chapter / Method Employed</th>
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The final method is Text-Based Modeling, a blend of two corpus-based approaches, computational corpus linguistics and semantic network analysis. This
method is a fully computationally driven one, where the researcher uploads the files after engaging in a pre-processing stage wherein the researcher reduces the data by creating stop lists of words that will not be analyzed. In the instance of semantic network analysis, pre-processing involves creating a codebook of words to focus the visualization of the most salient relationships. This method has the most invasive data reduction process, and this again mirrors the focus and the purpose of the method. The focus of this method is text itself, particularly focusing on words and groups of words. As I discuss in Chapter 4, it is up to the human researcher to return to the models after and provide context for them, or to analyze them with the benefit of context, but the method itself, as a result of its computational focus, is the text files and the words that are subject to computation. While the purpose of these computational methods may be subject to debate, the purpose that I derived from my study was that of exploration or discovery. The selective nature of what comprises the models creates an opportunity for the researcher to see new or different aspects of the data set in a way that leads to new research questions and new methods for analysis of a particular phenomenon.

What my project design offers to a humanities researcher is a consideration of how method may affect what kind of research project she is able to conduct, and how alternative methods bring to light different areas of study of the same research project or even the same data set. As my outline for future research demonstrates, there are still many more research projects for me yet to pursue to address the user experience of home pregnancy testing, and they incorporate yet more methods across this spectrum from the humanities to social science. The important implication is not that one researcher need learn all of these approaches, but to learn why and how different research questions
require different methods at different phases in a research project. As this project demonstrates, this movement across methods is largely an iterative one. Most notably, when the computational corpus linguistics software WordSmith Tools generated models that indicated a different use of words from initial to subsequent test taking, I knew that I needed to extract the demographic information from the data manually, in order to see why these models differed, which is what is shown in Chapter 3. This corpus-based discovery is to my mind the best example of the iterative and non-linear path that we as researchers must take; rather than remaining committed to a particular method, but instead, allowing the research to guide the method. This could also mean working collaboratively with a research team with members that work in different methods, which is one model often found in the digital humanities.

**Considerations for the Digital and Medical Humanities**

**Models for Digital Humanities Research**

This project offers specific considerations for the transdisciplinary initiatives referred to as the “digital humanities” and the “medical humanities.” The digital humanities as a collective is currently experiencing growing pains as it decides which disciplines and which methods it incorporates into its self-definition. As Gold (2012) explains, “As the digital humanities has received increasing attention and newfound cachet, its discourse has grown introspective and self-reflexive” (p. x). What is the digital humanities? What are its goals and purposes? Who is involved? These definitional questions often take up more time in digital humanities discussions than digital humanities projects themselves. While these battles continue, Warwick, Terras, and Nyhan (2012) offer the definition of “the application of computational or digital methods
to humanities research, or to put it another way, the application of humanities methods to research into digital objects or phenomena” (p. xiv-xv). This definition alludes to the notion that the digital humanities can be (and often is) partitioned into two camps by method: the computational and the theoretical. This division has created acrimony between the two camps in ways that are at times generative and at times an obstacle to performing important work that requires both kinds of researchers. One example that encapsulates this division is McPherson’s (2012) examination of the histories of race and computation, arguing that computation has a cultural dimension in which technology is designed in such a way as to erase issues of race. The effect of this, as McPherson describes in the introduction to her chapter, is that cultural critics (humanists) and technologists tend to self-segregate into interpretive and computational cohorts, respectively (p. 139). Jensen (2014) further describes a strict view of the history of the digital humanities that divides the movement into waves in which the first was quantitative and the second qualitative (p. 128; citing DMH, 2009, p. 2). The effect of this in Jensen’s mind is that corpus linguistics has been pushed out of the digital humanities as irrelevant to the second wave, despite the focus of the digital humanities (in any iteration) on transdisciplinarity and collaboration.

In my own experience conducting this dissertation project, I observed that the cultural logics that divide the humanists from the computer scientists are deeply felt on both sides of the divide of a digital humanities lab. Because I learned the computational methods that comprise Text-Based Modeling in a lab alongside PhD students and faculty across the disciplines, I had the benefit of observing how participants from varying disciplines experienced various aspects of these methods. I observed that humanities
students and faculty were much less comfortable with the software and much more
comfortable discussing and critiquing the method, while computer science students were
quick to jump in and play with the software, even before they had developed a research
question. These kinds of observations derive directly from the kind of cultural logics that
divide humanists and scientists McPherson (2014) describes. The response to these
cultural divides can be separatist or collaborative, and I would posit that this dissertation
project attempts to bring humanist concerns with particular methods and their
assumptions, as well as the treatment of data across disciplines, without discarding the
potential for using a method or data set and making findings from them. This is especially
difficult given that camps in the humanities and sciences that I work with—even on this
project—might be more willing to discard, respectively, computational methods or
humanist critiques entirely.

What this project demonstrates is, as a humanist researcher, my desire to employ
both social and computational science methodologies, with the understanding that as a
humanist I will draw the critique where necessary, but also employ the method to address
the research questions that I have formulated. As I suggested earlier, this is but one
template, and one with its benefits and limitations. One of the benefits I suggest is that by
learning the methods myself as a humanist, I can take humanist concerns into account
and read the methods through a lens of a humanist. One of the limitations is that I rely on
my own skillsets. For a different project, particularly larger projects where efficiency
becomes a concern, I might need to collaborate with a team that includes those with
deeper expertise in various methodologies.
The limitation of a team-based or collaborative transdisciplinary model, as I suggest earlier, is the need to translate across the cultural divide of the theoretical and the computational. This translation work is not an easy task, for it requires a certain degree of topsight and code-switching to reach across the divide, even if it is not overtly pronounced. This topic falls outside the scope of this dissertation project, but in future research I am interested in exploring the divide between the computational and the theoretical (and the corresponding divides with regards to race and gender in technology) through the lens of Flower’s (2008) intercultural inquiry and rhetorical problem solving. While Flower’s model is intended for public engagement with marginalized and privileged groups, it offers a rhetorical framework to enact the translation work needed here, and for a similar purpose: to attend to the ethical and social justice concerns involved in creating a space where marginalization of any group is minimized. This approach is one that actively engages with difference and might be used to explore working across methodological approaches with collaborative researchers.

**Methods and the Medical Humanities**

The emerging medical humanities also face a definitional debate. Chiapperino and Boniolo (2014) describe the results of a medical humanities literature review to reveal “a substantial lack of consensus as to their aims and scope [as a discipline]” (p. 378). Methods play a large definitional role in this challenge. Much like the digital humanities, the focus of the definitional debates frequently involve what disciplines can participate in the area of study and whether or not participant researchers should be inter- or multi-disciplinary (p. 378). For team-based work, this is a similar predicament as discussed earlier with the digital humanities. Should researchers maintain their independent work in
their own disciplines and build understanding by collaborating with others working in other disciplines, or should they build multi-disciplinary awareness by attempting to blend their approaches? Chiapperino and Boniolo (2014) argue that this is a misguided focus for the defining of medical humanities, and advocate for a problem-based approach that focuses a definition of the medical humanities on the research questions—rather than the discipline or method—that researchers who are members of this initiative address (p. 379). This position would allow space for research questions about the comfort dimension of user experience of home pregnancy testing. Defining this project by field of study, technical communication and rhetoric, would render it outside of the strict interpretation of the medical humanities. However, defining it by its research question—specifically, exploring the ethics of home pregnancy test packaging and ethical and inclusive user experience of home health products—clearly falls within the auspices of the medical humanities. A team could then be assembled by interest and ability to address this research question, instead of by discipline or method.

This approach does not solve all problems for working as a scholar in the medical humanities. One issue raised in this project is the use of home pregnancy test user narratives in research, and what methods are appropriate for the study of those user narratives. Narrative is an important aspect of study in the medical humanities, as more ethical patient care is a frequent subject of inquiry, and patient testimonies offer a means by which care may be studied from a patient’s perspective. Still, the disciplinary methodological and disciplinary background of a researcher dictates to a large degree how these narratives will be studied, particularly when they exist in digital form; “data
as constructed artifacts, data as interpretable texts, and data as processable information” (Jensen, 2014, p. 118; citing Owens, 2011). This project draws attention to what Gibbs and Owens (2013) call the hermeneutics of data, or “the process of interfacing with, exploring, and then making sense of historical sources in a fundamentally digital form” (n.p.). There is no question, as this dissertation project illustrates, that scholars in different areas of study approach a digital oral history archive much differently. Humanists treated the CHNM/NIH survey responses as an interpretable text; explicating selected quotations to interpret and make meaning with in conjunction with a theoretical or historical framework. A social science approach such as the thematic analysis in Chapter 3 took the position of the CHNM/NIH survey responses as data that is processable information. The corpus-based approaches took this one step further, and created visualizations from that data after choosing selected elements of that data to model, and in doing so, constructed artifacts from that data.

This project underscores the complications that arise when researchers from different disciplines hold different assumptions about the use of digital oral histories as an object of study. It can easily lead to questions of ethical treatment of the respondents and their privacy; it can lead to different opinions about the manner in which the data should be “read” and interpreted. As Gibbs and Owens (2013) argue for historians (but I would argue is equally apt for all humanists), scholarly writing must “foreground methodological transparency and free itself from the epistemological jitters that make many historians way of moving away from closing readings or embracing the notion of the historical record as data” (n.p.). This dissertation project, at its core, is an attempt to foster transparency about methods and begin a conversation about working across them
in order to address a research question that is larger than one single discipline. If we hope to have impact and improve the ethical dimension of communication surrounding a technological and medical product, this is a crucial conversation to continue.
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