

IN NETWORK: GAMING THEORY AS A STRATEGY FOR BUILDING DIGITAL
HEALTH LITERACY

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ABSTRACT

Emily Bunner: In Network: Gaming Theory as a Strategy for Building Digital Health Literacy
(Under the direction of Todd Taylor)

This dissertation examines how theories and rhetorics from game studies create deeper understanding of the literacy needs for writers in the networked, multimodal environment surrounding American health care. I combine video game and social network theories to explore how computational algorithms and protocols interact with social networks in the communication of high-stakes knowledge. Gaming theory is a timely tool with which to address health literacy because contemporary medical communication flows through and is shaped by a technologically mediated system that can be understood as a set of rules both supporting and constraining action. My work demonstrates the importance of game studies to literacy scholarship by showing the rhetorical dimensions of networked health information and play. This dissertation includes in-depth case studies on the formation of knowledge around gluten sensitivity, vaccine refusal, and rhetorical constructions of diagnosis in networked media. It concludes with a plan for how we can incorporate network theories informed by game studies in Writing in Disciplines and Writing across the Curriculum instruction on medical writing and other high-stakes professional discourse. The literacies supported by this approach will train writers in the ability to think more ably and ethically across a variety of language communities.

To my mentors in study, in survival, and in serious play.

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INTRODUCTION

This dissertation will examine how our rhetorical understanding of social media systems can benefit from the application of gaming theory.¹ I will analyze the construction of medical knowledge by providers and patients to demonstrate how networked media influence and shape communal discourse in rule-based systems. First, I will outline how gaming theory is defined and used in the field of rhetoric. Next, I will explain current problems in networked medical communication that gaming theory can help. Finally, I will suggest how we can use gaming theory to prepare students to address these communication problems in WiD and WAC composition classes. A useful connection exists between gaming studies and health communication because contemporary medical discourse is shaped by a technologically mediated system, and gaming theory is a highly effective tool for allowing us to understand and intervene in diverse technologically mediated systems.

I will approach the broader problem of how gaming theory can clarify systems operations by addressing the question: “How can a gameful understanding of contemporary medical rhetoric improve health science discourse?” My methodology will apply gaming theory to allow exploration of the ways in which health information is created and transformed in connection to the larger ecosystem of social media. As medical discourse

¹Many writers use the label “video game theory” to describe modern studies in gaming application; I choose to use the term “gaming theory” to avoid potential confusion with the related mathematical field “game theory” that studies quantifiable models of strategic behavior and decision-science within populations.

comes into contact with various nodes in a broad network of research dissemination and social media, its meaning, purpose, and reception change in rhetorically important ways. Understanding this system is of great value to rhetoricians who study medical communication and ethics. Rhetorical analysis will also assist in the education of medical professionals and writing instructors who wish to engage more productively in the social media by which much health information is disseminated. By using the example of networked health discourse, I aim to show how gaming theory will build increased understanding of the rhetorical implications of social media practices, many of which are erroneously taken for granted as transparent tools for relaying data.

Rhetoric scholars commonly approach the problems of how knowledge, literacy, and meaning are created and disseminated using a disciplinary model. Fact and evidence are evaluated differently within various fields and disciplines; we've been open to this concept since embracing the work of Foucault and Perelman in the 1960s. We can no longer study how meaning is shaped by the practices of disciplines alone if we want to understand and teach critical rhetorical skills in modern colleges and universities. Writing has always been one instantiation of a larger, open system that echoes through many spheres of sociality. With the normalization of Web 2.0 as an infrastructure for everyday sharing, creation, and literacy development, we can more easily trace the evolution and circulation of ideas. However, we also need to recognize that these processes have been changed by the technologies through which they move. Current technology provides additional shaping influences and automated inputs that did not exist prior to online interaction.

To study networked communication, we need to become comfortable with discussing the participants in an act of communication in terms of the system in which they are situated.

In his 2008 discussion of the importance of gameplay as a model of real world learning, Eric Zimmerman claims that “systems literacy” can be considered “a paradigm for literacy in the coming century.” Gaming, an essentially systemic activity, is an effective literacy training tool because “there is an emerging set of skills and competencies, a set of new ideas and practices that are going to be increasingly a part of what it means to be literate.” This claim that games, as rule-based and systemic activity, can be used to understand larger systems of action and communication has become a foundational concept in the small but growing field of literacy and learning in game studies. In addition to studying the disciplines in which literacies are formed and taught, we need tools and models to understand the larger technological networks in which they reside.

An example of a pre-digital rhetorical framing of communication within a system can be found in Kenneth Burke’s well-known dramatic pentad from the *Grammar of Motives* (1945). We can draw a few connections between this widely established model and gaming theory in order to show the rhetorical foundations of current game studies practice and the directions in which they have lead. Burke frames his approach to understanding motives and action as a question of “What people are doing and why they are doing it.” In order to find “*some kind of answers*” (italics in original) he proposes a system that breaks the question of motives down into five elements addressing act, scene, agent, agency, and purpose. These elements illustrate the dramatic characteristics of human relations. While this method will not, according to Burke, provide definitive answers about human behavior, it will shed light on the way behavior is described in language. Burke alludes to the usefulness of applying this method to larger networks, as these “forms of thought” are “equally present in systemically elaborated metaphysical structures, in legal judgments, in poetry and fiction, in political and

scientific work, in news and in bits of gossip offered at random.” In short, Burke advocates a method of investigation that can be used to understand a variety of systems across multiple disciplines and settings.

Burke’s interest does not extend to the actions of technology and machines beyond how they are used as instruments that allow people to exert their own agency. Additionally, he states from the outset that “we want to inquire into the purely internal relationships which the five terms bear to one another...and then to see how these various resources figure in actual statements about human motives.” Gaming theory can function as an extension of this system of evaluation, adding such questions as: Is the agent human or nonhuman? What interactions lead to the creation of the scene? What level of automation was involved in the act? How do different degrees of social power influence the purpose of an action? Gaming theory, especially when addressing issues of communication and literacy, views networked activity as an open system that must move beyond “purely internal relationships.” Certainly, Burke was deeply concerned with communities, social ideas, and complex relationships, but in a pre-Internet world where locality and privacy had very different meaning, actors and setting could be more easily separated. Burke claims that these five terms “never need to be abandoned, since all statements that assign motives can be shown to arise out of them and to terminate in them.” While act, scene, agent, agency, and purpose remain powerful concepts, the definitions of each term have stretched considerably, and the relations between them cannot be drawn in a simple pentad. Gaming theory could not unproblematically outline a simple set of guiding questions that enclose a system, because an open system has an infinite network of branching nodes. In a gameful system, the points of the network, whether

arranged in a pentad or a widely dispersed cloud, are not as important as the lines of connection between them.

I propose that a methodology informed by gaming theory will allow us to study complex systems of human and nonhuman actors as well as the procedures and protocols guiding them in a useful and flexible manner that builds upon previous systems-based rhetoric. Gaming theory addresses a variety of inputs and outputs, as well the human, material, and digital components of a system in order to increase understanding of how information functions in a networked world. The importance of learning how networks operate has lead gaming theorists to embrace the concept of “procedural literacy,” the ability to construct and analyze operations in accordance with predetermined rules or logics of a system. In 2007, Ian Bogost popularized a methodology for “procedural rhetoric” as a subset of this literacy that seeks to understand how and why these structural logics and rules work. His guiding questions include “What are the rules of the system? What is the significance of these rules (over other rules)? What claims about the world do these rules make? How do I respond to those claims?” In Bogost’s theory, a game can serve as a model of a given system while allowing exploration of its rules and relations through serious play. I am interested in the affordances of gaming structure, language, and collaborative activity to demonstrate strategies and constraints for procedural interaction within networks comprising a large number of points or nodes.

A rhetorical investigation of how games work can be productively applied to a number of gamelike or gameful technologies that mediate our lives, including this dissertation’s guiding case study: health care. Providers, patients, communication tools, legal requirements, governance documents, and social communities are all assemblages of nodes

in a gameful system constrained by formalized but often poorly understood procedures and rules. After constructing and clarifying the operations of gaming theory, I will explore communication networks of knowledge creation and negotiation within a digitally mediated medical infrastructure and the gamefulness of literacy education in health and medicine WiD and WAC instruction.

CHAPTER ONE: GAMING THEORY AND HIGH STAKES LITERACY

What is gaming theory, and what does it have to do with the nuanced communication skills required for medical study and practice? Gaming theory is a diverse and quickly evolving field that offers many potentially productive hybridizations and border crossings with medical rhetorics. The emergent status of this new and deeply interdisciplinary field allows it to behave as what Eric Zimmerman calls a “cluster of practices” revolving around the joined concepts of systems, play, and design (2008). Game practices build theoretical frameworks by allowing us to understand networked action within a system, driven by both players and machines. Gaming theory is then an interdisciplinary constellation of techniques allowing playful interpretation and manipulation of relations, engagement, and design in the structuring and support of meaning within systems. This native attention to relationships and meaningful design ensures that gameful action will always benefit from sustained, careful attention to power structures and identity studies as with those addressed by contemporary feminisms and movements for social justice. Individual game titles can be powerful vehicles for creating, reshaping, and distributing knowledge, but gaming theory also stresses concepts such as situated learning and distributed knowledge that pervade the field of gaming on a much broader scale than any individual game. Games and their ongoing redefinition by changing groups of players and researchers function as theory building machines that allow us to understand many forms of activity and participation and to increase the efficacy of public interaction.

There are many possible points of entry into gaming theory, from a variety of disciplines. The larger field embraces the concepts of visual design, narrative analysis, critical race theory in character representation, code construction, audience response research, and a variety of other subdomains within economics, computer science, art, sociology, and other fields. My discussion will focus on the branch of game studies that closely interacts with literacy scholarship and pedagogy. It is here that we most directly see the value of gaming theory to educational practice, and by gradual extension, to the medical writing classroom.

We develop new methods and theories in response to problems and crises, and there is no shortage of proposed crises in American literacy education. Sources as diverse as the Common Core Standards Initiative and the best-seller *The Shallows*, which was assigned as required summer reading for my first year students at The University of North Carolina at Chapel Hill in 2011, stress the need to return to foundational skills in reading and writing. Nicholas Carr warns in nearly apocalyptic tones of the destruction of students' ability to focus in an age of distraction caused by digital communication, and I would claim, by digital literacy itself (2011). In *The Shallows*, Carr comments on his own growing inattention, brought on by email, social networking, and smart phones. Our students' ability to read deeply, he claims, is at severe risk. A similar, though more empirically researched view is emphasized by cognitive scientist Maryanne Wolf, in her 2007 text *Proust and the Squid*: "we must exert our greatest effort to ensure that immersion in digital resources does not stunt our children's capacity to evaluate, analyze, prioritize, and probe what lies beneath any form of information." Is it exactly at this point of concern that we can deploy gaming theory and game studies most strongly. Wolf's brilliant analysis of the material development of the

literate brain never mentions gaming, and she, like Carr, expresses intense fear that the digital revolution will result in the loss of neural development and arrangements millennia in the making. In the process, she also presents the strongest case I have ever encountered for the importance, even necessity, of incorporating gaming into literacy education.

If a brain is shaped by our literate experiences such that cognitive processes hard-wire in accordance with our most practiced approach to the word, then new generations may not engage in reading in the same way that their parents did. The restructuring of how the brain learns is a familiar topic in cognitive science and addresses how neural networks grow and strengthen based on actively practiced relations and frequently stimulated relationships, often affected by emotions (Smilkstein, 2011). Is this destruction or adaptation? And how do we adapt in response? Wolf cautions us, “The question that emerges, therefore, is this: what would be lost to us if we replaced the skills honed by the reading brain with those now being formed in our new generations of ‘digital natives,’ who sit and read transfixed before a screen?” This is the same question that worries Carr, but I think it is far more useful to ask what skills might be gained, augmented, or created by the changes that Wolf carefully illustrates based on neurological studies. The question that seems most pressingly suggested by her work is, “How can we address the literacy needs of the digital native?” Wolf compares the vocabularies of children who were read to often with those of children in “linguistically impoverished” environments. The trouble here is the focus upon the printed text and her stress on the necessity of “the language of books.” American children do not learn to read only from books; increasingly, they learn words in the context of video games (Hawisher and Selfe, 2007). If reading wires a brain to fire in corresponding pathways, how might the introduction of video games, as formative of early language encounters, impact the

learning processes of our students? Is it possible that there is such a thing as a “gaming brain?” Whether or not game-based reasoning can be wired into cognitive formation, it is part of our cultural learning landscape of networked communication. According to game theorist and designer Jane McGonigal, by age 21, Americans have on average spent over 10,000 hours playing video games, thereby crossing the “expert” threshold (2011). We have a great deal of experience learning by playing with systems.

No learning approach will answer the needs of every student, but gaming theory offers a strategy that can reach many students that traditional literacy training has failed and that college classrooms have left behind. It is important to note that the application of gaming theory and research to education does not imply an endorsement of “edutainment” or gamification: I am not advocating for educators to “make learning fun” by superimposing the appearance of games onto a standard curriculum. The use of games in the classroom must always be critically investigated in terms of what a given game actually teaches through its gameplay. (For example, my second grade teacher used a program called “Math Orchard” to teach us multiple digit subtraction. The game may have increased speed of recall for frequently repeated problems, but what it really taught us was how to guess effectively at the code words used to unlock the next level. We were learning a widely applicable and potential valuable program-hacking skill, but certainly not the one Ms. Murphy intended to teach us that day.) Gaming does not automatically make learning fun, nor does it ensure increased attention or engagement when it is not incorporated into a curriculum that recognizes the evidence-based expectations for and limits of game-based instruction. To use gaming strategies and outcomes effectively, we need to become aware of *how games teach*.

The most basic connection of games to learning is the axiom that every game must teach its player how to play. Games are always training tools for their own rules. Anything a game teaches necessarily has a context, and each rule represents a set of relations that exist in a specific situation (also called a game state). Students who stand to gain the largest benefit from gaming theory-based learning are those who learn by association and who struggle to memorize facts in a vacuum. James Paul Gee, one of the best known scholars of gaming and literacy, gives the example of science students being able to recite formulae but not having the opportunity or necessary training to apply these operations to a real situation, or in some cases, even to recognize their use outside of the classroom (2007). From this point, he builds an argument that has become one of the foundations of game-based education: “Human learning is not just a matter of what goes on inside people’s heads but is fully embedded in (situated within) a material, social, and cultural world” (2007, parentheses in original). Gee calls this concept “situated cognition,” and presents a theory of gaming as a productive literacy encounter based upon the value of embodied, situated experience. He is first and foremost a scholar of literacy and seeks to validate gaming insofar as it contributes to this field: “When people learn to play videogames, they are learning a new *literacy*” (italics in original). This is the core of his argument, presented in straightforward language, with no qualifications or hesitation. Gaming literacy exists. Further, he claims that the existence of gaming literacy presents a powerful case for considering the concept of literacy more broadly.

“Literacy” is a master term that, as of 2014, can be stretched and reshaped to include a broad range of definitions. I enter my discussion of gaming literacy and the usefulness of gaming to medical communication with a pause at the overdetermination and potential

overuse of the term “literacy.” I admire Gee’s bold definition, and at the same time I want to take care not to evacuate a term of meaning by loading so many ideas into it that it begins to rupture at the edges. In their 1999 article “Blinded by the Letter: Why are we using Literacy as a Metaphor for Everything Else,” Johnson-Eilola and Wysocki critique this troublesome overdetermination and potential overuse. After exploring a dense web of relations in literacy contexts and actors, they suggest that “we could describe literacy not as a monolithic term but as a cloud of sometimes contradictory nexus points among different positions. Literacy can be seen not as a skill but a process of situating and resituating representations in social spaces” (1999). Gaming has always existed as part of a distributed technological cloud and is certainly an aid to situating and resituating; more importantly, gaming is a process, in process, built upon a web of processes. I tread carefully around the master term, but I would not hesitate to claim that gaming theory enables a learning situation that is sensitive to the mutual redefining of symbols and society. Simply, gaming trains us to use (and to create, receive, and interact with) language in socially situated ways that encourage meaningful learning.

The role of gaming in the formation of American literacy was brought to widespread scholarly attention by Selfe and Hawisher’s ongoing Literacy Narrative project. After publishing *Literate Lives in the Information Age* (2004), which includes a collection of narratives about literacy formation, Selfe and Hawisher remarked on the frequency with which stories of gaming appeared in the literacy narratives of younger adults. In 2007, they published *Gaming Lives in the Twenty-First Century* to reflect this growing trend. Selfe and Hawisher support Gee’s argument that gaming can teach literacy and create productive learning environments. In their introduction to Colby, Colby, and Johnson’s 2013 edited

collection *Rhetoric/Composition/Play*, Selfe and Hawisher appeal to composition theorists: “If we lose sight of how students are composing meaning in electronic gaming environments and networked systems . . . we run the risk of ignoring a whole arena of serious language use and play.” Gaming, according to Selfe and Hawisher, has a profound influence on the development of learners as literate individuals.

Before I return to the discussion of gaming as literacy, I would like to review briefly the concept behind much theoretical work that focuses on the procedural structures of games: gaming as *action*. This theory is perhaps best developed by Alexander Galloway (2006), who builds on Manovich’s (2001) claim that in order to play, a player must execute an algorithm. Galloway separates gameplay from purely literate activity by stressing actions that are not tied to visual stimuli and by proposing “grammars of action” and physical vocabularies that the idea of literacy may be unable to encapsulate effectively. I present this action-based approach so that it can stand as an alternate possibility as we consider gaming literacy. It should be clear to us that gaming can play many roles and take on many forms in learning processes, in and outside of the college classroom.

We do not need to choose between Gee’s very direct, italicized claim that “gaming is *literacy*” and Galloway’s very direct, also italicized claim that “*video games are actions.*” Both can be simultaneously, alternately, supplementarily, or conditionally true in relation to the shifting situation of our gameplay. Instead, I would like to ask, “How might it be useful to consider gaming as literacy?” I will return later to address how this question applies to gaming as action. Gee’s conception of literacy is not an inactive one; he sees literate behaviors as constitutive of identity, which is in turn an aid to learning. Gee is, by self-admission, not a digital native, and his approach to games and gaming is clearly an operation

of reinscription. He maps what he has previously argued about literacy onto what he later discovered about gaming. In line with this approach, he structures his book on games and literacy as a guided catalogue of thirty-six ways that games positively encourage or influence learning, and particularly literacy education.

Gee's study relies upon the idea of a "good video game" that has built good learning principles into its design, which according to Gee, is something all good games do. It may be more accurate to describe these games as functional or complete games, rather than "good" games -- Gee leaves this definition somewhat open. A highly valuable piece of Gee's argument is his willingness to apply some of these claims not only to games themselves, but also to "gamelike technologies." This category will be vital to my own argument and will be discussed later in this chapter as I review the conversation surrounding what qualifies as a game and how far this label can be applied before it loses the effectiveness of its specificity. Gee argues that both good games and gamelike technologies encourage young people to learn in "deep ways." His sense of learning depth implies that students who learn through gaming are more likely to understand concepts in specific contexts and to remember them for a significant amount of time. It would be far beyond my scope to look at all thirty-six of Gee's recommendations and assertions; however, I would like to investigate a few of the claims that will most closely relate to how gaming can improve medical writing.

First, Gee explains that gaming can make student-players into partners rather than passive listeners in the classroom. This approach seems to answer the Freirian anxiety about situating students as receptacles for knowledge bestowed by an all-knowing and incontestable instructor.² Contestation, and testing more generally, is a central performance

² See Paolo Freire's 1970 discussion of active and passive learning in *Pedagogy of the Oppressed*.

in the process of play. Learning through repetition is, according to Gee, also transformed by play insofar as repeated attempts and practice are more natural to play than to study. By presenting a challenging obstacle, games encourage experimental trials. They do not require repetitive study for the sake of memorization alone, but for immediate application. This trial and error procedure closely echoes the scientific method that shapes medical theory, classroom activity, and the writing that represents medical study or actions. It is easier to ask students to assume the identity of a scientist as they enact the ethos of a scientist by performing this methodology. Gee contends that one of the strengths of game-based learning is the opportunities it presents for identity play and trial. The extent to which a game, even a highly realistic and immersive video game, simulates authentic identity formation is a highly contested concept. Sherry Turkle (1995) is one of the most iconic supporters of the productive possibilities for identity play, and Lisa Nakamura (2002) is one of its most deft and nuanced critics. Gee does not make concrete claims about how closely simulated experience corresponds to the experience of an actor in the assumed role, but he hopes that identity play will add meaning to the genres, audiences, and contexts addressed by a composition or assignment.

The communal nature of knowledge acquisition and production is incorporated into much of Gee's argument for the value of gaming as a learning tool. One of his best known ideas is that of the "affinity group," suggested in place of the more popular "discourse community" model used in many composition pedagogies.³ Affinity groups are communities that organize themselves around shared interests and concerns rather than features of identity,

³ Discourse communities have been studied as sites of language formation since the term was coined by Martin Nystrand in 1982 and elaborated by John Swales in 1990. In the field of Rhetoric and Composition, discourse communities are of particular interest to genre theorists who, following Perelman, examine how language gains meaning through community use and context.

profession, or discursive constraints. I am hesitant to sweep aside the organizing power of identity in group formation, but I believe that the affinity group is a useful concept for understanding how communities form in digital environments. In the affinity group, knowledge is both shared and distributed: All members share some core knowledge(s) that define their ability to participate and interact, but other types or areas of knowledge are distributed throughout the group, residing only in certain members. Even if a member is not knowledgeable in a given area, they still have access to that information as a result of distributed cognition within the group. I see this structure reflected in such situations as the communal composition of a *Wikipedia* article written by experts in various subtopics, in the structure of a fantasy role playing game where some members know how to heal and some how to fight with swords, and in any medical lab team where some members are knowledgeable about pharmacology, some about anatomy, and some about how to communicate the two to an outside audience. Learning is best done in affinity groups that resemble how people work together in “real” and digital worlds. Much traditional schooling, as can be demonstrated by such documents as the Common Core Standards, stresses individual mastery *and performance*. Students need to become adept at communal performance that incorporates different depths of knowledge among members bound by a shared interest.

Practice working in affinity groups is supported by game-based learning in Gee’s study because games allow players to experiment under conditions of low-risk participation, distributed problem-solving, social interactivity, embodied experience, and contextual applications. Gee believes that knowledge acquired in this way will be highly transferrable and that academic study will be more compelling because the introduction of challenges will

keep students working at the edge of their skill level. Of course, the potential of these methods will always rely heavily on the skill and experience of the instructor, even if they remain in the position of a de-centered learning guide. Calls to use gaming as a literacy tool have been taken up by several scholars following Gee, notably including Alberti's 2008 support of dialogic, interactive, and process-based problem solving, and Colby and Colby's (2008) focus on emergent composition. In each case, we assume that certain features are inherent in digital games and will offer given opportunities and encourage certain behaviors among players. These claims stumble somewhat on the gray area of what is a "good game," a definition that will often be left up to the instructor rather than being as certain as we might like to envision. Are all games really interactive? How dialogic is the gaming process? If composition responds to an emergent exigency, will the resulting rhetorical situation be more authentic or compelling to the student writers? Each of these concerns is addressed in ongoing debates within gaming and education studies.

I would like to expand the concept of gaming beyond literacy, without necessarily disincluding it. Consider Johnson-Eilola and Wysocki's claim (discussed above) that literacy comes with a "bundle of stories" closely associated with linear-alphabetic experience that we may or may not want to take with us and attach to the meanings of new technologies (1999). Is literacy still a useful concept? In rhetorical communication, I find usefulness to be a more important determinant of value than truth or definitional correlation. Insofar as gaming teaches players to navigate certain usages of language and to produce compositions that effectively address emergent audiences, the metaphor of literacy has many relevant applications. When we apply gaming theory to medical communication, we will see that literacy, in terms of the ability to associate symbols with valuable meaning, is a key problem

for audience outreach. The ways in which gaming theory might encourage improved distribution of medical information will be a central concern in later chapters. I would also like to improve our understanding of gaming as a learning experience or tool by looking at gameplay as action, a theory that often includes literacy as a subtype of activity.

Gaming is more than a performance of digital literacy. Games are not texts, and certainly not only texts. They are written in computing code, which is never designed to sit still or to be reserved for human contemplation. Code is an active language; each character, line, or segment corresponds to an operation to be executed by a machine. When we play a game, we rarely read the code itself (with the notable exception of game-modification composition). In their study on game cycles, Arsenault and Perron (2007) contest Manovich's often-cited portrayal of gaming as interaction with programmed algorithms (2001). It is the machine, not the player, who reads and performs these functions. We do not interact directly with the text; gaming is a very specific type of action that cannot be reduced to a pre-existing literacy. The actions of the gamer may themselves construct an algorithm as a result of their interaction with the computational outputs of the code, but "the [player's] mental model will never represent gameplay as a computer set of instructions or calculated formulae." Arsenault and Perron's claim draws on the related argument posed by prominent game designer and theorist Jesper Juul, that "gameplay is not the rules themselves . . . but the way the game is actually played" (2005). In Juul's description, gameplay is a combined consequence of programmed algorithm and player response. I describe this dynamic in order to emphasize the specificity of the action of gameplay as distinct from an act of reading. Seeing gaming as *action* opens up more possibilities for its application to education and intervention in communication domains.

What type of action is involved in gameplay? One of the most publicized early debates in game studies was the proposed divide between how games convey meaning or tell stories and how games perform or enable play. This dichotomy is often framed as an opposition between narratology and ludology, which is the study of play as a unique procedural experience. It is important to note that this divide was popularized in 1999 by Jesper Juul who later retracted the theory as overly simplistic. Narrative and play are both actions performed or made possible by video games. Storytelling is an activity that is most familiar in gaming studies from Janet Murray's book *Hamlet on the Holodeck* (1997), which explores how computers reshape narrative through interaction and digital landscapes. The non-narrative actions of gameplay take many forms, which may or may not be related to the story created by a given game's corresponding fictional world. Galloway's claim that videogames are actions, referenced above, is predicated on the idea of a larger algorithmic culture in which games exist. He asserts that "in video games the action of the machine is just as important as the action of the operator" because neither would exist or persist without the other (2006). The pervasiveness of algorithmic culture makes this claim all the more relevant because it can be applied to a number of systems with which we routinely interact. Before we consider the behavior of gamelike systems, we should consider the ways that games can guide and provoke actions.

Another frequently commented upon tension in gaming studies is the extent to which a game can be considered *interactive*. Many game scholars who began their careers in other fields and transferred their expertise to gaming have explored and praised the ways that a game promotes learning through interaction between games and players (Murray, 1997; Gee, 2007; Mäyrä, 2008). At present, the conversation seems to be split between scholars who feel

we have long passed over this crisis point and its significance to the field and a much larger body of writers who continue to address the importance of interactivity. An effective clarification of why this concept is inadequate or over simplified appears in Arsenault and Perron's investigation of gaming cycles and their relationship to computing algorithms (2008). While the player does not read the code itself or execute its demands, she does respond to the functions it produces. However, the computer's response is a pre-programmed routine that does not directly interact with any given player. The game cannot depart from the possibilities originally written into its files. Therefore, Arsenault and Perron suggest an alternate model of "inter(re)activity" wherein the player reacts to the preprogrammed code, the game selects the appropriate response from its executable files in response, to which the player reacts once again, leading to another algorithmically determined response, and so forth. This schema is tempered somewhat by games that allow players to shape responses to one another based upon a set of rules upheld by the computer, but Arsenault and Perron make a strong argument for taking caution before making an assumption based on the possibility of true interactivity with a machine.

Any discussion of interactivity or "inter(re)activity" during gameplay rests upon an understanding of what Galloway calls "gamic action" (2006). According to this theory, games exist when enacted, but can be enacted in at least four distinct ways, although Galloway does acknowledge several points of overlap and generalization that could allow later expansion.⁴ Galloway places gamic action along the axes of operator based or machinic, and diegetic or nondiegetic (part of the game's fictional world, or clearly outside of the

⁴While explanatory diagrams and figures are immensely popular in game studies, I prefer to use diagrammatic portrayals of game operation as open suggestions rather than demonstrations of a closed set of possible organizations, because many of these outlines may be more restrictive than productive and are more open to interpretation than the firmly drawn figures would imply.

story). These boundaries can help us see the ways that player and computer may interact or inter(re)act with the total system of a gameplay without moving any part of the experience outside the game itself. Games tell stories, players respond to stories, games perform machinic functions, and players respond to the interface representation of the computing core. Action along these axes may be relevant to a number of gamic or gamelike systems. For example, a social media program such as Facebook constructs itself as a networking tool, I respond to the narrated purpose of the technology by using it to connect with others, the program executes commands enabling my input to be interpreted, and I continue to create input influenced by the interface offered to me. How far I can take this comparison depends on how restrictively I define the concept of “game,” and its usefulness hinges upon how I understand the role of the interface through which I respond to the game.

Game studies, including design, theory, narratology and procedurality, is highly conscious of its newness as a discipline. Most works in gaming studies are prefaced by an attempt to define what the author means by “game.” This is not a token move: The significance of each study depends heavily upon which constellation of gamic features it targets. The earliest definition of gaming that has become part of the emergent game studies canon is Huizinga’s 1938 formulation of play. This complex explanation may appear overly restrictive in today’s context; Huizinga specifies that play must occur entirely outside ordinary life, existing within its own “magic circle” of discrete reality, it must not be serious, it cannot be connected with material gain or profit, it must absorb the attention of the player, promote the formation of social groups, and rely upon fixed and binding rules. We are now more likely to include activities of profit and material interest in our definition of games, to see the possibility for very serious games closely connected to exterior realities, and to

understand the importance of the roles of cheating, hacking, and modification of rules as gaming practices. As Mia Consalvo explains, “the magic circle has long been breached” (2009). But we can’t open the floodgates and allow anything and everything to be a game without losing the specificity of our field of study. Even if we look at a traditionally non-game phenomenon “as a game,” we are comparing or mapping its features onto some shared notion of game. At this moment in game studies, how much of our definition is shared and understood?

An honest, though rather unsatisfying, answer is, “it’s evolving.” By and large, gaming models gradually become less restrictive in terms of content and location, and more finely tuned in terms of structure and execution. In 2005, Juul made a heroic effort to compile some of the most widely recognized definitions of games into a simple table. His work demonstrates the dramatic changes the process of definition has undergone between Huizinga’s 1938 “magic circle” that exists outside of real world concerns, to Salen and Zimmerman’s popular 2003 definition that “a game is a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome.” With each definition presented, Juul shows the tension between the desire to define games more exactly and narrowly and the desire to focus on the systems undergirding the gameric activity. I believe that Salen and Zimmerman’s opening words, “a game is a system,” pinpoint exactly where the greatest usefulness of gaming theory lies. We live in a world of systems, whether we’re navigating the economy, pre-med coursework, social media, or instructions at the DMV. The scale of quantifiability represents a key development in the networked infrastructure of digital life. Salen and Zimmerman’s extraordinarily thorough textbook, *Rules of Play* (2003), makes clear that the “artificial conflict” referred to in their definition does not apply solely to

violence or competition, though it may apply to either. As a result, I argue that not everything can be looked at as a game, but many systems may be explored gamefully.

Consider the popular social networking site Twitter. Twitter is a complex system driven by commercial interests and sponsors, an extensive terms-of-service agreement, data mining programs, and proprietary sorting algorithms. The level of human interaction layered over this technological and procedural infrastructure introduces the element of conflict: Who can be the most popular? Or in a less visible but more technologically powerful contest, who can be algorithmically ranked as the “most influential” such that the site gives more screen time to their words? The outcome is unquestionably quantifiable. The greatest uncertainty we encounter if we try to look at Twitter gamefully is whether or not the conflict is artificial. While some aspects of the popularity contests ubiquitous to the ecosystem of social networks may arise from “natural” competition, the terms of this conflict, “who can get the most followers,” are certainly constructed and gain meaning within a contingent set of social and technological circumstances. I would argue that, like most social media platforms, Twitter is a game. It is more important, however, to recognize that gaming theory can be usefully applied to Twitter as a gameful system.

Applying gaming theory and terminology to other gameful systems is a growing area of interest within game studies. Many scholars, including Hunter (2011), McGonigal (2011), Alberti (2013), and Colby, Colby and Johnson (2013) indicate fruitful possibilities for expanding our notion of what games are and how gameful relations work. However, tension remains within the field regarding how games and gaming are defined and applied. Alberti (2013), basing his approach on Alice Robison’s 2008 definition of a game as designed, interactive, rule-based, achievement-bound, and inspiring of literate practices, concedes that

“the question of whether Facebook is a game or not seems more a matter of interpretive ingenuity than scientific certainty.” Perron and Wolf suggest in their 2008 *Video Game Theory Reader 2* that “The definition of [game studies’] object and the vindication of its examination are certainly representative of the first phase in defining the new field of research.” They explain that we have now entered a second phase in game studies wherein the foundations of the field and its value have been laid and the new task before us is to “attempt to articulate its exact nature and scope, codify its tools and terminology, and organize its findings into a coherent discipline.” As of early 2015, I believe it is clear that the nature and scope of game studies is not being pinned down more narrowly, but opened to broader application across more diverse fields and settings. The “codification of terminology” may in fact become the creation of a more flexible vocabulary that shows the relation of gamefulness to technological systems and social networks. The complexity of creating any one stable vocabulary is so widely discussed that in 2013, Zach Waggoner produced an edited collection called *Terms of Play: Essays on Words that Matter in Videogame Theory* devoted to exploring the diversity of terms and expressions used in the field. Some essays attempt to solidify concepts (what is ergodic?) and others throw concepts further open (such as Holmes’ discussion of “algorithms”). While Perron and Wolf call for “consistency and accuracy” in order to increase trust and coherence, this does not imply locking down the edges of the field or narrowing our research to pre-designated corridors of investigation. Like gamers, researchers in game studies push boundaries, test limits, and actively seek out new ways of playing the game before them. And this is a very good thing.

Gaming as System Building

The trajectory of game studies toward more diversified applications in multiple contexts is not a new development. Game studies has a long theoretical history and is closely related to the evolution of other network theories.

Gaming theory in its current set of instantiations and in its relation to mathematical game theory has close ties to the larger field of *systems theory*. The emergence of systems theory was one of the foundations of interdisciplinarity as a rising concern and goal in American universities. The formal investigation of “general systems theory” emerged in the work of Ludvig von Bertalanffy in 1969 and gained popularity alongside Foucault (1969), Burke (1969), and Perelman’s (1969) rhetorically important works on disciplinary knowledge. Bertalanffy frequently emphasizes that the multiple points of emergence for similar theories from different disciplines within the same time frame demonstrates a massive cross-disciplinary paradigm shift in thought (1969). He pinpoints this shift as the conflict between an “analytic, mechanistic, one-way causal paradigm of classical science” and a new worldview that considers all fields as members of *open* systems. Within a closed system, the elements under investigation are isolated from their environment, such that they can only influence and be influenced by other elements within the system. In contrast, elements in an open system exchange matter with their environment such that various effects under investigation may be caused by outside and seemingly unrelated elements. Bertalanffy explains that systems are “conceptual constructs” and are governed by a set of rules that can be studied in terms of systems themselves, rather than as elements of those systems. If we can study the behavior of a system as a system, Bertalanffy concludes, the time has come to recognize systems theory. He characterizes game theory as *a* system theory that is “the

offspring of specific and concrete problems in technology, but models, conceptualization and principles. . . by far transcend specialist boundaries, are of an interdisciplinary nature, and were found to be independent of their special realizations.” We can derive from this work the existence of a systems-based *literacy* that is reflected in successful gameplay, even if the game itself is also situated in a more specific context. The idea of events occurring in an open system as the results of multiple and complex outside influences is so normalized in contemporary culture that it is often uncritically taken for granted. Digital systems involve a multitude of actors and influences that require careful attention in terms of how they operate as a system, or as a game. Gaming theory is a flexible and accessible way to approach this complex network that reaches into so many areas of daily life.

As discussed above, much work in game studies focuses on the growing need to approach new media from systems-based perspectives. Zimmerman stresses the importance of systems literacy as a necessity for effective communication (2008), Gee points out the importance of relying on distributed knowledge in learning systems (2007), and McGonigal argues for the recognition of how gameful systems have empowered the population to accomplish both technological and social achievements (2011). We are natively networked in daily life without conscious effort. Gaming provides an ideal model for understanding how systems are integrated into one another such that they overlap, interact, inter(re)act, and produce new wholes without losing their specificity. Systems embed into one another. Salen and Zimmerman (2003) affirm that in addition to being systems themselves, a game is also “a system of interaction between the players and the game,” as well as being a system of interaction between the game and the larger culture in which the game is situated. We can

approach this embedding hierarchically, or assign equal value to each set of relations, depending on our motives.

Digital systems and practices of gaming that are increasingly focused on online play are often examined in terms of connections or connectedness. Connections between public and private information, places of play and work, and beliefs based in science and religion are important relationships that receive frequent study. Connections between system nodes, practices, and people are as significant to gaming theory as are the nodes themselves. In 2013, Jose van Dijck synthesized a number of approaches to actor network theory and political economics in order to examine a value she calls *connectivity*. Connectivity is the commodifiable counterpart to human connectedness that can be quantified, processed, and acted on by protocols and algorithms in social media. Her analysis examines social media microsystems in terms of their users, content, governance, ownership, and business models to show the ways in which networked and commodified society has become normalized in digital culture. She does not condemn or valorize this process, but makes a brilliant argument for the importance of studying and recognizing what I would call the players in a gameful system of social networking. The struggle for increased connectivity, whether by individuals seeking to become more socially influential, or by corporations seeking to control greater shares of user traffic overlays exceptionally well onto Salen and Zimmerman's definition of a game as a system including an artificial conflict with a quantifiable outcome (2003).

Van Dijck's attention to the process of normalization takes us back to our discussion of how neurological development adjusts to different environments of learning (Wolf, 2008). Just as the wiring of a brain that learned language through interactive gaming varies from one that learned to read from printed books, so our mental wiring changes to reflect the influence

of networked learning environments (Carr, 2011). Our daily experiences are saturated in the norms and values of connectivity, and the people with whom we interact -- students, patients, colleagues -- respond within a system conditioned by connectivity. Connectivity, as it is propagated and disseminated digitally, is driven by non-human actors in the form of protocols and algorithms that guide human behavior after being set in motion. These equations do not typically appear in the visible interface through which we participate in the network, and so are frequently overlooked or remain entirely outside of general public awareness. Gaming theory can help us investigate how these actors design and project different environments just as the graphics of a game appear as an immersive world, scaffolded upon numerical strings in a database. Gaming theory natively foregrounds the persuasive acts of mechanical computation and how it creates or limits possibilities for human communication.

Play within Systems

If games and gaming theory were limited to addressing mechanical persuasion and the outputs of non-human actors, their usefulness in learning practice would be severely limited. However, games, like the network protocols of social media, provide a structure within which communication and relation can arise. Zimmerman (2013) contends that “play” is what occurs within and because of designed rules. This guideline for game design highlights the relation between technological structures and human activity, bearing in mind that all structures and rules have authors with their own motives and interests. Some of the most persuasive artifacts of code were fashioned by human work and set in motion like the watchmaker analogy: blog templates, editing bots on Wiki, cookies stored in your browser

cache. Some constructs undergo frequent and responsive revision: Google's proprietary search algorithms, Apple's autocorrect engine, the ranking of your interests on Facebook. Some rules stand like concrete walls that shape the hallways we cross between classes. I can't decide that I will get to the computer lab more quickly if I walk straight through the classrooms between my office and my destination, because I can't pass through cinder blocks. However, this doesn't mean that I can't decide whether or not I'm going to walk to the lab at all, if I'm going to stop to talk to colleagues on the way, whether or not I refill my coffee cup enroute, or if I skip and sing as I round the corner. The structure of the system that is the brick and mortar of the English department building shapes but doesn't define my participation in the space it creates. Without the structure, there would be no office, no hallway, and no lab. My right-angle turn would be unnecessary, and the lab computers would get quite damp out on the lawn. The structure allows activity to exist and enables it to take on meaning. Without a corner to round, my right angle turn might represent a very different state of mind or intention. I can play with the system or my experience of it because rules exist.

In the case of an online network mediated by algorithms, protocols, and interface modules, the structure enables and shapes communication rather than footsteps. Before providing an empty text box in which users could describe their status, Facebook used to preformat status entries to begin "Emi is. . . which influenced what I could and could not say. I needed to describe some action or state of being, e.g., "Emi is writing." I could still share something unrelated to my activity, but the format would be awkward: "Emi is why is there a turtle on my desk?" The interface changed when enough people broke the syntax, but this action was the result of a set of influences and inputs throughout a system rather than any one

cause and effect. Mapped to the structure of a classic rhetorical triangle, the situation appears less complex than it is: *I speak to my Facebook contact list about a turtle.* However, if you run a Google Image Search for “rhetorical triangle,” you will see that there is immense variation concerning which points of the triangle earn which names, what words are overwritten across which peaks, and which lines are given arrows and new designations. Bitzer’s “Rhetorical Situation” has been similarly dissected and reassembled over the past 40 years as “audience, constraints, and exigence” fail to meet the needs of different audiences and scholars including Vatz, Edbauer, Garret and Xiao, Consigny, Brinton, Biesecker, Jamieson, Hunsaker and Smith, etc., have added ecologies, cultural traditions, rhetoric itself, fact, topics, relationships, identity, etc. We can’t simply draw a triangle, and we can’t limit all the terms of a situation. Since systemic literacy is interdisciplinary, we can illustrate the problem using the scientific method: It is impossible to prove a statement unless we have eliminated all other possible answers. To say that any object is X, and definitely only X, we have to rule out everything else it might have been. We are faced with the conjunction of rigorous methods and unanswerable questions.

We’re left with a giant cloud of ideas and things, inputs, actions, and turtles that we need a means of navigating. Like the scientific method, gaming theory is able to be at once rigorous and open, defining and problem solving without providing absolute limits. Bogost asserts, “Because games are systems, they offer a fundamentally different way of characterizing ideas. They can inspire a different kind of deliberation than we find in other forms of media, one that considers the uncertainty of complex systems instead of embracing simple answers” (cited in Selfe and Hawisher, 2013). We must recognize structures and rules, some naturally occurring, some constructed, some automated, and some always in flux,

and focus on how activity occurs within these rules and systems. For McGonigal (2011) these gameful structures “create ways for us to work together at extreme scales to solve real-world problems,” thereby optimizing human experience and creating meaningful engagement. The structure is what fosters a positive productive force. Structures that allow media systems to produce new affordances for “large scale collaborations” distributed across a network are also emphasized by Rik Hunter (2011). Hunter shows that social media systems (wikis in his example) lead to a new transition in literacy wherein the role of the reader-writer relationship collapses under new rules for participation. Not only are we participating in different ways, but different actors are participating as the result of changing systemic literate activity.

Annette Vee (2014) reminds us that “computational procedures are persuasive and expressive” and possess rhetorical dimensions that require new tools to study. Vee, in her collaboration with Jim Brown (2014) suggests that we need to consider the “algorithmic possibilities of language production and persuasion.” Whether within a system specifically designated as a game, or a within a structured communication network that creates space for play within its rules, we encounter the persuasive power of computation. Bogost’s influential work on procedural rhetoric asks us to focus on how games make arguments by representing “how real and imagined system work” and inviting interaction (2007). Games and other computational media persuade by “running processes and executing rule-based symbolic manipulation” which renders those activities inherently rhetorical. The player or user does not only respond to the appearance or sensation of a digital construct, but is influenced and lead through different experiences based upon their interaction with what Bogost calls the mechanics of the computation. Meaning is likewise created through computational modeling, rendering, and rules.

A Narrative Tour of a Knowledge System

Before introducing the complex configurations of medical rhetorics, I'd like to clarify this link between systems-based thinking and computational persuasion with a simple narrative example of situated action.

Imagine that I want to plant a garden. I live in Chapel Hill, North Carolina, which according to the National Gardening Association, is located in growing zone 7b. I found this out by Googling it. I have a few books on gardening, but I'm in the office and they're at home, and I, conditioned by a culture based on immediate delivery, want faster results than jogging home to get a book could provide. The answers are right here under my fingertips, courtesy of my overheating laptop and a Google search parsed and displayed through Google's Chrome browser. Another Google Search informs me that there is a very wide variety of garden plants popular in my area, that Southern States Garden Center down the street has many for sale, that the North Carolina Botanical Garden across the highway gives seminars on gardening, and that I might want to buy some lovely handcrafted garden decor from Etsy.com. I have encountered the effects of a search algorithm (Van Djick, 2013). The recommendations for Southern States and the Botanical Gardens are based primarily on my physical location, and would not appear if I were entering the same search terms in Forth Worth, TX, which is also in Hardiness Zone 7b. The Etsy result for daisy print stepping stones is based on my personal search history. Google's algorithm takes into account the fact that I have made a number of purchases on Etsy in the past and knows that I am likely to do so in the future. Both of these sorting parameters increase the relevance ranking of their results (John Jones, 2011; Google Press Center, 2012). Near the top of the page are links to the *Old Farmer's Almanac*, the USDA Hardiness Zones chart, and a site called "garden.org."

These are non-personalized search results that are presented based upon their population-wide relevance rankings. Internet users from many areas and demographics searching for similar terms have frequently clicked these links in the past. This much I can be fairly confident of in my analysis, but because Google's search algorithms are proprietary and kept secret (Dalby, 2009; Google Press Center, 2012), I can't discover all the details of why this set of information is presented to me when I ask about "gardening in zone 7b."

"Google it" is a common imperative in daily life, and we don't stop to question the interestedness or transparency of the procedure nearly often enough. I am not receiving a neutrally sorted set of information when I enter a query. I'm not turning to a static page in a dictionary. The knowledge that I create, act on, and potentially pass on to others is shaped by automated procedures that persuade me to action based on the results that the code determines are most relevant. The knowledge set with which I'm provided represents an assortment of commercial interests, relevance rankings, geographical tagging data, and stored preferences from prior activity (Van Dijck, 2012). My previous choices, as stored in my browser profile, are computed into the equation that will shape my future choices. The algorithm itself participates in my synthesis of communication into action by the weights it gives to various data and the pathways and results it constructs (Bogost, 2007).

Viewers literate in the principles of video game design will be highly familiar with this concept. Action in a game is not only about what you want to do, but how you can make the system give you the best possible outcome (Juul, 2005). In an adventure game, I might crouch before jumping only because I know that the game algorithm will determine a farther travel distance if I do so. In a strategy game, I might build more brick factories simply because I have discovered that a game algorithm will resultantly speed up the production of

other resources as well. I take for granted that there is a manipulable and programmable system that processes my actions, sometimes in unexpectedly arbitrary ways, and assigns weights and consequences that will influence future actions: how far I can jump, how many bricks I produce, what information I will receive about gardening in zone 7b. I can pick and choose among the information and results I receive and play with my choices, but the rule-based computations have provided the structure within which I make these choices (Zimmerman, 2013).

My choices about garden plants are not determined only by the information algorithmically provided to me by my search. First, I brought a lot of prior knowledge to this situation because my mother was an avid gardener and I grew up learning about garden plants. Second, not all of the plants listed in my search will be available locally or at reasonable expense, so I can't act on all of my results. If I do plant my garden, I will discover that certain plants fall over and die for no apparent reason, and I will have to take further action to create better knowledge about how to prevent this in future attempts (similar to Gee's 2007 discussion of the game skill "iterative experiential learning"). Online sources for help on why gardens fail will inform me of the importance of calculating shade, soil type, and moisture levels. In this case, my yard is composed of thick red clay, so I have a valuable hint regarding what might be wrong. When I start adding "clay soil" to my Google search for zone 7 plants, I start getting a great deal of contradictory and confusing information, so in this situation, I'm going to try to ask actual gardeners for advice via social media.

What does participation in social media do to the *process of knowledge creation*? I am now encountering not only automated computations and procedures, but also communication from other human actors, as mediated by these computations and procedures

(Bogost, 2007). I have now joined a Facebook Group called “North Carolina Gardeners.” I need to recognize from the beginning of my interaction with this group that the other members have been persuaded to join via a number of influences, motives, and procedures. Some may be long time experts who enjoy discussing gardens and searched for the group. Some may have had the group recommended by a search or marketing algorithm based on previous clicks and PageRanks. Some may, like me, be after answers to a specific question that an initial search failed to answer satisfactorily. All of the members are affluent enough to have access to a computer and a reasonably decent Internet connection, possess some basic literacy in new media communication, and most have the leisure time to garden and the physical space in which to do it (Alberti, 2013).

I introduce myself to the group and tell them that I’m trying to find hardy flowering garden plants that I can grow in a shady, clay-rich soil. The answers address a wide variety of relevant and somewhat less than relevant issues. Many members recommend day lilies and asters. Some people offer tips for using compost to improve the soil conditions. All is going well until someone recommends that I try to plant pampas grass. Pampas grass is a tall ornamental plant native to various parts of South America and very well known for its rapid spread and invasive nature, often wreaking havoc on local prairie ecosystems. An uproar commences. The person who made the recommendation is an ogre, and I will destroy the prairies of America if I act on this advice. (It doesn’t seem to matter that I don’t live anywhere near any native prairies.) This information is branded as bad knowledge. Sources are flung, theories about natural selection are put forth, anecdotes are delivered, grammar is insulted, accusations are made regarding the identity traits of “self-respecting gardeners,” and users are banned.

I did not encounter an angry mob of purely personal opinions nor a free utopian Internet democracy of ideas. The writers who provided sources also retrieved them through Google's heavily mediated searches (Van Dijck, 2013). The combination of voices representing various predispositions toward invasive species were collected into this community by mediated pathways, and fostered or rejected by morals advocated by the group identity (see Gee, 2007 on the gaming principle of distributed knowledge in affinity groups). The ability to remove dissenting group members was provided by the Facebook interface. The consensus was carefully curated by a set of group protocols and accepted methods for conducting and linking resources. The eventual agreement that ironweed is a better ornamental grass option was achieved through more mediated searches, image comparisons, Wiki articles, and textual turn-based argument filtered through a Facebook interface that cannot represent overlapping voices (Selfe and Selfe, 1994). Unfortunately, I never wanted a tall ornamental grass in my small backyard garden, so the entire debate ended up being a rhetorical exercise in who can find what information, how information is sanctioned, who has the power to sanction it, and how those sanctions are enforced. What risks would I run if I took this advice at face value, and what effect would it have on my actions and any resultant *reactions* to my choices?

This example is fairly low stakes. If I accept the community consensus and fill my backyard with ironweed, I'll just have an odd-looking yard. When we move on to medical rhetoric, the stakes rise exponentially. How is knowledge created, mediated, and disseminated when lives are on the line? What are the ethics for publicizing and training students in these procedures? If it turns out that the same routes that led me to choose garden plants influence the way I choose medication for high blood pressure, it's easy to see why we

need to examine the operations of the system *as* a system, including both its human and nonhuman actors. We need to examine the points of input and output that motivate the results (Zimmerman, 2013). We need to learn to interact with the modes of persuasion used by computational procedures to understand how they guide patients and future-patients to take meaningful action (Galloway, 2006). In short, we need to become systems literate. Gaming theory is a timely and highly effective method for understanding how systems operate, how communication is driven by rules, and how we can productively act and play within those rules to create space for agency and change.

CHAPTER TWO: HOW GAMING THEORY OPERATES IN MEDICAL COMMUNICATION SYSTEMS

Patients seek and obtain health information in differently networked and mobilized ways than they did prior to widespread Internet connectivity. As a result, American health care providers have radically adapted their approaches to patient education. The appearance of social media profoundly changed how health information circulates and how it is acted upon. Our medical communication processes need to change in response to these new players in the system or we run the risk that poor health information coupled with low levels of health literacy may result in threats to public health and medical compliance. Gaming theory can help us understand why people are acting on weak data and incomplete information and address the correct and respectful actions to take in response.

Medical writing must address a complex network of motivations and audiences mediated by computers and supportive of networked, multivocal conversation. The concept of the “rhetoric of medicine” addresses the ways in which medical discourse creates supposedly objective knowledge through persuasion. It is now widely accepted that neutral scientific truth is inaccessible, and that the conventions and language specific to the community and practice of health care often assert the truth value of claims by using techniques of influence that reinforce the authority of the field (Kuhn, 1962; Perelman and Olbrechts-Tyteca, 1969; Segal, 2005). In light of this shift in standards of proof, the models that we are using to teach and understand medical writing are out of date and reflect a

professional situation that has undergone significant discursive revision over the past decade. *I claim that scientific persuasion occurs through a series of rule-based procedures within networks.* Gaming theory can help us both understand and teach medical writers to navigate this technology-rich ecology. Applications of gaming theory illustrate how medical composition discourse legitimizes power structures, creates (both human and digital) actors and infrastructures, and determines truth values. This approach can also help us convey a more up-to-date understanding of the rhetorical actions in medical writing by offering new ways of analyzing and teaching writing through a procedural lens.

The applications of networked medical communication do not appear quite so technical in every context. Health care and medicine impact the daily lives of nearly all Americans. Each time I open a conversation about the medical voice or the rhetorical situation of health care, I am presented with personal stories, concerns, and experiences. During the month of October 2013, for example, we saw the enormous power of technological communication in health and medicine demonstrated by the failure of the new *healthcare.gov* website to meet the needs of the public, causing much of this public to be persuaded to a different opinion of the health care infrastructure (Horsley, 2013).

The near universal importance and immense power of the institution of health care make medical discourse an excellent case study to provide a deeper understanding of rhetoric-in-action for instructors and students. Studying medical communication rhetorically offers a contextual demonstration of persuasion, motives, situation, audience, *kairos*, and constraints. Bennet and Johnson's work on "Theory Building in Health and Medicine" (2014) demonstrates the importance of conducting careful and up to date rhetorical study of "high-stakes discourse and practice." They claim that "Because health care practices are

studied and understood quite differently by their various stakeholders, they provide rhetoricians with a fruitful ground for comparing theory-building methodologies and identifying potential applications and benefits of emergent concepts.” Building gaming theory into the current study of health care rhetoric will benefit the larger field of medical communication studies. The actions and players in this field (and I call them “players” very intentionally here) allow us to see the continued importance of rhetorical theory clearly illustrated in ongoing, active practice. Neither rhetoric nor the algorithmic base of proceduralism can be understood without the other. We face an amalgamation of rule-driven situations that persuade by numerical result and quantify even our most superficial chatter. We are trained to recognize the power of the equation as *a priori* truth without an understanding of its contingency on argument. It would be more productive to recognize the places where the system invites us to play with its terms and conclusions.

Medical writing operates on a different set of processes and qualifications than much scholarly writing: it is deeply communal and collaborative at all steps of composition from posing research questions to conducting research to setting results into text to disseminating those results. Medical compositions rarely have a single author. When the voice of a study in any field changes from “I” to “we,” the sense of responsibility, accountability and community must be reevaluated. In medicine, a potent shift occurred when the authorial voice in formal studies moved from a neutral passive “it has been shown that” to an active first person “we show that.” By clearly outlining source and accountability, the structure behind the production of medical knowledge becomes more clear and the system easier to examine. The importance of this shift is illustrated by Gabriella Rundbald who argues that the use of passive voice and metonymy in medical discourse distances source representation,

hiding the authors by rendering them faceless and genderless and making these authors stand simply for their membership or affiliation with larger bodies (2007). The growing use of active, personal pronouns into mainstream medical discourse makes the voice of the field less uniform and highlights differences in approach and opinion. This opens spaces for empathy and narrative, but may hinder institutional cohesion and mechanics of trust building. Both of these tensions will be primary concerns in the movement of medical information-making and practice toward social and networked media.

Implementation of gaming theory into medical writing studies addresses several issues of identity, process, and production. The principles of game-based learning allow us to provide contextual structure for study that more closely matches the communal and contextual applications medical writers routinely encounter. Gee's model of engaged, active, and embodied learning is well suited to handle the complex and challenging realm of increasingly public and democratized medical communication. Health care providers must be appropriately trained to approach the challenge of operating within health care systems that are now ranked by clarity of communication, patients' understanding of their physicians' choice of words, and the tone and voice used in physicians' bedside manner. Many medical programs already use video gaming to train students in technical and medical procedures (e.g., Stanford Health Care, Cleveland Clinic, Mayo Clinic). We can likewise benefit our students by applying gaming theory to a field that is increasingly recognized, largely thanks to the work of Foucault (1969), Latour (1979), Kuhn (1962), and Burke (1969), as intrinsically rhetorical. This project suggests that interactive engagement via gameful technologies will allow students to practice appropriate role-play, voice, and response among populations with rapidly changing levels of *health literacy*.

In medical discourse, the rhetorical triangle becomes even more tightly stretched and subject to rupture along its edges. As I argued earlier, networked communication is best studied in terms of relationships among heavily linked nodes, and researchers should remain open to shifts in the exigencies that will form in different situations. Judy Segal (2005) argues that online medical rhetoric needs to take into account “all parts of the rhetorical triangle,” rather than overemphasizing the speaker and the speaker’s authority. I agree that undue focus on the speaker has distorted much research in medical communication, but I don’t believe that the triangle, which she defined as existing among “the speaker, the subject matter, and the audience” is sufficient to address the complexity of networked rhetorical situation, any more than is Burke’s dramatic pentad. Segal explores “internet health” as “the public use of information Web sites to facilitate decision making on matters of health and illness [which] is a rhetorical practice involving text and trajectories of influence” (2005). Even if we restrict our inquiry to the use of websites to obtain information, it is important to consider how a viewer arrived at such a site, what type of literacy they bring to their reading, and in what communities they parse and act upon this knowledge. Much of the struggle we face when attempting to analyze public participation in medical discourse has to do with the concept of “health literacy,” which is a political term as much as a rhetorical concept. The “subject matter” point of the triangle is difficult to address with single-line connections because of the many barriers and terministic screens readers and speakers encounter as they attempt to convey what often appears as deceptively simple and transparent knowledge.

If one considers the rapid evolution of medicine in the western world, it may be surprising that so many people view medical *language* as a monolithic, impenetrable realm

of the elite. The transformation of medicine to a professionalized, regulated institution that guards its ranks so closely is only about 150 years old (Rosenberg, 2007). Most of the history of medicine is filled with stories of lay-midwives, surgeon-barbers, healers, medicine men, and family doctors who made home visits. Hospitals became standardized institutions for centralized care in America only in the past century. The language used to describe medical actions remains highly value-laden rather than purely scientific. For example, “Going to the doctor” rather than calling the doctor to come to the home is a recent discursive adjustment (Herritt, 2012). “Delivering the baby” rather than delivering the mother of her burden is also recent (OED, 1940). In fact, the idea of birth giving at home was nearly universal before 1900 (Davis-Floyd, 2004). Birth is one of the most compelling and well-researched areas of rhetorical transformation, arising from the new prestige of surgeons above physicians (surgeons are not just barbers anymore), and leading to the medicalization of birth via the introduction of surgical intervention as standard care. It happened quickly, and it happened at the intersection of language and power. This is one of many examples of the importance of studying the rhetorical dimensions of knowledge formation in medicine and the prominent role of language in popularizations of medical truth.

Medical English isn't getting any simpler. It can't: We value precision above all but ethics (in the best of practices). I keep returning to the fact that elite medicine is comparatively recent -- we're not that far from the days of negotiable action and consequences discussed in the home. In that short time, medical discourse transformed into the highly codified language associated with current practice. Expecting high levels of medical literacy from outsiders to the discourse community is no longer reasonable. Initiation is long and complex. And it's not enough for health care providers and professionals (HCPs)

to talk to one another and hope that health journalists will accurately and ethically translate knowledge for the public. Providers and patients need to speak to and understand each other in an immediate and ongoing context -- possibly in 140 characters or less.

Many professional stakes have changed and continue to change: liability, public rankings, universal insurance requirements that moved healthcare toward a consumer market, a maturing patient base, and most to my point, the *interface* between doctors and patients. Part of this interface is the technology itself: Patients want to use Internet tools to find information in places familiar and comfortable to them such as Facebook, Twitter, easy-to-search databases like WebMD, MayoClinic, and Wikipedia, and they want information that can be communicated quickly by email or text (French, 2012).

A highly visible example of the confusion that can result from the rule-based structure of medical discourse and the demands of public media can be found in the ongoing debate regarding vaccine safety. Many patients, and particularly the parents of young children facing routine vaccination schedules have heard conflicting evidence online on whether certain vaccines may contain ingredients that may lead to diseases, disabilities, or damage; the exact vaccines, ingredients, and effects in question can vary widely among different sites and communities. Researchers and care providers lose ground quickly in these discussions because they *can't* give the public what it wants, which is a simple “No, this substance will not cause any damage” or “this procedure carries no risk of (a given type of) harm.” Health researchers cannot ethically say: “We know this is safe” or “there are no side effects.” And it sounds dry and unconvincing to give the honest and technical answer that such a claim would violate the scientific method, which seeks probable truth through repeated tests of a falsifiable hypothesis. You can't prove a claim that an action cannot or

does not have a given effect because you cannot falsify a negative. Doing so would throw an infinite set of variables into your hypothesis, which would be impossible to test. This explanation, while accurate, risks alienating its audience through excessive technicality.

So we arrive at a public health brand of literacy crisis. Medicine aims to serve the public good, and less nobly put, lapses in public confidence severely harm the medical economy. If measles vaccination rates plummet and measles cases soar, many people suffer. We can try to increase medical literacy in the public, but literacy can't be a one-sided exercise. We also need to train practitioners in conscientious communication and rhetoric. And while we don't have the curricula in place yet, medical school entrance requirements are starting to nod in this direction: The calls for rhetorical education of medical students are increasing as studies draw connections between nuanced communication skills in both clinical and humanitarian practice (Lingard et al., 2009). How do we avert conspiracy theories, misinformation, and public health crises? We now know that our language is constitutive of our knowledge. Many audiences will uncritically believe "what research says." So *how* do we construct knowledge ethically and critically?

My focus is on the role of gameful technologies, including various social media, in influencing, changing, and benefitting medical discourse. Many medical institutions are working toward building communal knowledge using social media (Mayo Clinic, 2012), but the effort is often unsuccessful, and many other organizations and professionals express hesitation to adopt these tools. Managing a professional online persona is not necessarily simple. Each online action has symbolic and public meaning, and users new to social media may be or feel unprepared.

As in the previous chapter on gaming theory and literacy, I'd like to approach the

situation of increasing complexity in medical communication in terms of literacy. We've learned from Trimbur, Stuckey, Freire, Connors, and many other scholars of rhetoric and pedagogy that we are in the midst of a crisis or repeating cycle of crises in literacy and education. Class conflict, second language learning, economics, standardized testing, nostalgia, and the Common Core have all played major roles. Increasing attention to the social, political, economic, and community-based influences on literacy reshaped classroom pedagogies such that Conference on College Composition and Communication (CCCC), representing instructors of post-secondary rhetoric and composition, developed position statements on student rights and scholarship on collaborative writing.⁵ While we may now be “post-social-turn,” as some scholars argue, we still look at language use as a discourse-specific construction, established based on consensus among those with privilege in a given community (Burke, 1969; Foucault, 1969). This notion of language and truth as discourse-specific drives a growing body of work on rhetoric in medicine. The doors to seeing medical truth as contingent and socially constructed, rather than pure, empirical fact, were opened by the theories of Foucault (1963, 1969), Burke (1969), Latour (1979), and Kuhn (1962). From this theoretical foundation, we come to see medicine as an evolving body of knowledge based on socio-political events. The language of science gains legitimacy from consensus. We learn from Kuhn's foundational work *The Structure of Scientific Revolutions* that science doesn't develop linearly from discovery to discovery, but that the previous knowledge paradigm fails when too many questions cannot be answered and too many problems cannot be solved. At this point we reach a crisis and must accept “revolutionary science,” whereupon the prevailing paradigm shifts.

⁵ Including the position statement on Students Rights to Their Own Language (SRTOL, 1974).

This shift doesn't only happen in the realm of scientific discovery. With newly agreed upon truth values, we need to agree on new *language* with which to express those values. This brings us to the secondary crisis of scientific language. In past decades we had to face the question of how to communicate differently in the wake of major scientific paradigm shifts such as the revisions to the laws of motion that occurred at the advent of quantum mechanics. We needed not only new words but also new rhetorical devices to communicate the idea of "true-with-exceptions." This continues to happen almost daily on smaller scales in modern health communications. For example, the scientific community supports the conclusion that vaccines are safe for the general public, but with occasional exceptions. Persuading an audience to accept the exceptions without making them a rule that breaks down the veracity of the entire concept is very much an issue of health literacy.

Health literacy is a medical and legal term that has gained increased prominence since the release of H.R. 3580: *Patient Protection and Affordable Care Act* in March 2010, which borrows the *Healthy People 2004* definition of health literacy as "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions." According to a report presented by the Center for Health Care Strategies in November of 2010, approximately 90 million Americans have low health literacy (Somers and Mahadevan). Low health literacy correlates with decreased treatment and medication compliance, lack of preventative care seeking, ineffective self-care skills, higher mortality, and "poor responsiveness to public health emergencies" (US Dept of Health and Human Services, 2010). This set of issues disproportionately affects the elderly, non-native speakers of English, persons of low socioeconomic status, and those with lower levels of education. Many services and agencies

have been created to address these discrepancies, including the Center for Health Care Strategies (CHCS), which provides a number of fact sheets and modules that attempt to supply communication training for health care providers. This training includes a clear set of *rhetorical* strategies for audience and situation analysis. The CHCS advocates for the incorporation of literacy training into “broader societal structures like the health care system, educational institutions, and the media” for both patients and providers. Their training guide does not specifically address social media, but I argue that networked communication sites will continue to play a pivotal role in the expansion of health literacy in the American public. Within these broader structures, the CHCS targets three areas that should appear familiar to rhetoric scholars who have participated in composition instruction: “making print, oral, and electronic health information easier to understand,” “providing education to improve literacy skills and empower individuals,” and “reforming health care delivery to be more patient-centered” (2013). These approaches map onto the techniques of revision, pedagogy, and audience analysis, which are embraced by the CCCC as features of best teaching practice in college composition as of 2015. In addition, CHCS suggests that providers perform a role-play exercise, putting themselves in their listeners' shoes by claiming that they “should assume that every individual may have difficulty understanding health care information.” It is clear why scholars like Lingard advocate for rhetorical training for health care providers as at least part of the answer to the crisis in medical communication.

We need more than *textual* rhetoric strategies to address health literacy because, as Beatrice Boateng explains, “Whether we like it or not, social media has become an integral part of medicine” (2012). Boateng claims that we need to address “three main players intersecting in social media: the institutions, the medical staff, and the community.” These

players are, aptly, at play within the carefully designed gameful systems of social media networks. If we follow Zimmerman's model of examining games in terms of play, design, and systems (including culture), we can look at the practices of health literacy in any given community in terms of the system that represents the actions among nodes, the design of rules, including algorithms and protocols that constrain choices and give rise to play, and the ways that participants play with rules.

While addressing medical literacy, Rosenberg (2007) stresses the importance of attending to both social efficacy and "medical citizenship" in order to evaluate the "constructedness of all notions of efficacy." He frames this tension in systemic terms, although he does not explicitly address the concept of systems, as he suggests ways to bridge the gap between medicine as laboratory biology and medicine as means of creating improvement in the lives of individuals who will regard its social and moral dimensions. His description of the system is strongly reminiscent of the gameful system of networked media encounters:

This is the characteristic split screen that faces today's clinician: the tension between illness in the individual patient and disease as crystallized and made socially real in the laboratory's and the epidemiologist's outputs and inscriptions, practice guidelines, and algorithms. To this body of data are added institutional pressures to create consistency-enforcing mechanisms ranging from consensus conferences to practice guidelines. Bedside, clinic, and physician's office are points at which the mandates of the best -- and increasingly most economically rational -- practice bump up against the unique reality of the individual patient and challenge the physician's traditional autonomy.

The many nodes of the system shift and collide, always reforming the whole by their relation to one another. To Rosenberg, this is a crisis of authority and control which must be addressed by increased literacy. But medical literacy is only part of the problem: we must see medicine as a system and teach systems literacy in order to improve both practitioner and

public understanding of medical process.

The most visible arena in which this crisis plays out is social media. Volumes of guidelines and rulings regarding patient privacy and HIPAA regulations restrict the narratives and examples that practitioners can share to illustrate their problem solving and practice.⁶ However, in social networking communities like Twitter and Facebook, there is no shortage of patients willing to share their own experiences. The gathering of patients and patients-to-be (Segal, 2005; Rosenberg, 2007), can be framed in terms of “emergent player networks” (Mäyrä, 2008) that form to address the challenges of a gameful system. If we consider this grouping in relation to literacy theory and gaming, these emergent networks can also be seen as affinity groups (communities that organize themselves around shared interests and concerns), which James Paul Gee (2007) suggests are central constructs in the development of engaged literacy learning.

Affinity groups, formed within emergent networks of players or actors can develop among both patients and practitioners, groups that come into frequent contact and overlap in socially networked spaces. The players in each and all groups are able to act, react, and put information and ideas into play within the carefully designed rules of the larger system, in terms of Salen and Zimmerman’s heuristic for game studies as system-design-play.

The rules in social media systems are manufactured, but express agency, persuade, and often remain in the process of revision. Without rules, communication doesn't make sense in cyberspace (even 4chan, often regarded as the most lawless of social networks, has many firm rules). Human input protocols and computed algorithms come together to create

⁶ The Health Insurance Portability and Accountability Act of 1996 (HIPAA) was enacted ensure national standards for electronic record transmission, patient privacy, and related standards of care.

the structure of communication within a system. As Zimmerman and Salen discuss, systems can stack hierarchically, forming new, meta-systems as they combine. With systems of communication merging like galaxies both orbiting and colliding, in paths and clouds and arms, our triangle is quite literally bent out of shape. The overlapping systems can be examined strictly within their own borders, as closed systems, or we can telescope out to explain broader cross-system issues such as what writing on Facebook has to do with the systems of white privilege, with systems of US dominance, with the prioritization of marketing over user-generated content (UGC), or the ethical problems with using UGC as marketing. So when we might seem to be having a simple conversation about gardening, we're talking to each other in the first place because a complex search algorithm united us on a carefully targeted network that undergoes constant interface revision, and the words we say will generate data for future linkages and revisions, social and commercial. It is in this situation that most American Internet users encounter popular health information.

Social networking in high stakes discourse

Considering the amount of press surrounding medicine and health in social media and the number of patient-centered groups across various media platforms, there are surprisingly few academic and professional sources for health care providers regarding social media use. Most of the information currently in press addresses marketing professionals. Before we can help patients build strategies to increase health literacy, we need to consider how practitioners and researchers are trained to supply information online. The finest example of a comprehensive approach to social media training for health care providers can be found in the Mayo Clinic's Social Media Health Network

(<http://network.socialmedia.mayoclinic.org/>). The Social Media Health Network exists to train health care providers to communicate clearly and ethically with patients, to maximize return on investment (ROI), and to manage standards of privacy and professionalism. Patient needs, ROI, and professionalism form the core discussion for most resources that approach social media use in health services. Very little rhetorically focused work is available, but many of the concerns expressed by instructors and users of social media in health represent rhetorical questions and problems. For example, “voice” features frequently in conversations about communicating through social and networked media: How do I maintain a professional voice? What characterizes the “medical voice?” How do I speak in a voice that will communicate respect for and invite questions from patients? Since these concerns exist within a high-stakes discourse and involve a large number of actors whose communication is mediated through technology, gaming theory will help us unravel how to intervene most productively in these networks and understand their operations.

To demonstrate the need for information and discussion on social media in medicine, I would like to present a few important statistics and study results.

According to a study in 2009 by the Manhattan Research group, 88% of physicians in the United States report that “the Internet is essential to the practice.” A study conducted by Lemley and Burnham in 2009 reports that “approximately 53% of nursing schools and 45% of medical schools use social networking tools to enhance instruction,” including blogs, wikis, videocasts, and podcasts. World Medical Association's Junior Doctor Network published a white paper on social media and medicine in 2012, claiming that “a 2010 study demonstrates that 65% of students at the University of Otago New Zealand had a Facebook account. A comparative study carried out by Universal McCann in April 2008 showed that

the respondents in over 29 countries had overwhelmingly read and had their own blogs, uploaded or viewed video clips online, and continuously participate in social networks” (MacDonald, 2010). According to a 2011 study by quantiaMD, 65-90% of physicians use social media for personal and/or professional purposes. A 2013 snapshot by the Manhattan Research Project shows that 86% of medical professionals use the Internet to access health information, 92% access it from their office (Dolan 2010), and 71% of them use community sites.

Use of Internet searches and social media is similarly prevalent among patients and families and friends of patients. A study in 2008 by Langshur shows that almost a quarter of online health searchers search for *user generated content* in social media sites. According to a Pew Internet survey in 2011 (*The Social Life of Health Information*), 80% of Internet users have searched for health information, including information on diagnosis and treatment.

Because social media use is widespread among patients, future patients, and health care providers of various levels and roles, including those still in medical school and residency, it is important to consider guidelines and strategies for media use. To clarify the use of networked media in health care we need to understand two key terms: *health 2.0* and *e-patients*. Health 2.0, or *medicine 2.0*, is a term used increasingly often to describe new methods of communication that occur between health care providers and their patients. According to Bertalan Meskó (2013), “Medicine 2.0 is usually associated with communication among medical professionals; while health 2.0 is more about web tools used in health care.” He clarifies that “health 2.0 is a term referring to the interaction between health care institutions and medical practices; and to social media. As social media is becoming more popular among e-patients, it was a clear trend that hospitals and medical

practices would start using it creating an online presence and keep in touch with patients.”⁷

The idea of medicine 2.0 is developed from Eysenbach's 2008 article, “Medicine 2.0: Social networking, collaboration, participation, apomediation, and openness.” In many sources, the division between medicine 2.0 and health 2.0 is less precise. In Christina Thielst's guide *Social Media in Health Care* (2010), the term health 2.0 evolves from the widely used term *Web 2.0* to describe the interactive conversations that are becoming more common among patients and health care providers. According Thielst, health 2.0 includes not only social media, but also “telemedicine, electronic health records, personal health records, and home monitoring.” Her discussion draws on the widely cited 2007 argument by Tom Ferguson that the “underlying nature of health care itself must change” rather than simply being replaced by automation of earlier media and practices. The more active role taken up by patients in health care and their desire to control their personal records and information shows a revolutionary new direction in patient care protocols and procedures within medicine. In 2011, a conference called “Medicine 2.0 Congress” was held to study the incorporation of social media in medicine in meaningful ways.

The idea of an *e-patient* was also popularized by Ferguson’s 2007 work. Ferguson defines e-patients as “citizens with health concerns who use the Internet as a health resource, studying up on their own diseases (and those of friends and family members), finding better treatment centers and insisting on better care, providing other patients with invaluable medical assistance and support and increasingly serving as important collaborators and advisors for their clinicians” (qtd. in Thielst 2010). A Pew Internet study from 2012 called

⁷Meskó draws from his definitions from Van de Belt et al (2010) “Definition of Health 2.0 and Medicine 2.0: A systematic review.”

“The Rise of the E-patient” explored the increasing tendency of patients to research their symptoms and conditions online prior to discussing them with a doctor. Patients use a variety of social media and digital technologies to develop strategies to find answers for their health questions. According to Meskó (2013), “e-patients or Internet patients are health *consumers* using the Internet and digital technologies for gathering information about a medical condition or treatment (emphasis added).” Meskó claims that these patients tend to be more interactive partners with better health information than the general public. They may also be more empowered and engaged. The rise of the e-patient has, according to Meskó, led to the participatory medicine movement, which is now driven by the Society for Participatory Medicine. This movement strives to promote transparency and better communication and distribution of materials among patients and physicians. E-patients who engage with information online to better their health frequently form support groups and patient advocacy groups (such as the highly popular *patientslikeme.com*) and build collaborative and communal knowledge that may increase the visibility of health information and potentially lead to changes in health education for patients.

Beatrice Boateng and Eric Black’s 2012 collection, *Social Media in Medicine: The Impact of Online Social Networks on Contemporary Medicine* aims to continue the conversation on the meaningful use of social media to “teach, treat and learn.” The areas that Boateng and Black choose to focus upon represent many of the most popularly discussed issues in social media and medicine, including information sharing, understanding public attitudes regarding health, improving patient care and compliance, “the development of virtual communities,” legal risks, and privacy concerns. They include a number of conversations regarding the role of identity and health care provider participation in media.

Remember that when we interact with others in digital worlds and communities, whether within a gaming environment or a social network like Facebook that is supposedly based upon our “real world” identities, we are taking up digital personae based upon a selection of our characteristics and identifications. When we enter a digital community, we participate in a practice of role-play. Within discussions of health and medicine in social media this role-play can raise issues of trust, reliability, and professionalism. Provider identity and reliability generate a lot of press and can create confusion especially when personal and professional lives collide in social networks.⁸ The American Medical Association recently took action on this issue by posting a policy pertaining to professionalism in physician contact in social media. It is important to note that the AMA expressed concern not only for the effects of unprofessional behavior upon individual physicians and their institutions, but also for “the profession as a whole” (qtd. in Farnan et al.). There seems to be general agreement that social media education and conduct policies are important in the current practice of American medicine, but a great deal of variation and discrepancies exist between the institution of these policies and educational plans at various institutions.

I would like to discuss a positive model for social media policy and education and medicine. In 2010, The Mayo Clinic established the Mayo Clinic Center for Social Media (MCCSM) “to explore how social tools can improve patient care, catalyze medical research, strengthen medical education and promote continuous professional development” (Mayo Clinic Center for Social Media, 2012). Director of the MCCSM, Farris Tamimi, argues passionately for the need for communities to collaborate to build projects integrating social

⁸According to Farnan et al. 2012, “While nearly 100% of US medical schools have a web presence, with nearly 95% having an active Facebook account, only about 13% have an existing digital media policy to address student or trainee behaviors on such sites” (Kind et al., 2012).

media into health care. Tamimi describes this movement in terms of a paradigm shift, borrowing terminology from Thomas Kuhn's *Structure of Scientific Revolutions*. The MCCSM aims to redesign our health care system in order to enable two-way engagement throughout treatment and prevention processes. In the new model of health care, high status will be granted to clear communication, active engagement, mutual satisfaction, conversation, patient compliance, and improved clinical outcomes. Tamimi contends that "we must crowd-source the change we want to see in the world" (Mayo Clinic Center for Social Media, 2012). The importance of this change is summed up on the MCCSM's statement of social media philosophy:

We believe individuals have the right and responsibility to advocate for their own health, and that it's our responsibility to help them use social media tools to get the best information, connect with providers and one another, plus inspire healthy choices. We intend to lead the healthcare community in applying these online tools to spread knowledge and encourage collaboration among providers, improving healthcare quality everywhere.

The effectiveness of the Mayo Clinic's Center for Social Media resides in its skilled harnessing of a multitude of channels and media for communication with members of the profession and with the general public. The MCCSM is supported by the larger Mayo Clinic Social Media Health Network, which integrates a set of informational websites, newsletters, blogs, a print guidebook (*Bringing the Social Media #Revolution to health care*, 2012), and social media accounts on Twitter, Facebook, LinkedIn, YouTube, Pinterest, Yammer, and Instagram to reach the widest possible audience. In addition, the Mayo Clinic offers a 1.5-day training course in "Social Media Residency" to members of its organization and partnered institutions. This paid course requires 14 prerequisite training modules addressing such topics as social media strategy, return on investment, professionalism, legal risks,

privacy, personal branding, and training in the use of the specific tools and networks. The Mayo Clinic is open to partnering with other medical organizations to work toward building greater social media literacy across the profession.

Most of the materials that the Mayo Clinic makes available are geared toward health care providers within its network. A number of training videos are posted on YouTube that are accessible to the general public, but most specifically address Mayo Clinic employees. Likewise, their print collection of essays on social media and health is available to the public on Amazon.com but geared towards professionals. The CEO of the Mayo Clinic, John Noseworthy, says that “we see our role as catalyst and clearinghouse. We’re actively developing practical social media applications, and hope others can learn from our experience. The field is growing rapidly, with innovations arising all over the world. You want to help spread the best ideas” (2012). Noseworthy stresses the role of stewardship in social media education emphasizing the need to teach efficiency and safety along with media-specific skills.

Navigating social media and education requires developing strategies that enable us to participate in networked communication. Organizations like the Mayo Clinic cooperate with social media platforms like Twitter and YouTube to negotiate a set of *rules* within the system, thereby enabling meaningful activity to play out within the system’s constraints. Skilled users need to be familiar with institutional guidelines such as Mayo’s rule, “don’t disclose your affiliation to Mayo in such a way that implies that you speak for the organization” while balancing them with protocols such as Twitter’s requirement that you describe yourself on your profile in less than 140 words. What self-description can I give that will promote the trustworthiness of my virtual identity without seeming to endorse products

and procedures in my organization's name? Coming into these situations with an outlook informed by gaming theory enables us to examine these tensions and choices in terms of systems, design, and play linked in a network of many nodes and influences. Systems literacy grounds the reader in a multivocal situation mediated by technological protocols and rules for participation. It also invites readers to become participants and partners in shaping rules through dialogue, interface modding, political action, or other interventions. I would like to examine a pair of complex and quickly evolving rhetorical situations in health and medicine as they are constructed and enacted through social media to show the benefits of gaming theory for understanding networked communication.

My first case study, non-celiac gluten sensitivity, will show the construction of patient affinity groups and networks that attempt to build a workable set of knowledge that can fill gaps in the published scientific record. There remains no clear medical consensus on the epidemiology of non-celiac gluten sensitivity, and there is a large body of research that suggests a wide variety of possible explanations. Non-specialist readers attempt to decode this body of research in order to make the best possible health care choices for themselves and their families. My second case study, vaccine resistance, examines networks and communities that have similar patterns of construction to those fostered by patients seeking to understand gluten sensitivity. However, the rhetorical character taken up by individuals opposing vaccines is dramatically different because, rather than attempting to decode and synthesize an accepted body of knowledge endorsed by major research organizations and government agencies, vaccine resisters seek to create and identify gaps in a record of knowledge that overwhelmingly disproves most sources of vaccine injury. The rhetorical strategies taken up by each community build upon highly differentiated structures of *ethos*,

and they value different communication strategies and different sources of authority. Each group builds its own vocabulary of meaningful language approximating professional scientific discourse. These approaches to ethos, discourse, and exigence, as well as their parameters for what it means to “do research,” are made possible by the networked systems in which these communities reside and which brought these communities together.

It is valuable to approach these networked communities in terms of how they function as “virtual worlds.” The idea of a virtual world is widely discussed in game studies, and I would like to draw on the work of Nick Yee (2014) to think about how patients construct themselves as characters in networked spaces. Yee's work is based on an immense data set gathered from roughly 50,000 surveys administered between 2003 and 2009 to players in a wide range of online gaming worlds. Yee focuses on the influence that an online character or constructed avatar can exert on player behavior both during and after gameplay. He contends that there are “inadvertent ways in which virtual worlds control how we think and behave,” including ways in which these worlds can make false stereotypes become true. I would like to emphasize that all virtual world play begins with character creation, whether that world is a sophisticated commercial multiplayer online game or a social media site. The features of the networked environment constrain what type of character we can create, and the character that we create can, according to Yee, influence our thoughts and behavior to the extent that “virtual worlds change and control us in unexpected ways.”

This connection between character creation, thought processes, and after-game behavior is particularly important in communities structured around decoding and creating health information because community participation can shape “player” behavior and thereby affect health outcomes. Specifically, the constraints and affordances of a given virtual

community can shape the physical health of community members. Yee argues that this is a set of processes into which intervention is difficult because of what he calls the Proteus Paradox: “Even when we believe we are free and empowered, our offline politics and cognitive baggage prevent us from changing. And where we think we are fully in control, unique psychological levers in virtual worlds (such as our avatars) powerfully change how we think and behave” (2014). I believe that these “levers” are in fact part of the larger procedural rule set of the game, and that insightful analysis of the rhetorical power of procedurality will help us understand how patients construct knowledge in networked spaces that they must access through virtually constructed characters.

CHAPTER THREE: GLUTEN SENSITIVITY: RULEPLAY IN THE RHETORIC OF PERSONAL DIAGNOSIS

The proliferation of medical information online makes dietary health choices surprisingly complex: Should you be avoiding gluten? Many of your friends say so. Other media sources ridicule anyone who does avoid gluten. The research goes in multiple directions. How can we develop a literacy of the system behind health discourse that will help us to decode its operations in networked media? Gluten has been linked to everything from autism to schizophrenia to joint pain, but in what direction do the links flow, and how can we make them clear to a reader outside of professional health fields? Many consumers encounter so much information about gluten and gluten-free diets that without high levels of health literacy they are unable to make informed choices that will benefit their health. I attempt to intervene in this problem by suggesting a gaming-based theory of networked knowledge that will enable us to better analyze online discourse. The current debate surrounding gluten sensitivity and gluten-free diets is especially well-suited to rhetorical gaming theory analysis because of the state of uncertainty and lack of consensus in media and in published scientific research, which in turn invites patients and consumers to actively participate in and play with the system of medical knowledge making.

Remember that gaming, and play within designed gameful systems, is both literacy and action when brought into focus under different lenses. As described in Chapter One, Gee

(2007) reminds us that “When people learn to play videogames, they are learning a new *literacy*,” and Zimmerman (2013) argues that in order to train players and students to engage with the world of the 21st century, we need to become and teach others to become “systems literate.” Gaming literacy is for Zimmerman a type of systems literacy that is learned and developed through play, as constrained by the rules of a system. Similarly, Gee believes that many of the valuable skills acquired through play lead to important literate development that allows players to understand and meaningfully engage with the world in productive ways. Research from Wolf (2007) and Smilkstein (2003) has shown that it is possible that, as we exercise this type of networked systems literacy, our brains may even become wired to develop responses to and practices of literate experience differently. Some have also argued that gaming is primarily action rather than literacy, most notably Galloway (2006), drawing on Manovich (2001). According to proponents of gaming-as-action, play requires participation with mathematical structures and equations as well as physical motion. I believe that the concept of gaming literacy effectively encapsulates interactions with rule-structures as a type of literate activity. Community participants seeking health information must become proficient in systems-based literate activity to retrieve and translate medical information for use in their own care. Interacting with information systems without acquiring literacy in system operations will limit the agency of users and players.

Navigating the information available online about gluten sensitivity requires a very active set of literacy skills. Patients and consumers need to be able to navigate multiple databases and decode documents presented within a number of discourse communities and in widely varying voices. Most Americans have heard about the apparent benefits of avoiding gluten from newspaper articles, friends, family, advertisements, and possibly materials at

their physician's office. Promotion of gluten-free diets escalated with the publication of cardiologist William Davis' book *Wheat Belly* in 2011, which discusses a number of potential health benefits for eliminating wheat from the human diet. Davis claims in rhetorically powerful language that modern wheat is a *toxic* and *addictive* food that leads to other unhealthy habits. In response, a number of scientists including Julie Jones (2012) and Fred Brouns et al. (2013) examined the statements and theses proposed by Davis and found that a number of his claims were “incommensurate with current scientific data in the field” or were potentially over applied. Most notably, it is possible that Davis makes claims based primarily upon the consumption of refined wheat products rather than whole grains. The debate surrounding this book is a microcosm of the larger confusion regarding the problem of gluten and/or wheat consumption. Davis is a widely published cardiology researcher with a medical degree from St. Louis University who has appeared widely in American media. His credentials alone make him a reliable source in the eyes of much of the reading public. If, as we discussed above, as many as 90 million Americans have low levels of health literacy, it is very problematic to expect the public to be able to exercise advanced medical literacies and to parse scientific claims based upon the evidence, data, and the data interpretation methods used. We cannot expect the public to be familiar with all potential intricacies of current best practice in laboratory research. It would be unethical to place that burden upon them.

Current peer-reviewed research following best practice and standards is inconclusive about the causes of non-celiac idiopathic gluten sensitivity.⁹ This condition refers to a set of symptoms experienced by consumers of gluten and wheat products who do not test positive

⁹Celiac disease is an autoimmune disorder that causes patients who consume gliadin from gluten proteins to experience atrophy of the intestinal villi, leading to nutrient malabsorption, pain, and inflammation. Non-celiac gluten sensitivity occurs in patients who do not have celiac disease, but who experience pain, inflammation, or other negative symptoms following gluten consumption.

for either celiac disease or a wheat allergy yet experience adverse effects seemingly related to gluten consumption. This set of symptoms commonly includes indigestion, irritable bowels, acid reflux, bloating, abdominal pain, and diarrhea. Other reported symptoms may include joint pain, acne, migraines, or insomnia. Most research fails to draw a connection between gluten and the second set of symptoms and focuses primarily on digestion-related manifestations (Verdu et al., 2009; Sapone et al., 2010; Hadjivassiliou et al., 2007).

According to popular press author Danna Korn, more than 250 symptoms have been reported by people suffering from apparent gluten sensitivity (2014). An Amazon.com search in October 2014 produces more than 10,000 books with the words “gluten free” in their title or description. A Google trends graph from October 7, 2014, shown below, demonstrates the steady rise of interest in gluten sensitivity and forecasts continued high popularity among consumers using Google searches.

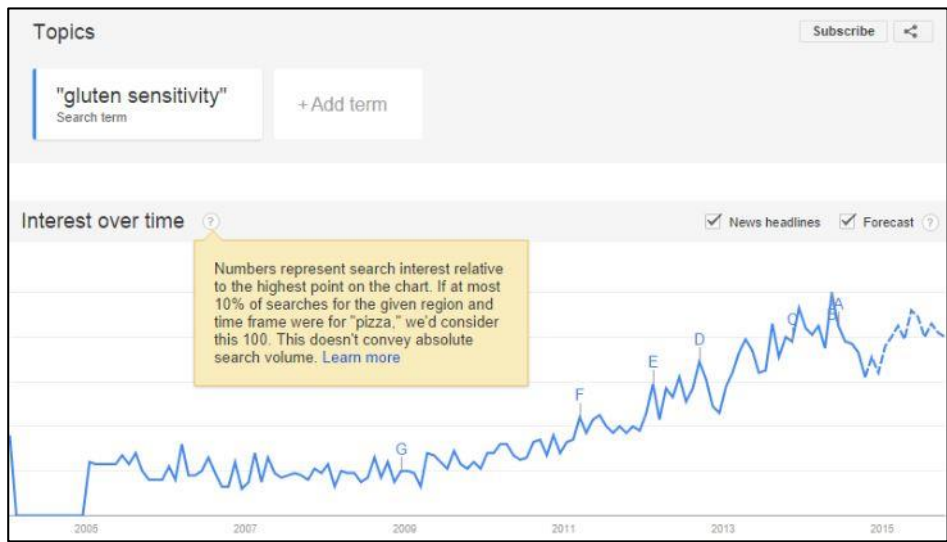


Figure 3.1: Google Trends report on the popularity of the phrase “gluten sensitivity” in Google web searches between 2005 and 2015.

Internet users attempting to find information about gluten sensitivity and gluten-free diets will encounter various texts from a number of discourse communities and information

systems and must select which search trajectory they wish to follow. Their choice of reference material will be informed by their education, their previous exposure to similar source types, their comfort level with the vocabulary and style of a given text or genre, and a variety of personal preferences developed from life experiences. Even a reader with a high level of health literacy will be confronted with difficult choices in this conversation. The more options that are available across print, news sources, online communities and so forth the more decisions will need to be made concerning what information to read and, even prior to that, what information to pursue. There is simply too much material for any single reader to review.

This discourse is highly complicated by the lack of consensus amongst medical professionals. By defining non-celiac gluten sensitivity as idiopathic, health care providers have indicated that the cause for the condition is unclear or has not been reliably established. Because of the widespread popularity of gluten-free diets, a high volume of research has been funded and conducted in recent years in the attempt to determine the cause of the symptomatology. Of particular concern has been the recent trend in promoting gluten-free diets as a way to lose weight. There is no conclusive evidence that avoiding gluten results in weight loss (Nash and Slutzky, 2014), and many researchers are concerned that mass adoption of gluten-free diets may lead to additional dietary and digestive issues (Peter, 2014; Stazi and Trinti, 2008). Gluten-free diets could potentially result in deficiencies of vitamins and minerals because gluten-free grains that are substituted for wheat are frequently not fortified. The adoption and promotion of gluten-free diets may also present an ethical issue in so far as consumers who attempt to treat an illness by following an unverified treatment regimen with the expectation of receiving relief may experience delay in seeking or receiving

effective treatments. Self-diagnosis and treatment of non-celiac idiopathic gluten sensitivity may result in prolonged suffering in those who are experiencing symptoms of a different condition. An additional literacy concern is that labeling regulations for gluten-free foods can vary widely. A consumer who purchases a gluten-free product will need to rely on *functional health literacy* to determine whether the measure of gluten is sufficiently low and whether the substituted grains provide adequate nourishment without potentially harmful additives (Hischenhuber et al., 2006). A number of complex systems of literacy requirements come together as consumers attempt to make the best health decisions regarding gluten consumption.

The current state of inquiry into non-celiac gluten sensitivity is leading to increased research interest in patient sensitivity to a type of carbohydrate in wheat, called fructan, which belongs to a carbohydrate class called FODMAPS (fermentable oligo-di-monosaccharides and polyols) (Eswaran, 2014; Biesiekierski, 2011, 2013). The complex name of this sensitivity and the accompanying recommended diet restrictions are uninviting and potentially prohibitive to lay researchers at lower levels of health literacy. Understanding the relationship between FODMAPS and symptoms previously associated with gluten sensitivity will require substantial translation, mediation, and negotiation, creating a divide between those who can and cannot directly access the research material. Research barriers are frequently countered by social media networks and groups that enable members of varying levels of health literacy to work together to decode the material. Communities such as *Gluten Free* on Facebook and *r/glutenfree* on Reddit represent community attempts to dissect the rhetoric of medicine and media and arrive at useful information to benefit themselves and their families.

I will offer a case study rhetorical analysis of the communities at <http://www.reddit.com/r/glutenfree> and *Gluten Free* on Facebook to emphasize how gaming theory and systems literacy can help us communicate more effectively in groups representing mixed levels of health literacy and familiarity with technology and scientific language. I hope to show how health information is communicated between health professionals and the public through mediated pathways and gameful negotiation of networks.

Gamefulness as a System Trait

Walz and Deterding's 2014 edited collection, *The Gameful World*, uses the word “gameful” as a synonym or variation of “gamification.” They contrast optimistic or even utopian views of what gameful or gamified domains of life can offer us, such as Jane McGonigal's claim that games can empower us to fix what is wrong with our modern reality (2011) and Clay Shirkey's idea that games allow us to maximize our potential by organizing our “cognitive surplus” (2010), with the more pessimistic viewpoints such as Bogost's reference to gamification as “exploitationware” (2014) and Jesper Juul's contention that gamified creations cannot achieve “the engaging qualities of well-designed games” (2014). Walz and Deterding point to what they call a “ludic reality invasion” in the early 2000s during which “pervasive games began to extend the magic circle of play spatially, temporally, and socially,” echoing the theories of Montola (2005). While many features of gameplay have been added to non-gaming environments in order to increase their appeal to consumers, I believe that the pervasive games revolution is more significant than a simple process of overlaying game features onto other environments. Designed experiences in multiple digital networks and virtual worlds came to take on various qualities of games in

order to increase their functionality and power rather than only their appeal, especially in the networked negotiation of health knowledge.

The world becomes more gamelike insofar as it becomes more networked, as more of our experiences are designed, and as more of our connections and points of contact are mediated by computation. Deterding describes an “interpenetration of games and everyday life” that I see as an inevitable merging. Not only do we design games to help us play with society and knowledge, our societal functions are themselves becoming more a matter of play as they occur within designed systems. This trend is exemplified in Eric Zimmerman's *Manifesto for a Ludic Century* in which he puts forth that “in our ludic century, information has been put at play . . . In the last few decades, information has taken a playful turn. To take a prime example, Wikipedia is not about users accessing a storehouse of expert knowledge. It is a messy, chaotic community in which the users are also the experts, who together create the information while also involving the system as a whole” (2014). The reevaluation of what creates an expert becomes the basis of the movement for sharing diagnostic and care information in health community groups online. These groups may be messy, chaotic communities, but they also allow users to share personal or alternate types of expertise that may supplement or supplant mainstream medical knowledge. Similar to Wikipedia communities, patient groups may also create information together and have an impact on the evolution of the system in which they are able to create this information.

Social media networks retain close ties to the gaming community through their operation and by their genealogy. Cliff Lampe (2014) clarifies this relationship in his argument that “both genres of interaction combined social and technical architectures to shape and enable user practice . . . Social media environments combine the effects and

processes of both social and technical systems.” As discussed above, community relations in social media are constrained by what tools and vocabularies are available to the participants in those communities. The rules that govern the interfaces accessed by users both limit and create possibilities for what kinds of action can be undertaken in the network. Lampe argues for the importance of the influence that games have had on the architecture of social media sites, which often use structures and terminology borrowed from tabletop gaming, role-playing games, and MUDs.¹⁰ The creators of many early social media platforms including USENET, Slashdot, and Wikipedia had previous experience participating in and leading online role-playing games, and they carried this experience into their design concepts in future projects (Turkle, 1995; Poe, 2006; Lampe, 2014). Lampe argues, in fact, that in some social media platforms “the games metaphor is so strong, it may be confusing or alienating newer users who are not as steeped in role-play-based games.” I argue that social networks not only retain many characteristics of their Role Playing Game forebears, but also constitute a new genre of persistent reality games.

The creation of networked health knowledge in the wake of unclear research consensus

Davis’ influential text, *Wheat Belly*, plays with the system of medical research methodology by neatly sidestepping the question of diagnosis directly into the realm of “proof of harm.” He uses highly emotional and moralized language to present a thesis that modern wheat is toxic to all human beings. He refers to wheat, specifically *triticum aestivum*, as “what we are being sold that is called ‘wheat.’” Further, *triticum aestivum* is “the transformed product of genetic research conducted during the latter half of the twentieth

¹⁰MUDs, or Multi-User Dungeons, are text-based multiplayer online games that were popular prior to the widespread availability of advanced graphics cards and high capacity data networks.

century. . . Compared to its ancestor of only forty years ago, modern wheat isn't even close" (2011). The recent transformation of wheat from a wholesome dietary staple to a harmful "frankenrain" parallels the recent emergence of gluten avoidance as a popular trend: gluten sensitivity is a pathology that is made possible by the state of current medical research. The logical flaws in Davis' text also make it subject to a type of critique made possible by modern information networks. The studies and their refutations are immediately available both to researchers and to the lay public, and the criticisms blossom swiftly across news media, editorials, and blogs that are spread by viral networks. One of the most common laments expressed by *r/glutenfree* and *Gluten Free* on Facebook is the frustration of being accused of following a fad diet, or of only being tricked into believing that gluten sensitivity exists.

Claims about the weight loss potential of gluten-free or wheat free diets regularly occupy popular news headlines. Davis makes "belly fat" the enemy in his invective against modern wheat, claiming that his patients who eliminated wheat from their diets lost 20-50 pounds within the first few months of diet modification (2011). Further, he stresses that the *blame* for weight gain rests not on the consumer but on the genetic engineering of the grain that has led to the "democratization of obesity" and "the most visible, insulin-opposing, embarrassment-causing fat: belly fat." Moral guilt and shame figure strongly in this argument. Davis offers a way out of not only the burden of weight gain but also the negative feelings and self-blame associated with it.

My initial objection to the use of Davis' work to support the cause of gluten-free eating centered on my confusion about why his proposed diet conflated the gluten protein with a specific cultivar of wheat. Davis answers this question in a direct but troubling way: "I

focus on wheat because, in the vast majority of American diets, gluten exposure can be used interchangeably with wheat exposure. For that reason, I often use wheat to signify all gluten-containing grains.” Wait, I thought, doesn’t that contradict the argument that it’s specifically wheat, and more specifically *triticum aestivum*, that is causing the current epidemic of obesity and diabetes? And the claim that removing wheat will cause weight loss and potentially even *cure* diabetes, even if other gluten products remain in one’s diet? It turns out that this very question is the lynchpin in a staggeringly large number of social and networked media discussions of gluten-free eating, the scientific reality of idiopathic non-celiac gluten sensitivity, and potential treatments and/or cures for a loosely grouped set of digestive symptoms.

Reactions to Davis’ text and to the larger conversation surrounding gluten and weight loss illustrate one of the most striking distinctions between the two social communities on which I focus my research. The Reddit group, *r/glutenfree* shares many common features with the ethos of Reddit at large. Reddit is a pseudonymous community, meaning that members can create personae or characters within in a virtual world that may differ widely from their daily offline identities. Building up a character on Reddit can be a lengthy process because users’ “karma scores” are featured prominently in their profiles and, on some subreddits, next to their contributions. A karma score represents how many “upvotes” a user has received on content they have submitted, minus the total number of “downvotes.” Reddit is not a truly anonymous community, like the often associated community 4chan: Reddit encouraged persistent user profiles and logs IP addresses so that the contributions of each member are linked and fairly easy to track (and to trace in the case of illegal activity). Because the characterization of any pseudonym is ranked by upvotes, which are in turn

ranked by community evaluations of content quality, it is easy to ascertain what types of arguments, links, and information are most valued by any subreddit (Reddit is a massive content-sharing site; subreddits represent smaller topic-focused forums for sharing.) In *r/glutenfree*, posters with high karma scores typically post strong scientific sources, do not employ *ad hominem* rhetoric, and support their recommendations with reference links. Most importantly, they provide information that is considered to be of high importance to a large number of users, pushing their posts toward the top of the page. The emphasis on source quality and scientific data in this community is perhaps best exemplified by its frequent interlinking with the community “*r/glutenscience*,” a forum dedicated to providing specialist-level information that explains or investigates the scientific truth value behind each claim. *r/glutenscience* also performs a subversive, liberatory role by retrieving articles and data that has been sequestered behind paid gatekeepers, such as university or library subscriptions, and bringing that information to the larger *r/glutenfree* community. Increased access to insider sources helps the *r/glutenfree* community parse the immense amount of often-contradictory data available on adverse gluten reactions and to see for themselves that the scientific community is in focused pursuit of answers to this intensely puzzling etiology.

The Facebook group *Gluten Free* also encourages sharing of mainstream scientific articles, but has a higher tolerance for findings based in alternative medicine. Because it is hosted on the Facebook platform, most users are visibly linked to their offline identities by name and image, although some users carefully build pseudonymous profiles to protect their identities. The consequences for association with legal names goes both ways: not only can members of *Gluten Free* see who a user identifies as outside of the group, but many users may be recognized by members of their offline communities who can see their posts and can

confirm or reject the authenticity of any expertise claimed therein. *Gluten Free* is a “closed group,” meaning that membership is by invite only and that posts will not appear on the news feeds of users’ family and friends who are not members themselves. However, *Gluten Free* is easy to join, and has nearly 32,000 members, so the likelihood of recognition is not small. Because offline identity is visible to other users, members who are medical practitioners or who have professional associations with the nutritional industry may have more trustworthy ethos imparted to their arguments. *Gluten Free* addresses many concerns that are similar to those raised by *r/glutenfree*: the processes of diagnosis, dealing with disrespectful family and friends, sharing recipes and ideas for eating out while avoiding gluten, and symptom management. In contrast, *Gluten Free* includes a higher frequency of “venting” posts and more commercial promotions. While the screening process for information on *Gluten Free* is less rigorous than that of its Reddit counterpart, its policies also allow increased diversity of beliefs without prompting a community override based on highly-rated research discussed in past threads in which consensus on the matter was reached. An example of this diversity of views is support for Davis’ *Wheat Belly* thesis.

Without exception, every mention of Davis’ work on *r/r glutenfree* archived within the past three years has been highly skeptical. When the book first attained national popularity, much of the *r/glutenfree* community focused on the reliability of its author. A number of posters pointed out that Davis’ work was targeted toward popular audiences rather than appearing in a peer-reviewed journal and that his credentials did not match the field of his conclusions. User **rhapsodic** summed up the community’s skepticism by supporting these critiques: “He’s pointing out that he’s not a nutritionist because it’s extremely fucking relevant. You can’t put forth the ethos argument of ‘trust me I’m a doctor’ and then bitch

when people point out that you are a doctor in a completely different field. Would you trust a nutritionist to diagnose your heart conditions?”¹¹ While most practicing cardiologists do actually receive training in nutrition (Friedman et al., 2010), rhapsodic’s argument about ethos and credibility demonstrates popular techniques of evaluation within their community.¹² Other threads express distaste for *Wheat Belly* because it associates gluten sensitivity with a “fad” or “trademarked diet” (**Phantasmal**, 2012). When user **sweetsorghum** added a post highly recommending the book, no users derided **sweetsorghum**’s opinion, but **frozenfire** politely offered a counter editorial “for the skeptical among you,” and **Gillbreather** recommended researching the “selective carbohydrate diet” as another possible way to address the symptoms targeted by Davis. Mostly, however, Davis’ work was ignored or set off to the side by the *r/glutenfree* community. User **intelligensia_**, while asking for reading recommendations, edited her post to include the following: “let me clarify that i want to stay away from the mentality found in ‘wheat belly’ where it is assumed that everyone in the world would greatly benefit from cutting gluten out of their diet” (2014). While the relative civility surrounding this discussion is not always the case on *r/glutenfree*, Davis’ work was evaluated by the community majority as an unreliable and unhelpful source, and most users accepted this analysis and added the decision to their knowledge set about gluten research.

The communal activity of affirming, rejecting, and building of knowledge in social networks is has been foretold for 50 years by McLuhan’s iconic quote, “In this electronic age

¹¹ All quotations preserve the authors’ original spelling and punctuation, inclusive of inaccuracies.

¹² Reddit is gender neutral and gender inclusive, so pronouns can be especially difficult. Use of the construction “his or her” doesn’t address the issue because of the wide range of gender identifications supported by the community. While “their” may be an incorrect use of the plural, I feel it’s better than committing an incorrect elision of personal identity.

we see ourselves being translated more and more into the form of information, moving toward the technological extension of consciousness” (1964). Whether or not our bodies have become part of the electric complex of information technology (and I would argue that they have), our virtual projections are fully elided with the information expressed by and around them. In line with gaming theory, they are also defined by the information they are unable to relay, that is, information they have not been designed to transmit. On the matter of games, McLuhan further explains, “Any game, like any medium of information, is an extension of the individual or the group. Its effect on the group or individual is a reconfiguring of the parts of the group or individual that are not so extended . . . [A game] has the power to impose its own assumptions by setting the human community into new relationships and postures” (1964). Reddit, a highly rule-bound and overtly gameful networked community has had many deep and lasting influences upon human community and relationships online (Shelton and Nardi, 2015; Weninger, 2014). The particular ways in which it encourages scholarly research, makes high quality data publicly available, and, often in highly irreverent ways, encourages public questioning of norms and standards have resulted in a powerful bundling of pseudonym, reputation, and content collection. You are what you share.

In Chapter One, I supported Salen and Zimmerman’s approach to games as systems of inputs and outputs defined by rules, whether upheld by a computer, an individual, or a community (2003). Salen and Zimmerman present a three-part framework for understanding games by examining their rules, play, and cultural systems. In the broadest possible application of this framework, they put forth that “RULES = the organization of the designed system. PLAY = the human experience of that system. CULTURE = the larger contexts engaged with and inhabited by the system” (2003). While their immediate focus is

on games, gaming, and game design, they allow that this framework will support critique of any designed field. I find this heuristic especially useful for viewing the health and-medicine-related operations of Reddit through a gameful lens. The users, existing as pseudonymous extensions of their knowledge, participate in a system of very clearly demarcated and enforced rules. All subreddits have appointed moderators and posted rule lists, which must themselves comply with the site-wide moderators and rule lists, which must act or be enacted within the constraints of the interface design. The front page of *r/glutenfree* clearly lists the moderators as JulzE820, frozenfire, DTanner, and SonataNo8, the latter two bearing a tag to denote them as specialists in celiac disease. Along with specific guidelines about posting and links to frequently asked questions, the rules panel (on the right side of the page, as on the majority of subreddits) qualitatively explains that “*r/glutenfree* is a supportive community for those eating a gluten-free diet. This diet is required of those with Celiac Disease, Dermatitis herpetiformis, Eosinophilic esophagitis, Leaky Gut Syndrome, Hashimoto's thyroiditis, gluten ataxia, and general Gluten Sensitivity.” This list of pathologies serves multiple functions within the rule set: it validates certain conditions that the community feels are grounded in what it has defined as evidence-based science, it leaves out conditions it feels are not supported, and it links the name of each condition to the corresponding *Wikipedia* article, directing users to become informed by another rich site of collaborative knowledge-building that also places heavy emphasis on source attribution. If a user violates either the letter or the spirit of the law, they become subject to what is widely known as “the banhammer,” and can be either temporarily or permanently removed from the community and its knowledge building capacity. If a user commits a severe enough violation of the rules, they can be targeted with

an “IP ban,” which prevents them from “cheating” the system by creating another account and returning. Once a user’s IP address has been banned, all site activity from that location is blocked. Playing outside of the rules is not necessarily an easy venture.

Play, according to Salen and Zimmerman, comprises the ways that human users experience a system. This definition may be surprising or seem off-target to researchers who are accustomed to associate the idea of “play” with that of “fun.” Play may be accompanied by an experience of fun, but certainly does not require it.¹³ While it is likely that a large number of Reddit (and Facebook) users would describe their experience as “fun,” they are equally likely to describe it as compelling, thought provoking, or addicting. Play, however, is more than the qualitative sense of an experience, but what a user goes through when they act within the rules. In *r/glutenfree*, user experience will be a joint production of the Reddit interface and the human-enforced rules, habits, and customs supported by the community. Reddit is often critiqued for having an unfriendly interface that new users struggle to interpret. While famous for enabling image-sharing, Reddit’s front page is very text-heavy, prompting many users to design and install “skins” to rearrange and change the appearance of interface features in order to optimize their experience. This is not surprising, as optimization through “addons” is a common daily ritual in gaming communities, and */r/gaming* is one of the highest population subreddits.

The element of play that is most significant in an examination of networked health literacy on social media sites is the way that designed experience results in unique *constructions of knowledge*. Salen and Zimmerman's third category, culture, engages the

¹³This discussion is taken up by a large number of game studies texts and articles. It is often addressed in discussions of games as ludus, or rule-based, designed play and paidia, or free, spontaneous play (Callois, 1961; Essid, 2010).

societal structures in which rules and play are embedded. Because gameful media systems exist within a network, culture becomes a node in a feedback loop whereby it influences both design and play but is in turn constituted by them. The current culture of medicine is of great importance to understanding how lay communities participate in knowledge validation in modern health care. While both *r/glutenfree* and the Facebook group *Gluten Free* target an international audience, the bulk of the research that they cite is grounded in American medical conventions, agencies, and licensing practices. Van Dijck, in her 2013 discussion of the ways that sociality is engineered in a “culture of connectivity,” emphasizes the way that networked communication shapes everyday life throughout the community. Networks do not only channel the activities of the surrounding culture, but those activities are programmed by interfaces and platforms: “as a medium coevolved with its quotidian users tactics, it contributes to shaping people's everyday life, while at the same time this mediated sociality becomes part of society's institutional fabric.” Networked sociality then governs habits, routines, and “micro-behaviors.” Van Dijck's claim that “the construction of platforms and social practices is mutually constitutive” is especially important in the context of Western health care as it shifts from a population to an individual level. Social practices evolve quickly in online networks, transforming patient routines and habits. The Institute of Medicine 2004 report on health literacy reminds us that “traditional and mass culture and society provide a lens through which individuals perceive the mix of opportunities and underlying values and assumptions inherent in the healthcare system . . . Social factors work through social networks as well as through government programs, legislation, and private sector markets” (Kindig et al., 2004). In the years since the most recent Institute of

Medicine (IOM) report on health literacy, social networks have become increasingly participatory, as shown in Van Dijck's model of networked influence.

A common reflection upon the state of Western medicine today is that we are moving toward a market model in which patients become consumers (Elliot, 2004; Mnookin, 2012; Mayo Clinic, 2012). Direct to consumer advertising of prescription drugs and devices has had a profound impact on doctor-patient interactions. Patients are more likely to expect a discrete diagnosis and approved treatment in order to feel that they have gotten their “money's worth” from a doctor's appointment (Lachhwani and Ghose, 2012; Stone and Merlo, 2012). Americans are trained to believe that no matter how good they feel they can always feel better, look better, perform better, if only they acquire the correct product. I believe that this marketing model has resulted in over popularization of a number of treatments and an oversimplification of treatment processes, but I do not believe that it is a one-sided, top-down movement rendering patients and “patients-in-waiting” into passive consumers. Patients take on an active and critical consumer role in order to negotiate their health care.

This strategy is deeply interwoven with the habits and micro-behaviors learned from participatory social media and online research. Jenkins, Ford, and Green discuss the networked influence of what they call “spreadable media” within systems (2013). They contend that “this shift from distribution to circulation signals a movement toward a more participatory model of culture, one which sees the public not as simply consumers of pre-constructed messages but as people who were shaping, sharing, reframing, and remixing media content in ways which might not have been previously imagined.” Jenkins et al. do not link this hybridized model to the participatory medicine movement, but the construction

of scientific information does not differ as much from the negotiation of popular belief as it seemed before the spread of Web 2.0. The Reddit community, with their reliance on scholarly sources displaced from gated communities as well as crowdsourced information curated by communities such as Wikipedia demonstrates the multi-directional circulation and construction of health knowledge that is not simply transmitted via approved government channels. Jenkins et al. look at similarly distributed networks of knowledge flow to see how various influences “determine how material is shared across and among cultures in far more participatory (and messier) ways” (2013). The culture of *r/glutenfree* is closely related through interface and infrastructural constraints and by genealogy to the largest gluten-free supportive community on Facebook; however, the structures of knowledge sharing and distribution differ widely between the two communities. This difference results in unique sets of tactics and strategies for decoding the complex questions surrounding non-celiac gluten sensitivity and judging what constitutes an appropriate channel for information generation. Whether by design or as the consequence of the play experienced within the rules of the network, *Gluten Free* exhibits the more highly participatory and messy ways of sharing referenced by Jenkins.

Gluten Free, as an especially large Facebook group, is introduced to viewers by a pinned “RULES” post that attempts to moderate the actions of 32,000 users, mostly tied to their off-line identities and representing a very wide range of levels of health literacy. While Reddit has a text-based interface that requires both higher alphabetic literacy skills and greater comfort with older “nested” formats, Facebook is designed to be accessible to as large a segment of the world population as possible. Users may be more careful not to share information that could reflect negatively on their identity, but may also be less able to

evaluate and retrieve scholarly sources. The *Gluten Free* community is a popular target for Internet “trolls,” who gain access to the group in order to harass members and express negative opinions about their motivations for choosing to avoid gluten. The group moved to “closed” status in order to try to combat trolling. Unlike an open group, closed groups give moderators the power to remove members who violate the rules. The primary moderator of *Gluten Free*, Viola¹⁴, indicates at the top of the page that this group is intended to be an international group (this claim is underscored by the use of a world map in the cover image) although the majority of the members are located in the United States. The first rule outlined by Viola is that members should avoid including personal information in any thread, despite Facebook's native disclosure of a certain degree of personal information with each profile. The group is firmly described as a respectful place for people going gluten-free for a large number of reasons, including sensitivities, allergies, and celiac disease. Most of the rules document is aimed to regulate product sales and personal blog promotions that frequently clutter the page.

The Facebook *Gluten Free* page is focused less on arriving at scientific truth on questions of diagnoses and biomedical mechanisms and more on personal problem-solving and applied symptom management. The most frequent category of post includes recipe sharing or tips on where to eat out or buy gluten-free products. Debates revolving around dietary decisions often highlight the tensions in the community on what counts as “natural” and how important (or even possible) it is to live a “natural lifestyle.” For example, conversations frequently debate whether the Grocery chain Aldi’s is doing a favor to the gluten-free community by providing so many gluten-free alternatives to popular products in

¹⁴ Facebook users are identified by first name only in order to respect the privacy of postings made in forums designated as “closed groups.” Please contact the author for additional identification information if needed.

their “LiveGFree” line or simply pumping their children full of processed chemicals. Members engage in the process of submitting and defending definitions of “natural” that emphasize the functional impact of the definition on their personal lives. These discussions frequently include a great deal of frustration and offense, which becomes an important part of the information creation process in this Facebook group: emotions surrounding research are part of the culture of play within the system's rules, and they become part of the knowledge that the community accepts when making decisions.

The importance of emotions to the constitution of medical knowledge is demonstrated by the success of the blame avoidance tactics used in Davis’ *Wheat Belly*. A subheading in the introduction to the work is, “It's Not Your Fault.” Granting powerful roles to blame, fault, and guilt makes the necessity of their avoidance part of the treatment plan for a diagnosis. Likewise proving the reality of a condition such that a person who is avoiding gluten will not be accused of ignorance or “sheep mentality” becomes an essential part of symptom management. On May 4, 2015, Shireen asked the Facebook group, “[D]oes anyone else get offended when people deny gluten intolerance, or make fun of it? I have gotten into arguments because of it. I find it annoying that people overlook the serious burdens and health issues we face. They need to understand and be sympathetic.” This concern is repeated daily on the posting board of *Gluten Free*. In addition to treating the condition, it is important for a management plan to target symptoms that will affect quality of life: in networked communities shame and guilt may be as serious of symptoms as abdominal pain and allergic reactions. When user Krystal (5/13/2015) excitedly posted photos of the gluten-free products that she had found at her local grocery store, user Stacy replied, “I'm actually glad there is no aldie near me! that is a lot of processed food!!!”

Krystal responded to this critique, “thank you for being rude when I was so happy to finally have more options. Just because there is a lot here doesn't mean that is all I will eat. This will last me for a while. I eat very healthy whole foods. I felt that if I posted this than [*sic*] others would realize there are other options out there.” Shaming is forbidden by unspoken rule in the community. It is common to associate language of praise and blame or guilt with food habits in America, and members react strongly to metaphors of food and morality. A high calorie food is rich, indulgent and sinful, and a lower calorie option is “guilt free.” Negotiations of guilt over indulgence, weight gain, potentially incorrect diagnoses, and natural versus processed dietary options figure heavily in proposed treatment regimes and in proposed etiologies for the conditions being treated.

Many proposed treatments for gluten sensitivity focus on measurements of “quality of life” (QoL). Jessica (5/13/2015) points out “Processed or not [gluten-free snacks] makes my 11 year old daughter with celiac VERY happy!!!” Participants in the American health care system do not only want to be functional and free of disease, but able to enjoy an increasingly important quality called “wellness.” Wellness is not a state defined by presence or absence of physically measurable symptoms alone, but it also takes into account happiness and perceived quality of life. Wellness movements began in the late 1950s and accelerated rapidly in the 1990s through the present.

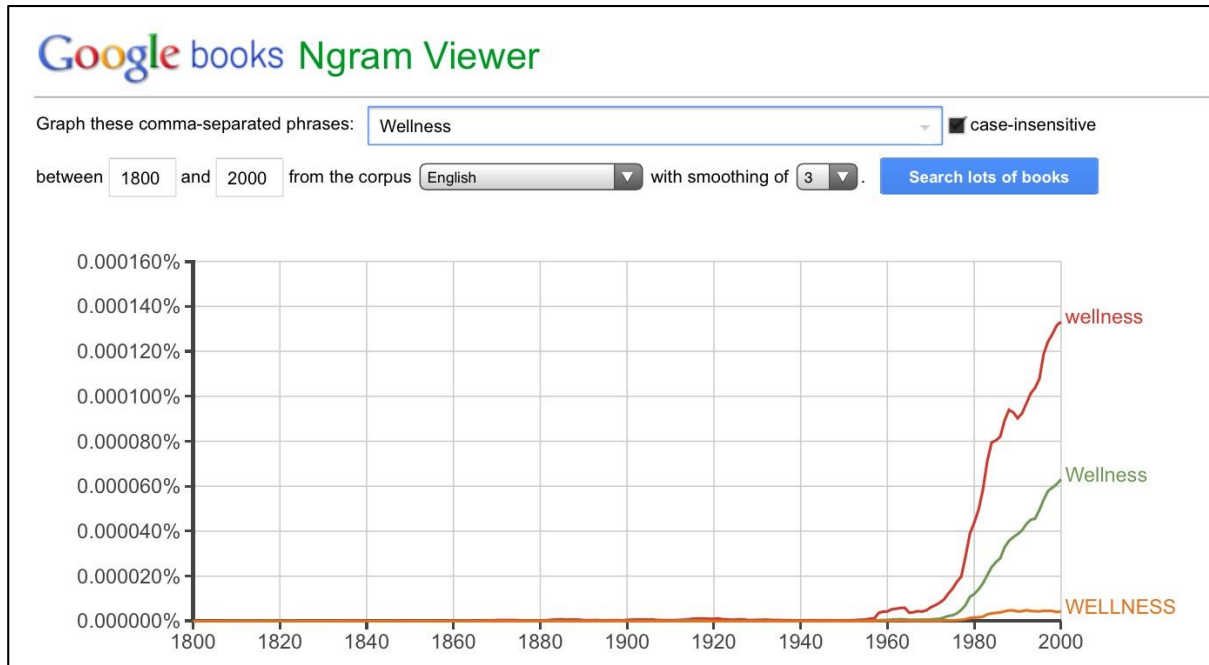


Figure 3.2: Ngram graph of the usage frequency of the word “wellness,” including variation in capitalization, in all books catalogued by Google Books with publications dates between 1800 and 2000.

What is currently perceived as “being well” has been heavily influenced by communal rhetoric and networked spaces. Cardiologist and popular author Eric Topol (2012) refers to Google as a “prosthetic brain” that allows patients to diagnose and find a name for each symptom they experience in an individualized context that might potentially be remedied. Carl Elliott (2004) examines how American desires to enhance wellness, including a desire to “achieve a more authentic self” demonstrate a communal drive to be “better than well.” According to Elliott, Americans have developed a tendency to utilize the “language of illness” to manage optional enhancements. The supposedly inappropriate desire to diagnose discomfort as illness is targeted by groups and individuals who oppose the spread of gluten-free diets by claiming that dieters are inventing sources of disease to make excuses for other poor habits.

Groups like *Gluten Free* on Facebook represent massive support structures of tens of thousands of people, but bring into sharper focus the individual nature of each set of symptoms suffered. Charles Rosenberg (2007) writes that our increased health technology and sharing apparatuses create “patients-in-waiting that are vulnerable to difficult to avoid misdiagnosis.” Social network support for self-diagnosis highlights the previously discussed “tension between illness in the individual patient and disease as crystallized and made socially real in the laboratory’s and in the epidemiologist’s outputs and inscriptions, practice guidelines, algorithms.” Illness may be as difficult to define as wellness: As patients and patients-in-waiting strive to become better than well and to assure themselves that it’s not their fault, the meaning of diagnosis takes on new dimensions that respond to fluctuating communal inputs.

So is wheat actually a new, toxic creation of the 20th century, or are patients seeking a reason for their lack of better-than-wellness? How is this claim absorbed in a Facebook group that has less stringent guidelines for source accuracy and expert credentials? Some members of *Gluten Free* do strive to distance themselves from Davis’ claims, like members of *r/glutenfree*; the community at large seems to accept his view as one of many possible causes for rising intolerance of wheat and gluten containing products. Denise on May 4, 2015 laments, “Unfortunately, the ppl who have gone GF for weight loss, wheat belly or whatever, has given CD & NCGS [celiac disease and non-celiac gluten sensitivity] a bad rap. Set them straight by teaching.” Notably her critique of the *Wheat Belly* theory does not center on its lack of credibility but on the resulting negative public sentiment targeting those who avoid gluten. A document called “wheat belly food list.doc” is popularly circulated throughout the *Gluten Free* community. It appears to have been originally authored by

Rosalyn Wedner, who went through a lengthy battle to determine the correct diagnosis for her gastrointestinal symptoms. Like Wedner, many other users have attempted to create guidelines based on Davis' suggestions to trace which symptoms correspond with which pathologies. *Wheat Belly* may be accepted because it allows users who have been unable to reach the golden standard of “a positive diagnosis” to nevertheless be able to justify the actions that they take to treat symptoms that are very real and impactful. What does it mean to be diagnosed in networked American medicine?

The science of diagnosis in the age of gadgetry

A specific culture of diagnosis arises from online communities of knowledge building, especially when those communities address culturally or scientifically contested diagnostic labels. The modern model of medical diagnosis arose in order to allow specific treatments to be firmly correlated with pathologies such that the necessity for those treatments could be coded for insurance support. Achieving a diagnosis authorizes a set of treatments that have been shown to be effective for managing either the symptoms or the root cause of the diagnosed pathology. Some of these treatments may be restricted by prescription scheduling or by the financial burdens incurred in the absence of licensed diagnosis. Social media communities often invert the order and thereby the function of medical diagnosis: rather than obtaining a diagnosis in order to access the treatment, many community members carefully chart and log the effects of a publicly accessible treatment in order to demonstrate personalized proof that *because the treatments are effective, a diagnosis is warranted*. In this situation, the diagnosis itself performs a different rhetorical role, as validation, achievement, displacement of blame, or another goal meaningful to the diagnosed. In the context of

gameful networked media, diagnosis has itself been refigured to support a different system of evidence and belief.

Gameful systems, whether designated as games or virtual worlds, are uniquely powerful communal spaces for granting enhanced rhetorical significance to medical choices and actions. Celia Pearce, a gaming researcher building on the earlier game studies work of Janet Murray, argues that “virtual worlds of all genres share a set of conventions that have been proven over time to enhance player experiences and reinforce what Murray calls the ‘active creation of belief’ (1997). In the case of virtual worlds, we might further characterize this as the ‘collective creation of belief,’ virtual worlds are, by definition, social construction” (2009). Active and collection creation of belief, translated into the creation of medical knowledge, is both supported and driven by new movements of personalized medicine, enabled by networked sharing, and further supported by the rising popularity of networked medical tracking devices.

In Pearce’s work, virtual communities allow unique forms of emergent behavior and provide a social support network that is as real as those available to users in “proximal space.” A very recent emergence in social media networks is the embedding of wearable technology that enables what Eric Topol calls the “digitization of human beings,” which cultivates a “data-driven participatory culture” of hyper-connected users (2012). For Topol, this is a positive development that will give patients greater levels of control over their care and generate more accurate diagnostic results and treatment plans. He speaks in celebratory words, “some will consider this to be a unique, opportune moment in medicine, a veritable once-in-a-lifetime Kairos.” The ubiquity of mobile phones, digital trackers, and apps that allow patients and patients-in-waiting to record symptoms, behaviors, and attempted

treatments are shifting the landscape of medicine. Each of us creates a large personalized set of data that we can use to share with our care providers or to build our own conclusions, either individually or among our networked communities. McLuhan's technological extension of consciousness has been miniaturized into portable interfaces and gadgets.

Non-celiac gluten sensitivity is often diagnosed by exclusion, that is, it becomes the default diagnosis when testing has not conclusively proven a different organic cause. Because various causes for gluten sensitivity are frequently confirmed or rejected by testing a series of differently restricted diets, tracking plays an important role in validating outcomes. Members of *r/glutenfree* discuss the effects of attempting to restrict wheat products or FODMAPS, following organized diets including the paleolithic and ketogenic diets, and excluding a number of specific ingredients. They make precise logs, often using the popular tool MyFitnessPal to track food intake and accompanying symptoms. Automated charting of consumption and symptoms is even more pronounced in the Facebook group *Gluten Free* as a result of cross-platform interoperability supported by resources like the mobile app for MyFitnessPal and the wearable tracking device Fitbit, which in turn support pairing with one another. According to Van Dijck, “we also need to reassemble the ecosystem of interoperating platforms in order to recognize which norms and mechanisms undergird the construction of sociality and creativity” (2012). The rhetorical power of devices shifts as they are networked into social media platforms. As of May 1, 2015 the Facebook page for Fitbit had 773,000 likes, connecting users or potential users to Fitbit updates via their personal news feeds. Between April 2013 and March 2014 about 3.3 million fitness trackers were sold in the United States with Fitbit models accounting for 67% of sales, followed by Jawbone at 18% and Nike at 11% (Danova, 2014). Popular Fitbit fitness trackers are one of the most

notable exemplars of the “quantified-self movement” and allow users to track food intake, steps taken, stairs climbed, sleep patterns, heart rate, and through additional apps blood pressure, glucose levels, and other pre-defined activities. MyFitnessPal and Fitbit are frequently used together because of Fitbit’s focus on automated algorithmic tracking of activity and MyFitnessPal’s provision of a uniquely massive and collaboratively built database of nutritional information for foods. The official MyFitnessPal blog announced in December 2014 that they had reached 75 million users. MyFitnessPal’s Facebook page had 1.2 million likes, showing the popularity of its integration into Facebook’s interface. Both Fitbit and MyFitnessPal can be linked to Facebook logins and can automate fitness networking and friend making by importing Facebook contacts.

The quantified-self movement is popularly described as the translation of personal activities into computational inputs that are self-monitored and logged on analytic applications. Self-tracking is transforming our present experience of wellness and illness and illustrating future directions in the personalization of medicine. The quantified-self allows us to configure personal inputs of mood, exercise, sleep monitoring, infertility tracking, symptoms, and diet with a hopeful output of good health. Topol is highly optimistic about these developments and expresses hope that as we create a “digital, immutable archive of our lives” we will be able to lead to the creative destruction of medicine through “new, individualized medicine that is enabled by digitizing humans” (2012). Further, he supports the integration of apps and devices into personal definitions of wellness alongside crowdsourcing and “friend sourcing” in social networks. In a delicate rhetorical move that blends the virtual and actual selves, Topol states that “the ability to digitally define the essential characteristics of each individual -- the high-definition human -- sets up a unique

era of medicine.” This movement is not going to flash and disappear: this is the future of American medicine and our models of treatment.

Systems literacy and health networks will require understanding of how to read the quantified-self in order to understand the relation between an individual, wellness, and the available diagnoses for lack of wellness. James Paul Gee's discussion of gaming literacy indicates an “intertextual principle” that describes the importance of understanding any text as part of the genre of texts that must be understood in relation to one another, “but only after having achieved embodied understanding of some texts” (2007). In the case of the quantified-self in social media, embodiment reaches into the network and becomes itself algorithmic. The idea of reading the body has taken many forms in literary and rhetorical histories, and now it emerges as a set of quantified data taken from the body and understood in terms of the individual body. Medical texts, expert opinions, social health communities, and sets of self-tracked data collaboratively shape the genre of medical information that a reader must come to understand and in which they must gain literacy in order to understand the role of diagnosis in networked health care. Jane McGonigal, a game designer and optimistic supporter of quantified and gamified health, believes that layering physical experience into algorithmic feedback models makes both designed and natural environments more meaningful. In her discussion of the Nike+ tracker and accompanying app, she examines the positive nature of the gamefulness of self-monitoring and self-reporting to provide motivation, improve health, and, like all good games, to give people a sense of control of their lives. When connected to and racing against friends via the Nike+ app, “The challenge puts the runners' personal goals into a larger social context, which gives each jog more meaning” (2011). While McGonigal frequently uses the concept of giving something

more meaning or making something tedious meaningful, I find it more useful to consider how these quantified inputs rearrange and create meaning that influences collaborative knowledge building.

As members of *Gluten Free* on Facebook attempt to juggle complex restrictive diets including paleo, keto, FODMAPS restrictions of various levels, gluten and casein free diets, and wheat allergen avoidance diets, they frequently turn to tracking apps and logs in order to substantiate their claims of wellness or illness, often to “prove that something is wrong.” In the wake of the rising popularity of gluten-free diets, many sources began to discuss the so-called “nocebo effect,” which represents the opposite function of the placebo effect. “Nocebo” is the Latin word for “I do harm;” unlike a placebo, which has no effect but convinces patients that they are being helped, a nocebo has no effect but instead creates a sense in consumers that they *are* being harmed (Benedetti, 2007; Colloca and Miller, 2011). Popular sources suggest that persons who avoid gluten and then feel better have convinced themselves that, as Davis argues, gluten is bad for everyone, and therefore they feel better because they are avoiding it (Levinovitz, 2013;Dahl, 2014). In order to combat this type of counterargument, many users on social media who support gluten-free diets create careful records of their symptoms, intakes, and activities. They are thereby able to present detailed dietary records and to show the results in terms of weight, blood pressure, quality of sleep, etc., in order to prove that the treatment is working, and that therefore the diagnosis is sound. On April 19, 2015, Teri Lyn shared her weekly Fitbit report, including total steps, sleep records, and calorie intake. She uses this information to show how going gluten-free and limiting her FODMAPS help her to achieve her health goals. She explains how she uses the tracker in conjunction with getting normal blood tests and checkups to avoid needing to

return to the hospital for G.I. interventions and says that “getting a fitbit a month ago has been the best thing ever . . . And thanks to some great fitbit friends to push me to get my get daily goal! It has also kept me in check with my portion control!” On February 8th, 2015, Cynthia expressed a similar opinion: “get a fitbit. It calculates the calories you're burning and has a food log to keep you honest. It has really motivated me to move more.” Other users recommend use of Fitbits for combating weight gain associated with higher calorie gluten-free diets, tracking restlessness and lack of sleep potentially caused by gluten sensitivity, and keeping track of what dietary supplements or treatments were taken at what time. However, the symptom logs and food diary functions available on Fitbit are not as extensive as the more commonly referenced and less cost-prohibitive MyFitnessPal.

Food tracking and symptom diaries are frequently promoted to new users as ways to understand and to get control of intakes and symptoms. More creative uses and applications of this software are represented by such posts as Iris’s query about tracking gluten to improve polycystic ovarian syndrome (May 13, 2015), Charlie’s recommendations for using MyFitnessPal to create printable PDFs that could potentially be shared in nutritionist visits (4/30/15), Jennifer’s promotion of the app to combat the gluten-free learning curve (4/7/15), Debbie’s use of the app to control for carbs in order to limit extraneous variables (1/15/15), and the recommendations made by various members of the community in response to Linda’s query about gluten avoidance and uncontrollable eating urges (1/11/15). Community members creatively identify a variety of uses for tracking and self-quantifying technology in order to support and prove effective treatments for a number of individual, or individualized, diagnoses.

Personalized tracking devices that turn biological data into quantified output allow for newly emergent behaviors in gameful health networks. Many of the apps used to interpret health data are intentionally gamified through badges, leaderboards, and point-values granted toward achievements and quests. Some apps like Fitbit and Nike+ encourage users to see their input structured into a narrative leading to a healthier life. Use of these apps is layered onto participation in online communities to build a gameful structure for maintaining wellness. McGonigal praises the ways that visualizing the Nike+ user as an avatar that looks energized or tired depending on tracked activity inspires that user to improve their performance; these games are “meant to improve players’ real life experience of a real-world environment” by making goals achievable and maximizing visible output. In gamified health logging of inputs and symptoms, users become player characters in a virtual world that is subject to quantified system rules. Pearce reminds us that in a virtual game world “player characters and their actions are proceduralized through a blend of statistics and die rolls” (2009). With pervasive networks allowing ongoing digitization of the self as a virtual avatar, this expression becomes more literal and the boundaries between self and avatar less clear. Yee’s investigation of virtual worlds similarly indicates the power of virtual worlds to change our behavior, here departing from McGonigal’s claim that a well-designed game gives the player more control over their world. In Yee’s model it is the “unique psychological levers and virtual worlds,” including avatars, that may exert control over not just our actions but also our thought processes. The avatars constructed by inserting digitized selves constructed from our carefully tracked and unique biological data are obviously not transparently uploaded copies of ourselves, but interested and profitable selections of attributes. And despite being highly personalized, these avatars are also collective

productions of the community based on what inputs and outputs (for example diet and weight loss) that community believes to be important.

Yee clarifies that “when we adopt new gadgets, those gadgets help shape how we think, behave, and interact with one another” (2014). Our gadget-generated avatars are one of many powerful tools of persuasion whose actions may be undetectable in mixed reality worlds. Munsen et al. (in Walz and Deterding, 2014) explore the quantification of health in a gameful world by critiquing the use of “gamified personal informatics tools.” Similar to Yee’s discussion of avatar influence, they investigate “which metaphorical levers various interventions might pull” in gamefully designed experiences intended to influence health behaviors and attitudes. The power of networked tracking for health behaviors lies in the perception that prevalent behavior is a health norm that in turn proves to the community that it is a valuable or correct choice. Social media users who are considering avoiding gluten despite not (yet) having achieved a diagnosis that would warrant this treatment will use the uploaded health data of other users as proof to affirm the community view that the treatment is successful and that therefore they have “earned” a recognized and validated diagnosis. *Gluten Free* users, such as Melanie (9/25/14), were directed to MyFitnessPal after expressing her frustrations: “I am going crazy and feel like a hypochondriac. I have issues with gluten and dairy but all blood work comes back negative for CD. I cut out gluten, dairy, all grains, meat and it seems like everything else...” and MyFitnessPal user Dianne (9/25/14) who admits, “I’ve decided to become GF. I haven’t felt well for a long time. I can’t seem to shed weight always have a belly” show the role that digitized tracking gadgets play in attempting to relieve undiagnosed health issues in a way that will hopefully lead to eventual diagnosis. The underlying tension here recalls Elliott’s contention that American patients seek not only

treatments but enhancements such that they might become “better than well”: a diagnosis becomes a tool for enhanced wellness experience (2004). Segal's “kairology” of the medical rhetorical situation considers how “diagnosis is a metaphor, an idea in which we have invested a series of meanings transferred from another medical idea, the idea of health itself. We crave diagnosis. . . (2005) If diagnosis has come to stand for health, then tracking their symptoms in order to confirm or create a diagnosis gives patients unique power to define their own wellness. Munson et al. summarize the current state of gameful digitized medicine:

To help individuals become and sustain their “better selves,” many people are turning to applications and devices designed to promote healthy decisions. These systems present context and intervene in the moment, can connect people to networks with peers and friends and family to deliver accountability, motivation, and advice, and can engage users in rich narratives offering additional motivation and incentives to participate.

As broad definitions of health, illness, and wellness are tracked through personalized data to meet individual rather than population standards, concerns arise as to how this data is safeguarded and whether it might be used for control in addition to personal application. Donna Haraway (1991) warns that “we are living through movement from an organic, industrial society to a polymorphous, information system -- from all work to all play -- a deadly game.” In the quest to gain more control over ourselves through data, are we sacrificing control over our lives by collecting and submitting this data? What will this data say about us, and will we lose power over its voice? Eve Sedgwick (1998) describes the transference of individual health choices into labels: “What had been a question of acts crystallized into a question of identities.” Allowing oneself to be translated into a data-driven virtual representation might have potential to strip the agency from the digitized body in a gamified system.

The performance of patient sociality in a gameful network: a note on ethos

New literacies of ethics must be cultivated to promote healthful practices and safeguarding of information. According to the 2004 Institute of Medicine report on health literacy, a primary cause for lack of clarity in the communication of health information is shame felt by a patient who does not wish to admit that they don't understand that information. Shame is a powerful stumbling block to improving health literacy because it prevents patients from seeking clarifications or admitting that they have trouble decoding data. Pseudonymous communities like Reddit may help address issues of shame and understanding by allowing patients to ask for clarification without revealing their identity or admitting low literacy levels face-to-face. The quantified-self movement heightens the requirements for digital and system literacies within the realm of health literacy because patients must understand privacy agreements, user rights and licensing contracts, and identity security in order to use popular apps and gadgets to manage their health care. Patients must achieve literacy in managing the health and safety of their actual bodies and the bodies of data that constitute their digitized selves.

Jennifer Whitson's chapter "Foucault's Fitbit: Governance and Gamification," examines the risks involved in voluntary self-quantification (in Walz and Deterding, 2014). She discovers a problem in gameful tracking because self-digitization apps tend to impose a top-down model of what counts as health mastery accompanied by corporate surveillance that may stifle the ability of gamers to play with the system. She argues that players are different than "users" because play is often based upon breaking rules or at least testing their limits. Because play does not always follow predetermined pathways "there is an obvious disconnect between the desire on part of the designers of gamify products to promote the

efficient productive behavior of their users and the inherent playfulness of gamers themselves, who are less interested in efficiency than they are in exploration, or defining the limits of systems, and in many cases playing with them...” (2014). I value Whitson's comments on surveillance and governance of play in health systems, although I believe that users and players are able to find experimental and creative ways of applying self-quantifying apps and systems. For example, the tactics used by members of *Gluten Free* show how tracking can be used not only to prove that the treatment for a given diagnosis is working but that a diagnosis is warranted on account of successful tracked outcomes of that treatment. Munsen et al. propose a related question: “because the game designer can craft experiences that reward certain activities, does gamifying health take away an individual’s agency with respect to his or her wellness?” (2014). Are apps and trackers able to impose designed values onto patients and patients-in-waiting? Might they solidify attitudes of pride and shame about certain behaviors or conditions that will negatively impact understanding, literacy, or communication?

In *r/glutenfree* and the Facebook *Gluten Free* community, trackers and apps are creatively used to push back against potentially detrimental sources of shame directed at symptoms for which the medical establishment is unable to determine a cause. Articles accusing the adherents of gluten avoidance diets of following a fad or being prey to a mass “nocebo effect” are countered by networked knowledge databases constructed by social media apps and tracked by wearable devices. A heavily circulated popular press article posted by Buzzworthy and titled “Science Proves Gluten Sensitivity Isn't Real, People are Just Whiners” gave a powerful example of community resistance via tracking. The article summarizes a peer-reviewed study by Peter Gibson conducted in 2013, purporting to debunk

his own famed study from 2011 that had provided scholarly support for non-celiac gluten sensitivity. The study was based on double-blind administration of gluten to patients who self-identified as gluten sensitive. The study's results did not demonstrate any link between gluten consumption and negative symptoms. On January 6, 2015 a large number of members of *Gluten Free* protested the findings of this peer-reviewed study by citing their personal health data. Users including Gisele, Patricia, Viola, Leslie, and Karen counter the article's claims by listing their symptoms and the alleviation of those symptoms following maintenance of a gluten-free diet. The collective belief of the community, supported by individual data, attempts to neutralize the shame imposed by the condescending tone of this article. The community also works to insulate its members from the detrimental effect of personal shame on literacy development through such "venting threads" as Sarah's highly popular April 10th 2015 post, "Stupidest thing someone ever said to you about being gluten free. Ready go!" Sharing frustration, shame, and anger is a staple action of health support networks, whether online or in face to face support groups.

Another heavily circulated article on both *Gluten Free* and *r/glutenfree* is Julia Belluz's April 23, 2015 editorial in the science and health section of *Vox* titled "The real side effect of a gluten-free diet: Scientific Illiteracy." Belluz portrays gluten avoidance as a fad that runs completely counter to scientific evidence rather than as a negotiation of conflicting and uncertain evidence. Her argument is that by accepting a fad that is not validated by the majority of evidence-based science, dieters are willfully ignoring scientific literature and accepting only what they want to be true. This approach cultivates shame and activates resistance on part of social media members who have developed personal expertise in self-quantification. The rules for debate between personalized data and peer-reviewed evidence

change often and acquire different meaning in different settings. Developing ethical responses to alternate forms of argument will improve literacy levels in health care negotiation.

Personal data and scientific evidence are both inputs in a gameful health care network, and we must understand the rules of designed environments to appreciate and respect how they contribute to health outcomes at the individual and population level. Being open to play within the rules of a system will help us understand the ethics of the surrounding culture. Jan Holemevik, drawing on the work of Bonnie Nardi, explores the role of ethics and consequences online: “We are inventing a new ethics through the *act* of ethics, through playing, we are experiencing outcomes and consequences is the key element. This is not about establishing a universal ethics but micro ethics applied individually . . . Through play we can experience the consequences of the ethical choices we make.” Players and designers mutually construct the values of the community, and the rules of each community create site-specific sets of interpersonal micro ethics. Yee writes that “we are used to thinking of altruism as a personality trait, but altruism can also be a system trait. A community can be designed with rules and mechanisms that engineer altruistic behaviors. . .” (2014). The design of both Reddit and Facebook communities allow for easy sharing of articles accompanied by multiple responses governed by the human-enforced rules of the community. This call and response allows not just construction of the body of accepted knowledge but of accepted responses and behaviors regarding the pride and shame of members, or of their digital selves. Clearly, not all Reddit and Facebook communities are positive, and many are unsupportive, hateful, and controlling; however, because they are

rule-based social constructions, the structure retains its potential for well-designed experience.

The rules of social network communities and the rules of professional medical communication don't always make a clean match, but training programs, like the Mayo Clinic Social Media Residency, are underway to help practitioners communicate more effectively with patients. Too often, "doctor" is a term whose authority insulates its members in a shroud of unavailability and nonnegotiability. A lay community of patients offers both available and negotiable discourse, but may also perpetuate a myth that establishment is "against us," or that we have to fight to be heard. Mary Pat Whaley, instructing other physicians in fostering patient empowerment recommends gameful techniques including "avatar coaches," and contends that "emotional technology studies show that people can improve health by accepting and utilizing health care strategies" that they encounter in social networks. As social media health becomes an entrenched part of medical culture, both and all sides must cultivate altruism as a system trait. The ethics of care ask providers to see their patients as people, humans, individuals, but the community too often sees doctors, researchers, or other speakers of medical language as emotionally distant machines. In truth, we're all machines now, but we have the capacity to be compassionate machines. In virtual worlds where we construct our own characters, even within constrained system rules, we have the capacity as well to be *compassionately embodied machines*. Our play is a figurative language of acts, situated within a computational, rule-bound system and distributed through a networked culture. Donna Haraway (1997) clarifies that "configurations are performative images that can be inhabited. Verbal or visual, figurations can be condensed maps of contestable worlds . . . All language, including mathematics, is figurative, that is, made of

tropes, constituted by bumps that make us swerve from literal-mindedness.” As members of online health communities search for ways to negotiate patient identities without clear support from mainstream systems of diagnosis, they perform as builders of health knowledge and translators of population-based medical language into personalized narratives of the digitized but human and suffering self. We must become literate in the system of medical play that binds us to our gadgets, health records, and shared communities. Cynthia Haynes (1995) reminds us not to separate emotion from the machine:

[I]n the interface between technology and the human subject lies a vast emotional terrain dominated by the overlay of technology and cognition, technology and sexuality. . . And memory. . . And infection. . . An addiction. . . And politics. Where is pathos? There is a conceptual bug in our monotonic narratives about machines and humans.

In the social media communities that seek to identify, track, and support gluten sensitivity options and diagnoses, the location of pathos is often shame, which strangles new literacy development. The healing algorithm to shame is compassion.

CHAPTER FOUR: VACCINE RESISTANCE: NETWORKED AGENCY AGAINST “MEDICAL CERTAINTY”

Vaccine resistance information in social media networks is constructed through a set of interlinked systems that rely on keywords and research methods borrowed from scientific discourse, then recontextualized and translated for individual application. When we examine exchanges between anti-vaccine activists and the mainstream medical establishment, we encounter conversations that frequently include very similar vocabularies but rely upon different argument structures and supporting networks of meaning making, possibly without realizing the lack of match. There are no compelling data produced in recent scientific studies that demonstrate a causal link between any vaccines and developmental disorders (Iannelli, 2015; Dales et al., 2001; Kaye et al., 2001; Taylor et al., 1999; Fombonne et al., 2006; Hviid et al., 2003; Madsen et al., 2003). When parents who are concerned about potential risks circulated by various media and social networks bring their concerns to their doctors, they may find that the conversation is swiftly shut down when the medical provider indicates that the work of Andrew Wakefield has been thoroughly debunked. The trouble with this conversational route is that while many concerns often referenced by parents (bowel irritation, unusual crying patterns, emotional withdrawal, etc.) are in fact drawn from a study published by Wakefield in 1998 and later retracted by *The Lancet*, the parents are rarely citing or relying on this source directly. They are citing, rather, the conversation that has

arisen throughout a network formed around these claims. No matter how thoroughly disproven or debunked Wakefield's work might be, that debunking does not disprove or adequately answer the full conversation. It is only by examining the role of scientific language and patient-character agency in the networked health care conversation that we will be able to intervene in a positive manner. I do not suggest that to “intervene” means to alter the discourse or choices of patients who are worried about the safety of vaccines; I hope, instead, to encourage an ethical conversation that grants a speaking role to both members. Like much professional and technical writing, medical communication does not always offer a meaningful dialogic role to the audience or allow expressions of agency in response (Surma, 2005). Networked writing and speech may offer greater participatory possibilities, but only if all participants can reach a baseline of literacy in one another's language.

If a health care provider interrupts discourse by dismissing the incorrect concern, or even a generalization of a relevant concern, no progress will be made toward ethical exchange. In her discussion of shared decision-making in medical care Judy Segal (2005) highlights the concerns raised by conversations between experts and non-experts when they take place within an expert realm: “What frequently is thought of as ‘informed,’ ‘shared,’ or even ‘consensual’ decision-making is actually, when considered rhetorically, a process of persuasion in which the parties are not, despite appearances, fully rhetorical partners.” Segal notes that it is not reasonable to expect patients to become experts in medical discourse, but that improvements can be made toward granting patients a persuasive role. Similarly, when a concerned parent's objections are dismissed on incorrect grounds, the parent is not given full rhetorical agency because the conversation has been moved onto grounds in which they cannot fully participate. The conversation has, in fact, been transposed into one about

research methodology and scientific validity rather than the medical discourse constructed within a network of concerned parents and then brought by a given parent to a medical establishment.

What would it mean to create an “enfranchised discourse” that acknowledges networked knowledge? The burden of changing or reinforcing health care choices falls on the medical establishment rather than on public audiences or lay researchers because of the specialized research program required to initiate an individual into medical discourse. In contrast to untenable patient training, it would not be unreasonable to train health care providers to understand and respect networked knowledge creation. “Scientific validity” may have a different meaning and tone within a networked community of laypersons. What appears to be scientifically valid is often a function of document design, algorithmic persuasion, language barriers, and previous educational experience. Social networks frequently impart extensively preconstructed ethos tool kits to practitioners and experts in various fields. “Big pharma,” “Natural medicine,” “conventional,” and “alternative” are concepts that come bearing identities deeply embedded into overlapping systems. A practitioner must understand what to expect when the networked community has configured them in accordance with one of these roles and how that will influence the impact of their words. Computations that rank electronic search results by user relevance will also influence the prevalence and use of these terms. Social network media are, of course, partnerships of human, algorithm, and interface.

An exploratory study conducted by Kata (2012) that examined the rhetorical tactics and tropes used by patients who refuse vaccines highlights this discontinuity between notions of expertise held by medical professionals and by patients. She critiques a new movement in

medicine that she, perhaps problematically, describes as a “postmodern paradigm of health care” leading to shifts in power and agency from doctors to patients, questioning of the legitimacy of mainstream science, and relativistic attitudes toward scientific truth. Kata’s work revealed a surprisingly strong amount of animosity toward vaccine resisters, but she also reminds us that humanists may overlook an important branch of the system: rhetoric that valorizes patient agency and supports relative and personalized truth may be potentially harmful to public health. Kata supports the claim that “Web 2.0 allows users to *create information*,” in order to argue for the importance of rhetorical awareness in medical training. Studying medical rhetoric in online communities is an activity of great importance:

It is for the laypersons with genuine questions or worries about vaccines and the health care professionals who work to ease their fears that keeping abreast of the methods of persuasion discussed here is essential. Recognizing anti-vaccine tactics and tropes is imperative, for an awareness of the disingenuous arguments used to cajole and convert audiences gives individuals the tools to think critically about the information they encounter online.

A similar directive is issued by Love et al. (2013) following their study on Twitter as a "content driver" of health information on vaccination:

Clinicians must be prepared to address patients entering the clinical environment with opinions and expectations based on social media sources and shared links, possibly including false impressions about adverse effects or unsupported expectations for vaccine effectiveness. Conversely, researchers, practitioners, and public health professionals have the opportunity to employ these channels for patient education to address common myths in understandable, accessible ways. . .

I also hope that increasing rhetorical understanding of the tactics, strategies, and methods of meaning making in online health communities will help us to make positive interventions in public health care, although I believe that each of these tactics must be examined in the context of its situation within a larger virtual world and social network. Nyhan et al. conducted a randomized trial of 1,759 US parents to research what type of messages would

be most effective in vaccine promotion, and they discovered that none of the attempts undertaken in their study design had a significant effect (2014). Refuting the link between MMR (the measles, mumps, and rubella vaccine) and autism reduced misperceptions among parents whose attitudes were recorded but still decreased the intent to vaccinate in those who had expressed prior unwillingness. In addition, images of children sick with preventable diseases, emotional stories about side effects, and the correction of false claims were counterproductive. Because the knowledge that drives alternative health communities was created within networks mediated by social connections and technology, perhaps education must also be instituted in a similarly networked environment. Unless a corrective answers each of the constituent elements of knowledge creation, it does not answer the question constructed by the system. Humphreys et al. (2013) remind us of the power of online media to both “generate and reflect social power relations” through “intercreativity.” Information is not simply transmitted, but collaboratively constructed in *designed environments*. We must understand that social media platforms do not simply convey old information in new places.

In order to highlight possibilities for developing ethical communication strategies and understanding the networked creation of health counter-knowledge, I would like to use networked gaming theory to look into the formation of popular ideas concerning vaccines and developmental disorders, community driven formation of keywords, definitions of “doing research,” and possible points of intervention. As discussed in previous chapters, it will be important to remember that actions taken within virtual worlds have meaningful impact on character construction and ethos development both within and outside of social media environments (Yee, 2014). This hybrid construction of character is taken up by Jan Holmevik (2012) who describes our technologically mediated (and gamelike) situation as

that of a “highly mixed–reality environment.” We never really leave our electronic self-projections behind. Holmevik argues that “our lives and very existence today seem to depend more and more on fragile electricity-powered digital representations of who we project to be.” Many studies conducted on the influence of online vaccine resistance communities over the past 10 years support this continuity of medical character (Humphreys et al., 2013; Love et al., 2013; Hawn, 2009; Kata, 2011; Keelan et al., 2007). These characters, shaped by the constraints and affordances of gameful networks have direct impact on health choices and outcomes in the non-digital world.

The Construction of Vaccine Resistance

Vaccine resistance has existed for as long as modern vaccines have been available -- roughly 240 years by most accounts, possibly beginning with the religious objections of Reverend Edmund Massey in 1772 (Mnookin, 2012; Kata, 2011; Jack, 2014). Some of the earliest popular anti-vaccination tracts were written by Lora Little, who, similar to many vaccine activists today, highlighted the greediness of doctors who will push medical advances simply to line their own pockets (Little, 1906; Kaufman, 1967). Resistance increased rapidly after a number of infections originated from the administration of tainted polio vaccines manufactured at the Cutter Laboratories of Berkeley, California in 1955 (Wolfe and Sharp, 2002; Offit, 2005). In response, President Eisenhower suspended the vaccination program, thereby escalating widespread fear of the potentially negative effects of vaccines and leading to increased rumors of conspiracies involving money hungry doctors (Mnookin, 2012). In 1974, a study was published claiming that nearly 40 children had experienced neurological issues following a DPT vaccination (Kulenkampff et al., cited in

Galiza and Heath, 2008). Once routes for vaccine related litigation were established, claims of injuries requiring compensation rose swiftly. Seth Mnookin calls attention to a watershed moment in 1982 when an NBC station in Washington, DC produced a special titled “DPT: Vaccine Roulette.” This show presented interviews with parents who believed that their children had been injured by vaccines. The interviews had a strong emotional impact on viewers, who responded in large numbers. Popular skepticism involving the efficacy, safety, and necessity of vaccines has risen steadily since this release (Wolfe and Sharp, 2002).

It is significant that both Little's tract and the NBC feature foregrounded the voice of parents. Jordynn Jack's 2014 monograph *Autism and Gender* explores the rhetorical role of “Mother Warriors,” a name drawn from Jenny McCarthy's eponymous book, who attempt to interpret scientific evidence in order to take an active role in the diagnosis and care of their children. Jack explains, “These mothers have been dismissed as denialists, conspiracy theorists, or scientific illiterates, but I argue that those who engage in this movement actually participate in the larger scientific trend of ‘total motherhood,’ a version of mothering that requires women not only to provide affective and emotional labor but also to manage the mental and physical health of their children.” The *character* of health manager, when taken up by either, both, or each parent is a driving force behind the negotiation of health knowledge online. Discourses of reliability and authenticity remain inaccessible to much of the public, and with long wait times and high cost consultations, caregivers take up roles as decoders of the variety of conflicting data they encounter online. One of the most common charges I encounter in vaccine resistance communities is for all members to “do their research.” Similarly, a common explanation for resistance to mainline treatments is, “I have

done my own research.” What does it mean for a layperson, often a parent who has entered the role of decoder and health manager, to “do research?”

The body of knowledge drawn upon and constructed by vaccine resistance proponents has many points of origin, ranging from peer-reviewed studies conducted by accredited research universities to personal blogs and self-published testimonials. I would like to explore this construction by looking at conversations that attempt to arrive at truth by collaborative negotiation in networked media communities. The debates surrounding vaccine safety are often highly emotional, convey a great deal of anger, and liberally assign blame to many persons and organizations. A common claim used by angry supporters of vaccines is that vaccine resisters are uneducated, deluded, and just believe whatever they read on Facebook. A quick glance at any active vaccine resistance Facebook community will dispel this myth: “Antivaxxers” cite many sources, and social media act as sorters, aggregators, filters, and communicators of data from many discourse communities. I argue that knowledge is created within Facebook communities, but that it rarely originates there without citation of outside sources. Facebook communities attempt to mimic scholarly health discourse by including sources, validating authorial credentials, and inviting cross-referencing.

To demonstrate the rhetorical situation of vaccine resistance as mediated by networked communities, I will examine two popular Facebook communities dedicated to resisting compulsory vaccination, *Parents Questioning Vaccines* and *The Vaccine Resistance Movement (VRM)*. These groups serve similar audiences, with a membership overlap of over 1,000 users. *Parents Questioning Vaccines* is a closed group of approximately 3,000 members that is geared toward families looking to share information, find resources, and build community. The group summarizes their mission as follows: “We DO NOT support

The Vaccination Program, but we do welcome those questioning vaccines. Our goal is to provide evidence, data and information on the controversial topic of vaccines. We are a support network for those who believe the real risks outweigh the perceived benefits.”¹⁵ The group guards its ranks closely with externally hosted rule pages, disclaimers, and a warning that “any member who is found to be part of any pro-vaccination mocking group will be banned from this group with no questions asked.” Members are also informed that they will be deleted from this group if “You make any rude, harassing comments. You post a screenshot of someone else's child for any reason. You attempt to bless us with your knowledge of the miraculous benefits of vaccines.” While it is overtly described as a support network, *Parents Questioning Vaccines* can be alarmingly harsh to anyone who is perceived to be an outsider.

The public group *Vaccine Resistance Movement: VRM updates and news from the trenches* is a much larger group with approximately 16,000 members and more openly hostile policies. *VRM* describes itself as “a grassroots, nonprofit organization striving for safe alternatives to vaccines; both empowering citizens around the world with the means of self-sufficiency while determined to expose vaccine fraud and pharmaceutical industry malfeasance.” *VRM* positions itself as both an activist group and a research foundation supporting studies and publications that will expose fraudulent actions taken by the pharmaceutical industry. As a public group, it is unable to moderate membership as selectively as *Parents Questioning Vaccines*, but it maintains heavy policing of its ranks to weed out any potential supporters of vaccines. Members are encouraged to spread the truth

¹⁵ All quotations preserve the authors’ original spelling and punctuation, inclusive of inaccuracies.

and educate one another about alternative research and treatments that are not endorsed by government health agencies.

On February 12th of 2015, Kristina¹⁶ wrote on the wall of *Parents Questioning Vaccines*:

Hello! Last week, I let the doctor give my son three vaccines (polio, hib, and diphtheria). He's finished DTAP and rota. Some episodes of high pitched screaming came the evening after each injection, but I was always able to calm him within 10 minutes. Still, these were the worst! He hardly ever cries! Also, much longer naps than usual. I feel so bad and fear it was due to brain swelling. What can I do, if anything, to speed the removal of these awful toxins? I can't believe I brought him to this.

In this post, Kristina is assuming the role of health manager for her child, and expressing personal guilt for her failure to protect her son from harm (Jack, 2014). Her description and question present a complex text that includes careful code borrowing from the language of the medical establishment and the concerned parent. Note that she uses correct terminology for the vaccines that her son received, and engages in careful observation and reporting of his symptoms following the vaccinations. She makes special note of two symptoms that might seem unremarkable to outsiders to the vaccine resistance dialogue: high pitched screaming and long naps, potentially caused by brain swelling (Young, c. 1980; Thompson, 1982; Kirby, 2005). These symptoms refer to claims originally cited by Lea Thompson as the supposed work of Bobby Young, who argued that they could be indicators of brain damage occurring as a result of a mixture of vaccine ingredients. The claims are widely disproven, and health care professionals are trained to inform parents of this fact (Offit, 2005; Mnookin, 2012). However, when parents like Kristina use this language, they

¹⁶ Facebook users are identified by first name only in order to respect the privacy of postings made in forums designated as “closed groups.” Please contact the author for additional identification information if needed.

aren't citing Young, but invoking the communal discourse that has arisen around his work and been shaped and refined through networked media.

In response to Kristina's question, community members suggested remedies for accelerated detoxing and recommended alternative resources for more information. One poster, Bethany, responded “Have you begun researching vaccination at all? If not, I urge you to begin. I would personally stop vaccination immediately. As above [apply] bentonite clay to injection site and epsom or Himalayan salt baths to draw out the toxins. I used epsom salt baths on my son during his reaction and I believe it helped considerably.” Bethany's response also blends supportive mother-to-mother advice and a call to participate in scientific discourse. Bethany recommends, like so many community members, that Kristina perform her own research. The undercurrent is that you can't trust what doctors who stand to profit will tell you, but that you should seek and decode information on your own, in order to fulfill your role as provider for the health of your children. Again, this recommendation may be met with skepticism by health care providers because of the level of training required to evaluate the reliability of sources and their use of evidence (Larru and Offit, 2014; Iannelli, 2015). The research recommended by the vaccine resistance communities involves complex operations of interpretation and application that may often be confounded by confirmation bias. The results are also constrained by technological proficiency, resource access, health literacy, interface affordances, and algorithmic sorting patterns (Jones, 2011; Kindig, 2004).

In my Writing in Health and Medicine course at The University of North Carolina at Chapel Hill, I frequently introduce my unit on medical writing for popular audiences by having each student in the class perform a Google search for the same term. If Google was a transparent tool that rated search matches by the number of times a term was found on a

given page, then each student would have the same results. As discussed in Chapter One, variation in search results occurs because Google searches are steered by a lengthy and frequently modified proprietary algorithm that takes into account relevance rankings based on previous clicks recorded, partnerships with platforms and services, demographic user data, personal search history, geotagging information, and various profile inputs (Dalby, 2009; Van Dijck, 2012; Google, 2015). Sources like Wikipedia, Reddit, and FDA sites consistently appear toward the top of a search result page for health information, often followed by links to services and businesses that Google has determined are nearby the user. However, Google results, in conjunction with browser data, often steer users to sources that match their previously expressed interests more closely. Search results can also vary based upon which word or phrase we choose to research. An early study on vaccination information online found that the choice between the search term “vaccination” and “immunization” had a profound impact on the type of information retrieved through a Google search (Wolfe and Sharp, 2005). Use of the keyword “vaccination” retrieved 60% anti-vaccination sites, whereas use of the keyword “immunization” retrieved only 2% anti-vaccination sites. This type of automated persuasion cannot be overlooked in a thorough study of the impact of networked media on vaccination decisions. Each of these factors will influence what it means for a vaccine resistor to “do the research.” Online searches through services like Google and Bing are far more accessible to most of the general public than scholarly library databases, journal subscriptions, or physical library stacks. Most parents who do their own research will encounter sources that have been algorithmically sorted by relevance based on how broader Internet populations have ranked them, as well as by the features listed above. In this way,

part of their research has been predetermined: they are not facing a stack of unsorted texts, but a categorized and interested list.

Creating Counter-Knowledge through Networked Community Resistance

On May 1st 2015, Lucy posted a query to the *Vaccine Resistance Movement* Facebook page asking users why they personally decided to become an “anti-vaxxer.” She specified that all she wanted were “personal reasons, not links to data.” Lucy compiled these responses in a pie chart made publicly viewable on Google Docs.

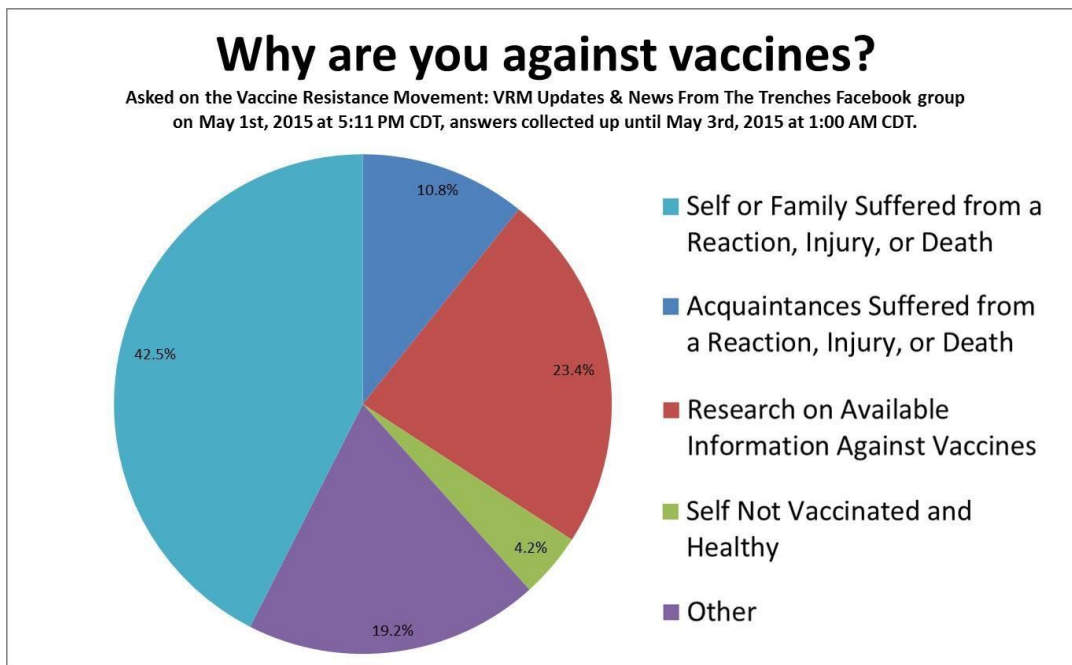


Figure 4.1: Google Chart generated by Lucy Bmq to show motivations for vaccination resistance among VRM members.

This post became one of the most commented upon entries of the past month and generated no small amount of controversy as many users suspected Lucy of being a government plant collecting data to be used against them. The reasons that users listed for why they decided to begin resisting vaccines give an interesting overview of the motivations for the movement and the rhetoric members use to support their actions. The first comment,

by Angela, lists the reasons “research, facts, toxic ingredients, common sense.” Her list summarizes most of the following responses, but it is useful to look at the body of justifications offered in this thread. Other important examples include Lori’s description of the regression of her son who was once healthy into an autistic state following his vaccinations. Heather adds that “the risk of injury or death from a vaccine is much higher than the risk of even getting the disease you are vaccinating against nevermind injury or death from it.” Robert summarizes the conspiracy viewpoint by succinctly stating, “I don't trust the fucking government and big Pharma owns them.” Some posters believed that the creation of this post violates the group's charter stating that this is a safe place for people who don't vaccinate to share their stories, and others tried to rule out the possibility that various posters may be “government shills.” Many users posted graphs, charts, or infographics to support their viewpoints despite the request for personal stories rather than data. It would seem that for many people, *the data and their individual online research have become important parts of their personal narrative*. Additional reasons frequently cited in this thread include: personal reactions to vaccinations that posters received as children, greater faith in the types of research created by the anti-vaccination movement, undiagnosed difficulties with their own children's health, the perception that their doctors were not listening to them and were therefore hiding something, lack of corporate liability for injuries, fear of specific ingredients of vaccines, more trust in homeopathic and organic products, and a firm belief that responsible parenting requires the ability to ask questions. In addition, many users posted *meme* images as a response.

The use of meme images (usually simply called “memes” with the popular definition of “meme as image” implied) as expressions of personal opinion and of group identity is a

tactic that is enabled by social media systems. The concept of a meme was pioneered by Richard Dawkins in 1976 in his book *The Selfish Gene*. Initially, a “meme” was suggested as a parallel to a gene and described the way that an idea could go viral in a social sphere. What we call a meme today is typically a shared image with overlying text whose composition is governed by socially agreed upon tropes and language use matching a pattern of similar images. Meme images are well-suited to Facebook sharing because they are typically of small file size, easy to interpret and share, quickly consumed, and often meant to be entertaining. While meme use opens up another set of social parameters for correctness in a grammar of images and virality as well as language use, it provides rhetorical instances that are both discreetly packaged but that also makes sense only as part of a broader network (Dawkins, 1976; Danung et al., 2008; Bauckhage, 2011). In many health-related discussions, like the one started by Lucy, memes are traded like game pieces that may advance an argument or counter the forward movement of an adversary. While some memes are crafted for very specific circumstances and situations, most are reused and recycled, with the most popular viewpoints being the most frequently shared.

Visual memes appear in most lengthy threads and are peppered throughout many shorter conversations as well. Recognizing the centrality of meme use to the construction and dissemination of vaccine resistance information, as well as its role in building community, Abigail wrote on April 16, 2015 on the wall of the *Vaccine Resistance Movement*: “I need memes! All vaccine related, both funny and asshole-ish to informative!” Abigail’s request received 357 responses, resulting in a thorough collection of nearly all of the most commonly used and shared memes bridging both the *VRM* and *Parents Questioning Vaccines* communities. I collected each of these images and sorted them into themed categories in

order to demonstrate the rhetorical moves executed by networked communication within the rules of the social media systems in which they are embedded. I believe that this collection is a valuable addition to the work done by Kata (2012) in order to analyze the tropes and tactics used by vaccine resistance supporters by providing a more contextualized understanding of collaboratively constructed expertise and medical character roles.

Reviewing 357 responses resulted in the collection of 326 unique memes. These memes can be divided into the following categories based on topic and aim: expressions of freedom of choice and freedom to ask questions; endorsements of alternate notions of expertise and research evaluation; claims that vaccines contain toxins or are unnatural; claims that vaccines are ineffective; concerns addressing side effects and resultant pathologies; claims concerning corruption, conspiracy, or fascism; claims regarding morality, including arguments based on pride or shame; and claims that diseases against which populations are vaccinated do not pose serious health risks. Each of these categories represent a strategy based upon a body of knowledge collaboratively constructed within a gameful network. Some rest on reconfigurations of what knowledge itself means, others on constructions of character -- whether the ethos of the community or of persons or organizations opposed by the community, and others on moral ideologies. None of these three main areas (knowledge, ethos, morality) can be understood outside of the networked community.

Kata's 2012 study on tactics and tropes identified the tactics of the online anti-vaccination movement as: skewing the science, shifting hypotheses, censorship, and attacking the opposition. A sample of what she defines as tropes, encompassing mottoes, phrases, and rebuttals, includes: toxicity of vaccines, the need for vaccines to be 100% safe, claims that vaccines are unnatural, attributing eradication of diseases to other sources,

creating a false dichotomy between disease and vaccine injuries, claiming that “science was wrong before,” targeting government corruption, and claiming expertise on the health of their own child. As demonstrated by Nyhan et al. (2014) in their *Pediatrics* study on ineffective vaccine education techniques, these are difficult claims to counter in the treatment of individual patients. Debunking a claim may actually increase resistance. I believe that this difficulty results from only partially addressing a decontextualized claim after removing it from the surrounding conversation. Kata admits that the conversation surrounding trust and expertise in modern health care is a significant part of the reason that it is difficult to change the minds of those committed to the cause of resisting vaccines, and clarifies that “it is also important to note the criticisms levied here are not meant to belittle individuals with good faith questions about vaccines, or those worried or persuaded by what they find online -- it is easy to succumb to flaws in reasoning, for cognitive or motivational/social reasons.”

However, there is difficulty in entering a community with the attempt to change the governing ideology. Members may feel that their concerns are being dismissed outright when a cause that comes to symbolize their resistance is discounted.

The most important category of argument presented in healthcare discussions, often through memes, in both of the Facebook communities I have studied is that of knowledge creation. This argument has a particularly rich set of inputs drawn from characterizations of expertise, critiques of mainstream medical education, definitions of what it means to do research, and qualifications for validity of evidence evaluation. Rhetoricians and theorists including Arthur Frank (2013) Judy Segal (2005) and Susan Sontag (1989) celebrate the incorporation of patient voices into medical treatment plans, suggesting that we pay careful attention to what types of expertise are given weight in the medical establishment. This is the

same movement that Kata critiques saying that “the postmodern medical paradigm questions legitimacy of science and authority, stressing the need for patients to hold more power. Indeed it can be argued that in a postmodern society, everybody is an ‘expert.’” What validates expertise in a medical environment shaped by the influence of Web 2.0?

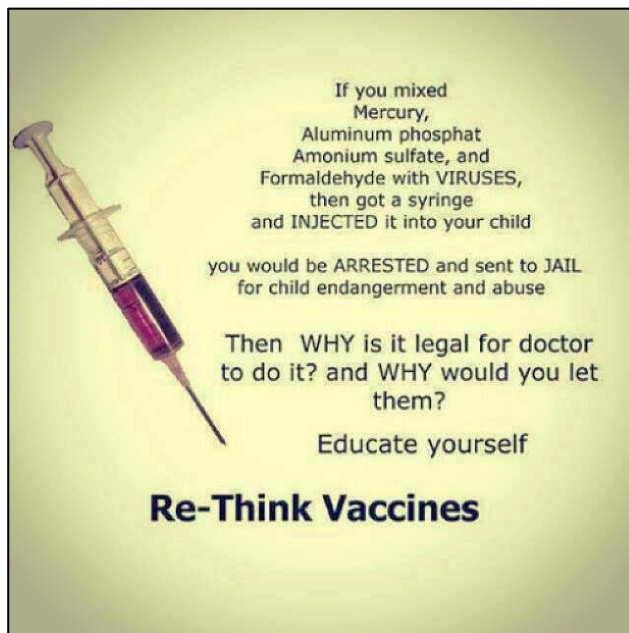


Figure 4.2: Image showing rationale for avoiding vaccination based on chemical safety concerns.

The most popularly shared memes in both communities involve calls for parents to do their own research. These memes frequently juxtapose disturbing images with text that calls attention to startling details of vaccination composition or administration. Figure 4.2 shows the image that has the highest sharing incidence in the collection thread (8 times). This image combines all three categories of persuasion, making appeals based on a call to obtain education, a restructuring of knowledge about vaccine ingredients, an implication of the untrustworthiness of the medical establishment, and a moral command that each person protect their own child. The image uses highly provocative language and capitalizes the terms that its author feels should have the strongest impact on its audience. (Note that it is very difficult to identify the author of any individual meme; these compositions are heavily

circulated, may have multiple points of origin, frequently combine or remix earlier memes, and multiple users may take credit for the same image. It is, in fact, difficult to pinpoint the origin site of each image since they have spread by social-viral transmission). The frequent use of this image attests to the strength of its message, in spite of the data manipulations that inform the text. Many members of anti-vaccination communities would be aware that the ingredient list represented in this image is out of date, that the typos might weaken its persuasive force, and that the color of the injectable fluid in the syringe has obviously been enhanced. None of that seems to weaken the rhetorical power of its imperative to become informed. Similarly any approach to counter the argument made by this meme based upon pointing out these factual inaccuracies will be ineffective because the exact content of the text is not the full message of the composition. Memes are, in fact, a way of playing with the concepts that structure our digital worlds. Galloway (2006) reminds us that “play is a symbolic action for larger issues in culture. It is the expression of structure” in a designed environment. Memes are often intentionally playful, while being deeply symbolic of a larger and very serious discourse.

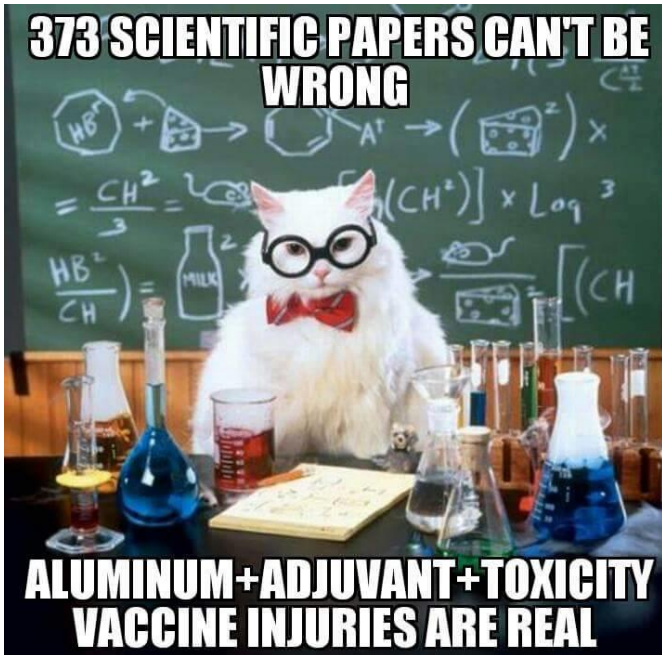


Figure 4.3: “Chemistry Cat” meme showing the amount of research supporting vaccine injury risk

In order to construct their argument, anti-vaccination activists must create characters that will inhabit their virtual world in a way that will gain respect from other users. They must do so within the constraints of the community and the software on which it is built. The interface of Facebook lends itself well to short text posts or to images that will appear in their entirety as other users scroll through their newsfeeds. Character building is often prefaced upon the body of research collected and referenced by individual members. Sticky or featured posts and FAQs in each community support collaborative bibliographies, Pinterest Boards and documents “hidden” on Scribd so that they cannot be taken down by government organizations (<https://www.pinterest.com/ashley51912/anti-vaccination/> and <http://www.scribd.com/doc/220807175/86-Research-Papers-Supporting-the-Vaccine-Autism-Link> are among the most frequently shared). Because a Facebook wall supports only relatively short textual summaries, most research is presented and hyperlinked to off-site resources. Users build status by curating collaboratively built bibliographies of studies that support their claims. Because the resources are not immediately present, and because anchor

links are rarely used even if the full text is publicly accessible, evaluation of the research relies largely on the analytical skills of the user (Iannelli, 2015). It is difficult to fact check an individual use of a reference because it is rarely presented side-by-side with a group member's interpretation. Even more commonly, users work only from the abstracts of scientific articles that are made available through Pubmed and MEDLINEplus.

Figure 4.3 represents a powerful override function performed by argumentative memes: they combine multiple persuasive strategies to cover potential shortcomings of the data. This meme uses a popular template called “chemistry cat” to present a biochemical claim based upon a fairly readily available body of research collected and curated by the vaccine resistance community. It highlights three keywords, aluminum, adjuvant, and toxicity, that do not share a true parallelism (adjuvant simply means supplemental), but that have strong currency in the community. The more problematic claim in this meme is implied in the text at the top of the image: “373 scientific studies can't be wrong.” The body of scientific research showing no link between vaccines and toxic reactions is much larger than 373 scientific studies. This is not a simple balancing act of how many studies are for or against vaccination; the community believes that these studies have greater factual weight and validity than the uncounted studies that failed to support the community's claims. Highly specialized research skills are required to determine what is and is not reliable research. This is a process that is very prone to confirmation bias, selecting for results based on what the researcher already believes. It is popular to claim that because any studies at all exist that show the harmfulness of vaccinations, we cannot discount their conclusions. Therefore, the more important descriptor here is “scientific.” What does it mean to perform scientific research? Can even extensive keyword searching in PubMed count as reliable research when

full text articles are not available, and PubMed gives no guarantee of the strength or community acceptance of any given study?

In order to prove the legitimacy of their research methods, many anti-vaccination communities emphasize prominently and frequently that their membership is not fairly represented by the stereotypical image of a misguided parent who is simply listening to Jenny McCarthy and using Google to find sites that prove what they already believe. This strategy requires at least two basic moves: clarifying what the misrepresentation is and demonstrating what characterization is actually correct. The character of the informed vaccine resistor is a collaborative construction that, as mentioned above, makes use of a number of linking and embedding affordances provided by Facebook's interface. In her famous interview with Oprah, Jenny McCarthy explained that she got her doctorate from the “University of Google,” and that she was able to make informed choices regarding vaccination because of her “mommy instinct” (McCarthy, 2007). These remarks are frequently cited in resources deployed by vaccine supporters who wish to weaken the cause of vaccine resisters (Offit, 2011; Mnookin, 2012). McCarthy has become a strawman for the anti-vaccine movement because of her frequent changes in opinion and reliance on unsubstantiated claims. As a result, distancing themselves from McCarthy and the “University of Google” is a common move of characterization within anti-vaccination communities (see figure 4.4).

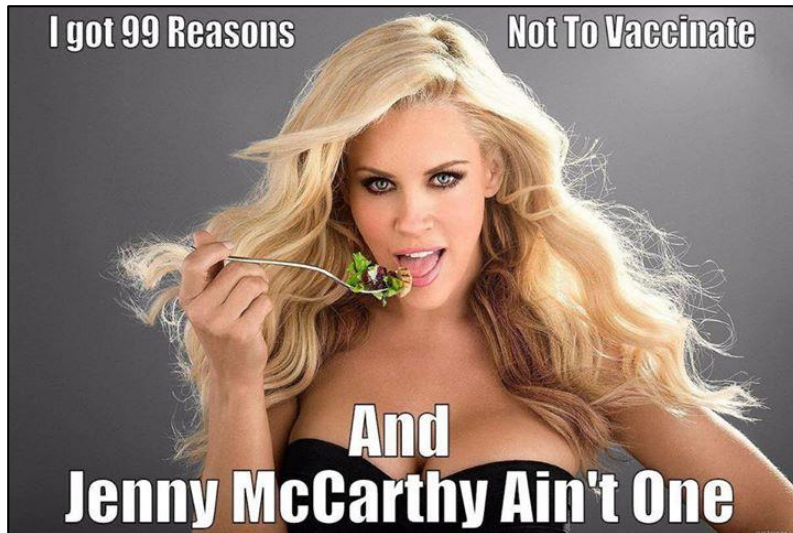


Figure 4.4: Meme showing community opposition to Jenny McCarthy as a spokesperson for the anti-vaccination movement.

It is of course not enough to simply say “I did not get my information from McCarthy or from a Google search.” Parents participate in a complex and communally structured strategy for information retrieval. The research most highly valorized by these communities is retrieved via MEDLINEplus and submitted complete with PMID numbers. Being able to take up the code of the medical community is an important mark of the identity of an independent parental researcher. Scientific claims promoted by vaccine resistance communities are not unsubstantiated, but differently substantiated. The arguments behind these claims move the power from the medical authority to the parents who are supposedly experts in the health of their own child. They borrow the rhetoric of the personalized medicine movement in order to create a concept of personalized expertise and sometimes to promote individualized vaccination schedules. This is a playful revision of the idea of scientific expertise: as play expresses structure, it also makes sense of individual experience in a technological world. Galloway (2006) elaborates, “the lives of individuals are submitted to a process of retraining and redeployment into a new economy mediated by machines and other informatic artifacts.” The acts undertaken by players in the designed environments are then “an allegory of the

algorithmic structure of today's information culture” (Galloway, 2006). By creating information within the framework of an algorithmically structured network, the players are in fact enacting an algorithm that both opens space for and constrains strategic and serious play.

If we wish to make a useful intervention into a space that so highly values deliberate character crafting, we must acknowledge the nuances of individual research characters. It will be important to first acknowledge that the character through which an individual is communicating *is* a researcher and has conducted scientific research. Even if a practitioner finds the scientific basis of that work dubious, no progress will be made if the work goes unacknowledged. As members of a technological society, we are wired to recognize patterns in technology use (Wolf, 2008). Lay researchers are familiar with many examples of retracted claims, recalled medications, techniques that have been banned, and scientific paradigms that have shifted in revolutionary ways (Kuhn, 1962). While the correlation may be over-applied, skepticism is not difficult to justify. Salen and Zimmerman (2003) remind us that games and gameful systems, as systems of information, create meaningful play based on both objective and “perceived information,” which is acquired through game play. (Note that “play” in this context is a serious, nontrivial execution of action within a rule-based system). The rules of a game or system become part of the body of meaningful information, and they feed back into the structure of a system. It is not uncommon, even among well-funded researchers, to refer to doing science as playing a game -- the scientific process is built upon a well-understood and easily observable series of methods and rules within which experimentation occurs. Lay researchers observe these rules and gamic actions in order to synthesize and create new working knowledge about what science is and how it can function as personalized guidance for action. A difficult piece of the process for lay researchers to

synthesize lies in the idea that science can be the closest thing we have to truth while still remaining in process (Iannelli, 2015). A scientific hypothesis cannot be proven, but only accepted or rejected; as a result, studies can fail to support a claim, but cannot prove that it is absolutely correct in all instances. This in-process and under-revision status seems to undercut the validity of medical claims as *fact* according to the popular usage of the term, referring to incontestable and unchanging knowledge. Despite scientific inability to prove complete absence of risk, acknowledging a patient's right to be skeptical as well as the importance of their individual research is essential to acknowledging their personhood at point of care (Murray et al., 2003).

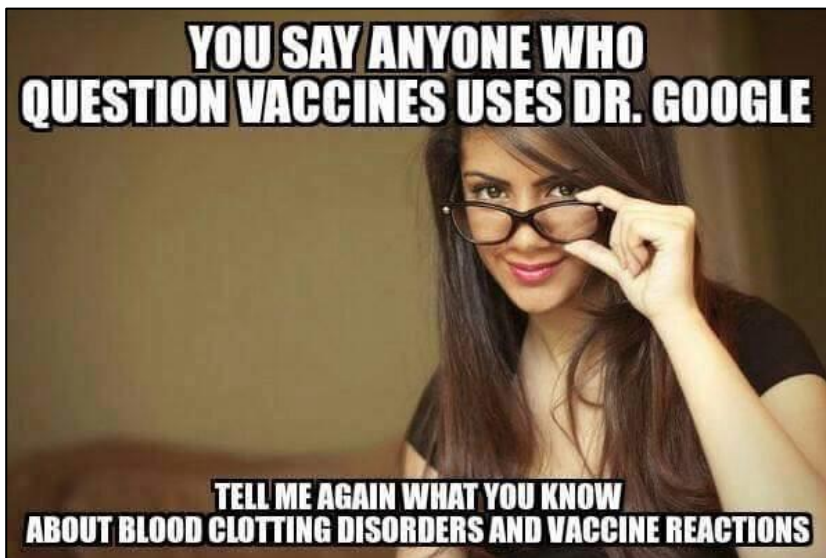


Figure 4.5: Meme showing that patient research goes beyond Google searches and may provide better results than mainstream medical doctors.

The vaccine-resisting character built in response to the instinctual and emotion-based persona of McCarthy relies upon rigorous research methods, uses the vocabulary of medical professionals, and presents itself as selfless and devoid of monetary motivation. Another popular meme (figure 4.5) shows a stark visual contrast to the depiction of McCarthy, while (mis)quoting her methods. This calm, conservatively dressed woman with dark hair and

glasses has done research that intends to outsmart the average primary care provider. She is a projection of the image *Parents Questioning Vaccines* and *VRM* would like present to the public and to cultivate in their memberships. The caption at the bottom of this image sets up an interesting problem because there is no conclusive scientific research published in mainstream peer-reviewed journals that demonstrates a link between vaccines and blood clotting disorders. This misdirection is a tactic that is frequently repeated and heavily shared by meme images in both communities, indicating that doctors are lacking adequate information to undertake the procedures they are recommending. Some images, including figure 4.5, urge community members to ask their doctors about links they have seen in alternative medical journals, knowing that a primary care provider with mainstream medical training will have to answer “I have not heard any support for this” or “I haven’t researched this possibility.” A more common tactic is to highlight doctors' ignorance of the exact ingredients in a vaccination and the potential effects that each of these ingredients may have (figure 4.6).



Figure 4.6: Meme showing intense skepticism about doctors’ knowledge of vaccine ingredients.

Vaccine ingredient lists are circulated almost daily as infographics, photographs, and compiled Google Docs among both communities. On May 3rd, 2015, Will posted a photo on the wall of *VRM* to show the Twinrix combined hepatitis A and hepatitis B vaccine package displaying its ingredient list. He captioned the image: “Ingredients: Human cell culture (aborted fetal tissue) and aluminum.” This caption elides the process of producing viruses in human cell cultures to the process of actually including cultured cells, as well as the material “fetal tissue” with cells grown from a line derived from fetal fibroblasts (in 1961). However, the inclusion of black and white data on the vaccine components, listing many substances widely known as hazardous in large, pure doses, creates a compelling narrative about the harmfulness of vaccines. Angela replies “Glad to see it listed here. If only people would read the box!” Amy chides Will “You forgot the formaldehyde!” to which Will replies that he didn’t have room because wanted the message to “look a certain way.” The potential toxicity of vaccine ingredients is a popular area of debate because ingredients like formaldehyde, aluminum, viruses, and phosphates can be easily used to raise alarm in lay publics. A common counter to this argument is the adage that “the dose makes the poison.” For example, Paul Offit argues that aluminum has been shown to be safe for adjuvant use in vaccines for 75 years (2005). A popular pro-vaccine meme reminds us that sodium is explosive when it comes into contact with drinking water, and that chlorine is a toxic gas used in warfare, but that together, they make table salt. Memes regarding ingredient safety, alone and in combination, are traded back and forth like a battle of Bible quotes, seldom resulting in a winner or any changes of opinion. The accepted *community knowledge* on vaccine ingredients including thimerosal, aluminum, and formaldehyde within the *PQV* and *VRM* is that because there is no FDA approved safe threshold for human consumption, these

ingredients are toxins that should be avoided when possible and quickly purged (or detoxed) from the body if not (Kirby, 2005; Bernard et al., 2001; Dachel, 2008; Sears, 2007). The National Vaccination Information Center (NVIC) provides a vaccine ingredient calculator to allow parents to easily find ingredients lists that will enable them to avoid allowing toxins into the bodies of their children (NVIC, 2015).

Another related strategy that uses official product and manufacturer's information is the use of quotations from vaccine package inserts, with special emphasis on reported side effects (figure 4.7). “Have you ever read the package insert?” is one of the most common questions posed to new members of each community. Reported incidence of side effects is another complex scientific concept with barriers similar to explaining the inability to scientifically prove absolute safety or the impossibility for side effects to occur under any conditions. Any reported occurrence of a side effect can be collected through the Vaccine Adverse Effects Reporting System (VAERS). Doctors may submit any side effects noted in their patients, researchers may present side effects observed and recorded in a lab, and parents can self-report side effects that they observe in their children. If a side effect is reported often enough that it can be considered statistically significant in the context of the population sample, it must be published. Low incidence side effects do not need to have their causality proven in order to be included; there need only be a widely suggested possibility of their existence (Offit, 2005; Mnookin, 2012).

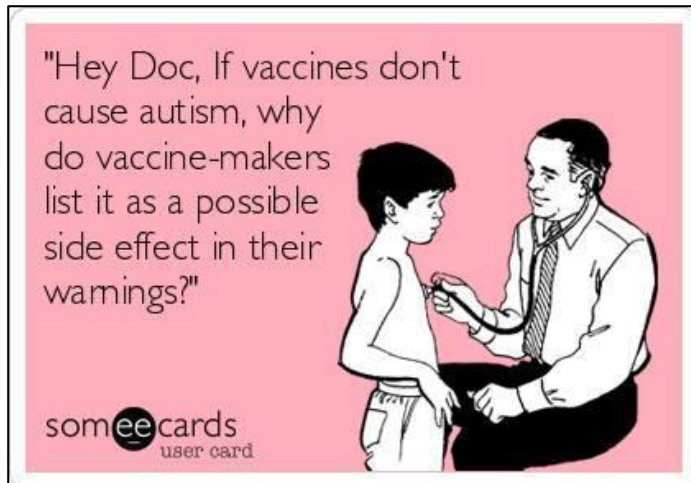


Figure 4.7: Shared image showing patient questioning of side effect reporting.

Sheila requested solid data to support the harmfulness of vaccines from VRM on April 23rd, 2015: “Hope I'm not speaking out of line here. Please list the resources for your research, where is it documented to be the truth? If this is not allowed, delete please.. [sic] We need good solid research and science to back up statements.” The first response was from Tammy: “An excellent place to start is with the actual inserts. Those are available at the FDA's website.” While the FDA is often condemned for being corrupt and (not so) secretly run by corporate interests, FDA sources that are seen as supporting risks associated with vaccines are particularly valuable because they are interpreted as examples of evidence so damning that the government itself can't cover it up. All package inserts for FDA approved treatments are reviewed by and filed with the FDA, and are publicly available online, making them easy to quote and share. The following day, Terry elaborated on the purpose of vaccination requirements: “Basically the reason is for experimental purposes. The vaccine package inserts state ‘there have been no controlled trials’ and ‘safety and effectiveness have not been established’. So in essence, the public just lends themselves to the vaccine experiment!” Catching these corrupt medical officials in contradictions found in their own published materials is prized proof of harm.

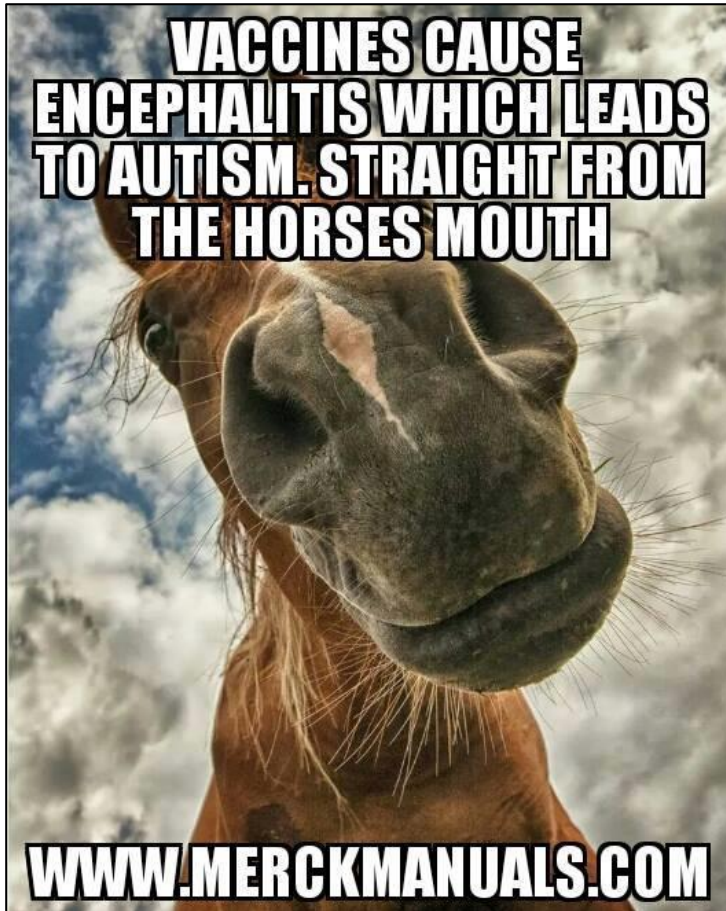


Figure 4.8: Meme showing supposed contradictions of safety recommendations on the Merck website.

An important example of supposedly conflicting evidence presented in government approved patient materials comes from the Merck Manual entry on encephalitis, which states that one of the ways that encephalitis can occur is when “a virus or vaccine triggers a reaction that makes the immune system attack brain tissue (an autoimmune reaction)” (Merck, 2015). Members of the *Vaccine Resistance Movement* applied this information to make a connection between the possibility of an adverse vaccine reaction in a person with an autoimmune disorder leading to encephalitis and the MMR vaccine package insert, which lists autism as a reported side effect (figure 4.8) (The Refusers, 2012). Autism is linked to encephalitis in some studies, although the organic cause of autism remains uncertain (Gillberg, 1991; Ghaziuddin et al., 1992, 2002).

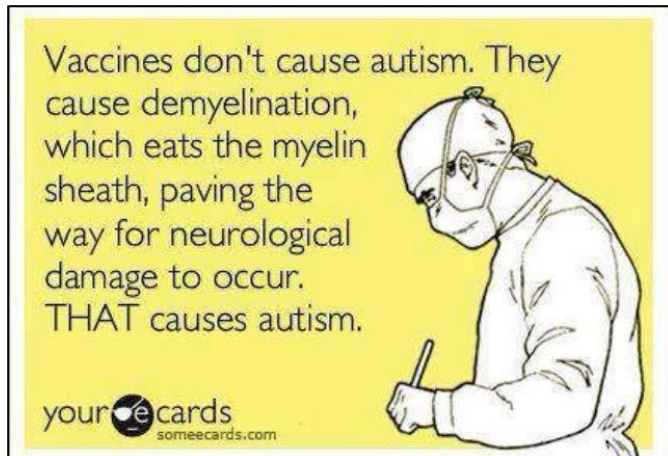


Figure 4.9: Shared image showing an alternate explanation of the biological link between vaccines and autism.

Figure 4.9, the second most commonly shared image in the collection of memes from *VRM* (five times) explains one proposed connection between autoimmune reactions, MMR vaccines, and the development of autism. Note the use of advanced medical terminology, the intentional counter to Jenny McCarthy's emotion-based direct claims that “vaccines cause autism,” and the image of the surgeon who is analogous to the level of expertise claimed by the proponents of this research among the community. Similar strategies are used to explore links between vaccination and allergies, the toxicity of vaccines, the possibility of overloading immune systems, the ineffectiveness of vaccines by reason of pathogen shedding, and support for natural immunity. The actions that link these studies may represent over-applied correlations in the context of formal mainstream medicine, but they demonstrate a rhetorical fluency in building persuasive arguments for causation.

One of the most vocal supporters of vaccines and one of the most hated enemies of the anti-vaccination movement is Paul Offit, whose 2005 book accused vaccine supporters of constantly shifting their hypotheses in order to support their agenda. When the 1998 Wakefield study was debunked, many of Wakefield's supporters rallied to him as a martyr for the cause, while others found new ways to draw connections between vaccines and autism as

in the encephalitis example cited above. The technique of shifting hypotheses to arrive at the same result is another highly strategized communal enterprise. There are a number of reasons why vaccine resisters have arrived at personal certainty that vaccinations are undesirable, as evidenced by Lucy's collection thread of personal justifications in *VRM*. Building legitimacy for these claims and counterclaims, despite multiple revisions of causality, required an infrastructure and apparatus supported by multiple nonprofit organizations (*Age of Autism*, *Project Rescue*), celebrities (Jenny McCarthy, Robert F. Kennedy), community groups (*PQV* and *VRM*), and public speaking platforms (*AutismOne*, *DAN!*). Activists often call for "democratization of data" in communities like *Parents Questioning Vaccines* and *VRM*. Many posters have questioned whether medical researchers' use of difficult language is in fact an attempt to obscure the truth from popular audiences. In this situation, code switching to medical speak by lay researchers may be in effect calling the bluff of the FDA, the CDC, and other government health agencies. The phrase "vaccines cause autism" has been revised many times over the years to make claims between specific vaccines (MMR and DPT), specific ingredients (mercury or aluminum), refinements of those ingredients (thimerosal), different mechanisms of action (overwhelming the nervous system), or different definitions and configurations of harm ("toxic neurological events"). While some of these descriptions may seem scientifically unrelated, the collaborative counter-medical rhetoric of the movement is smoothly executed in order to maintain a sense of continuity and to support the idea that members are all united for the same cause.

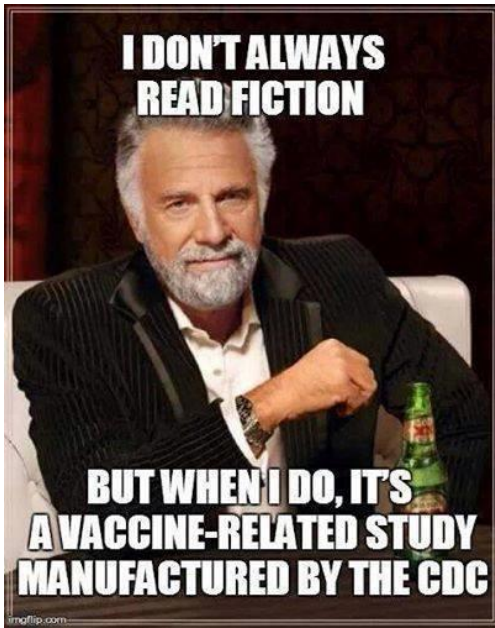


Figure 4.10: “Most interesting man in the world” meme showing skepticism of the political interests of the CDC.

Group identity solidifies around the concept of the “a shared cause.” The aim of *Parents Questioning Vaccines* and the *Vaccine Resistance Movement* is that of securing power for individual rights. Parents should be able to decide and make decisions about their own children's health. Individuals should be able to make their own health decisions. The concept of freedom should apply to medicine as much as to any other field of civil liberties. It is on these grounds that the groups can differentiate between their aims and those of doctors, vaccine manufacturers, licensing organizations, and government agencies.

Distrust of the government is an exceptionally common theme in anti-vaccine rhetoric: The government wishes to minimize individual freedom and to increase oversight of our personal lives. The government only cares about power and getting rich. The government has been bought out by vaccine manufacturers. “Big Pharma” controls the government, doctors, and medical law. Everything revolves around money, rather than your health or your child's health. Community rhetoric claims that pro-vaccine information is invariably

supported by government agents through a procedure described by Paul Offit as the “Big Pharma shill gambit” (2005). *VRM* sees posts on a daily basis expressing concern about Big Pharma shills hiding in the ranks while recording their responses, attempting to find ways to force them to obey, or at its most sinister (but surprisingly common) instantiation, taking note by name of who has unvaccinated children so that the government can come and confiscate them. With fears riding this high, it is no surprise that, as in figure 4.10, researchers fear that vaccine support information published by the CDC has been manufactured for the sake of power and money rather than health.

Sara, a mother concerned about potential allergy emergence in her young daughter, posted to *VRM* on March 26th, 2015: “My question is, is your child vaccinated, do they have any known allergies, and what allergy? Thanks a ton!!!” Sara’s concerns were raised by the frequent attribution of peanut allergies to childhood vaccination, and she phrased her request in friendly, informal language. Most posters either directly answered her question or offered analyses or source lists explaining the mechanisms by which vaccination can result in peanut allergies (OMSJ, 2014). A few other posters, including Pamela, found this question a cause for alarm. Pamela asks, “Sara, is someone paying you to gather information? With government breathing down peoples’ necks, about to seize their children for non-vaccination, and you are asking who has not vaccinated their child? Why?????” Pamela’s intense fear response is not universal among *VRM* members, but it is far from uncommon. Posters regularly raise concerns when answers are sought that might provide identifying information (despite Facebook’s interface defaults already providing a great deal of voluntarily disclosed data), when posters identify themselves as belonging to any mainstream medical establishment, or when someone seems to be unsure about the claims supported by the

majority of the group. Rules enforced by the community attempt to override or control the rules of the technological interface through high-stakes play within a cultural system of fear. The possibility of governmental confiscation of children is also a common theme; while this concern has not been raised by most members, it is spread by a very vocal minority in order to create a sense of urgency and to keep active the suggestion that loss of liberty could escalate rapidly. The full title of *VRM* includes the phrase “news from the trenches,” reminding users that this is indeed a war.



Figure 4.11: Image pointing out previous failures of the FDA to regulate treatment safety.

A vital part of building up the legitimacy of the anti-vaccination movement relies upon the ability of anti-vaccination groups to take down the legitimacy of other organizations. A large number of memes, quotes, and infographics specifically target Paul Offit, often with the phrase “off him” and images of a crosshair or a target. He is compared to Hitler, Pol Pot, or even Barabbas who was released in place of Jesus by Pontius Pilate. Vaccine supporters, licensed doctors, and the FDA are not simply after power and money,

but may actually kill indiscriminately for their own ends. Figure 4.11 represents a large body of infographics and memes that are meant to bring attention to the frequent safety revisions that occur in the pharmaceutical industry. Other common images claim that as many as 50% of pharmaceutical treatments are recalled for safety issues after they have been accelerated for the sake of monetary advantage. The trope that “the FDA has been wrong before” has a great deal of power to convince parents that safety studies could be wrong again (Kata, 2012). There is a sizable body of activists who suggest conspiracy theories without reservation, as shown in figure 4.12, which suggests that the government profits so much off of treatments that they do not want the people to be well. (A more familiar parallel conspiracy theory often cited in *VRM* is that we have had the cure for cancer for many years, but the government makes so much money off of cancer treatments that they have banned pharmaceutical companies from releasing the cure.) Conversely, the virtual character of the collected researcher presented in figure 4.5 would try to distance herself from conspiracy theorists because she sees them as lumping her in with a group of people driven by “brainwashed” mass psychology to hysteria.

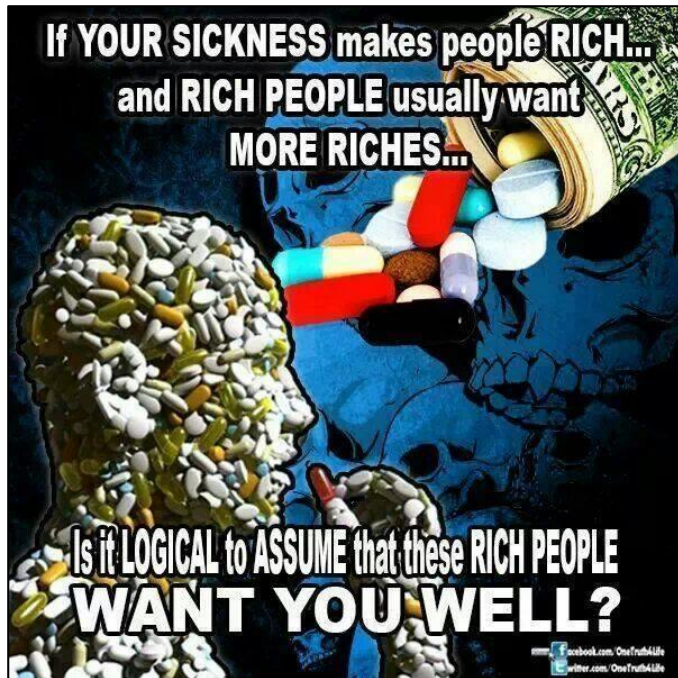


Figure 4.12: Image suggesting conspiracy on the part of those who profit from illness to prevent treatment of illnesses.

A great deal of the arguments that take place in each community are based on purely moral appeals, often invoking the concept of moral “evil.” They represent the conscientious researcher as fulfilling an obligation to stand against a government that only looks out for itself and to become the line of defense between their innocent children and power and money hungry Big Pharma shills. The tactics taken to arrive at this viewpoint vary widely but are usually based upon notions of individual rights and freedoms, frequently quoting the Nuremberg code.

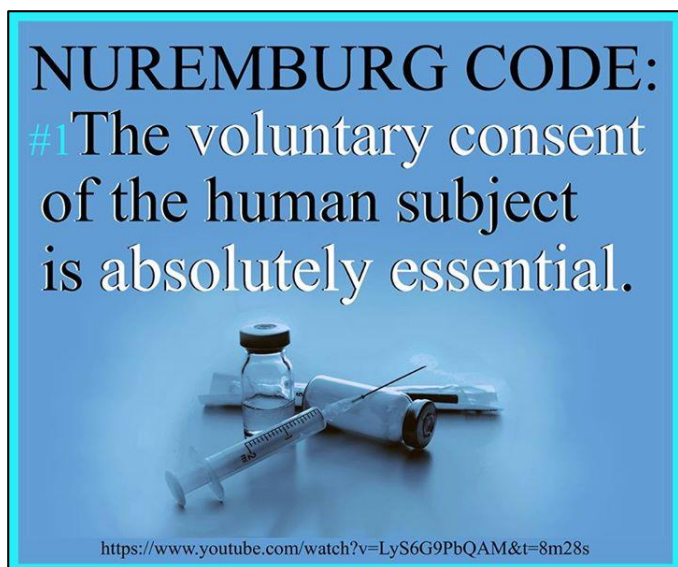


Figure 4.13: Image claiming that compulsory vaccination violates the Nuremburg code.

Other common tropes include comparing the FDA and CDC to fascists or callous despots who are only concerned with the greater good, again positioning the parent as the one obligated to stand in defense of her individual child, preventing that child from becoming another number buffering the general public. On March 24th, 2015, moderator Brittney posted an encouraging note to *PQV*: “If you ever find yourself in doubt, especially when bullies are involved, take a moment to re-read the data that helped you come to your decision in the first place. Check out the FAQ, re-read & reaffirm that you’re doing the best thing for your own family. Generally, those easily swayed are without much knowledge of the topic at hand.” This argument repeats the familiar call for members to build personal data collections, building character through algorithmically sorted source aggregating, but shifts the focus to resisting bullies in order to protect your loved ones. Many women express concerns about being shamed as “one of *those* mothers” when they explain their stance against compulsory vaccination. Similar to the gluten-avoiding Facebook community members, they seek to address the symptom of shame to avoid being saddled with blame or guilt. Brittney reminds

the PQV community that they stand instead as protectors between their families and Big Pharma interests.

A complex but frequently presented argument aligns the idea of a parent's right to choose not to vaccinate with a woman's right to choose whether or not to have an abortion. The abortion debate is frequently cited in anti-vaccination forums because, as described above, many vaccines include viruses that were cultured in a human cell line that originated with fibroblast cells taken from an aborted fetus. However, rhetoric supporting “choice” alternates between pro- and anti- abortion rhetoric. More often, the connection between vaccines and aborted fetal tissue is used as a justifying factor for religious exemptions. Similarly, the inclusion of animal tissues in the development and testing of vaccines is used as justification for moral objections on behalf of vegan lifestyle choices. A more objectionable extension of the trope of a woman’s choice appears in posts, memes, and notices that describe compulsory vaccination as “forced penetration.” A VRM post from April 29th, 2015 showed an image of a man holding his hand over the mouth of a frightened woman, accompanied by the caption, “Forced Penetration: Really -- no big deal, if it’s just a vaccination needle, and he’s a doctor. Do you really ‘need’ control over your very own choices?” The powerful relation of vaccination to rape is a calculated risk that could potentially alienate some members, but appear to others as a relevant comparison.

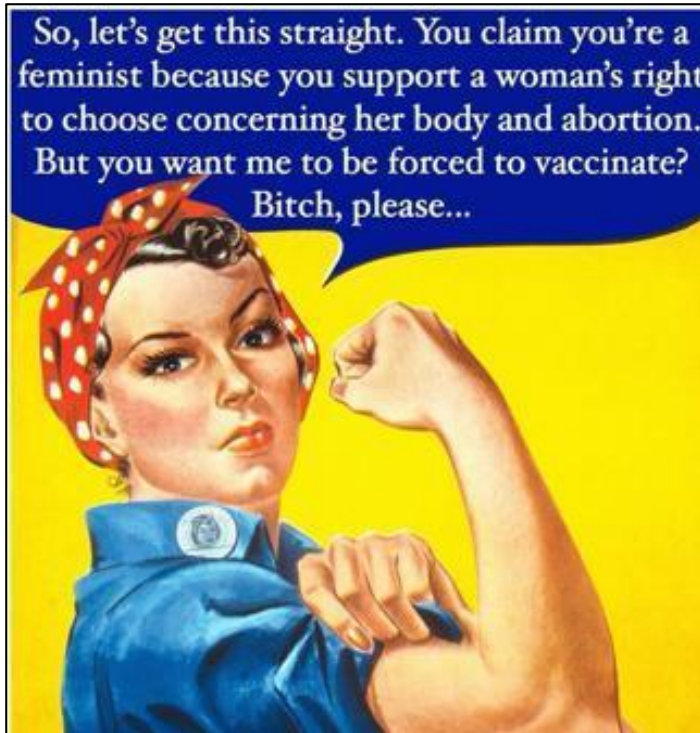


Figure 4.14: Image of Rosie the Riveter claiming that vaccinations violate a woman's right to choose.

The larger issue at hand is one of bodily autonomy and freedom. Joel, an administrator of *VRM*, repeated a featured post on May 7th, 2015:

Just consider the fact that our generation will set the stage for any protections of inherent rights & freedoms afforded to our children & their children. You have no choice but to make your voices heard while you still can. The government is ready to sell your rights & freedoms down the river, to empower the Vaccine Industry with the legal means to force-vaccinate our communities into an early grave. This is the essence of medical tyranny, and the outcome will be determined by your actions, today, tomorrow, and in the years to come. Now is the time to seize your courage, to wake up, rise up and find your will as a proactive participant in this cause.

Joel's stance against medical tyranny is taken up on various scales among community members, depending how they have positioned their virtually characterized selves in relation to conspiracy rhetoric. Whether a member is simply a parent who is questioning if vaccines are the right choice for their children or if they have taken up their place in the trenches, medical freedom remains a foundational concern that is built from a network of inputs

contributing to what it means to be free in a global and digitized world. The tropes and tactics taken up by these communities attain meaning only in the contexts of virtual worlds inhabited by characters constructed through research, information sharing, and association with constructed images.

In 2013, Shelby et al. published a study on strategies for vaccine promotion that offered a more optimistic conclusion than Nyhan et al. found a year later in 2014. Shelby et al. discovered through quantitative and rhetorical study of vaccine resistance in social media that *storytelling* was a more powerful vehicle for actionable health information than were explanations of evidence and statistics. While Nyhan's team did not find a strong correlation between narrative and changes in patient decision-making, Shelby found promise for the use of stories that include statistics and citations from studies when told by health care providers at point of care:

The tools used by the medical and public health communities to counteract the anti-vaccine movement include statistics, research, and other evidence-based information. . . This approach may not be effective enough on its own to convince vaccine-hesitant parents that vaccines are safe, effective, and crucial to their children's health. Utilizing some of the strategies used by the anti-vaccine movement, in addition to the use of evidence-based vaccine information, could potentially offer providers, public health officials, and pro-vaccine parents an opportunity to mount a much stronger defense against anti-vaccine messaging, which relies almost exclusively on personal narrative.

The personal narrative, especially when enriched with scientific evidence may be a more useful approach because it appeals more directly to the specific characters created by patients as participants in networked health care. Telling a story may be one example of a respectful, personalized gesture that acknowledges the centrality of individual research and evidence collection to the medical persona of the patient (Swanson, 2012). As discussed above, research collection and data curation is a central part of character development in the virtual worlds constructed by the systemic rules of social media health communities.

I feel that it is important to emphasize that I, as a researcher in health rhetoric, cannot offer a conclusive answer on whether the opinions and health care plans of anti-vaccination activists should be changed. I believe that an analysis of the gamefulness of networked health information creation provides deeper understandings of communal identity, the production of knowledge that intentionally counters information endorsed by the mainstream scientific community and government health agencies, and the importance of research to medical character formation. We can build upon this understanding to increase opportunities for ethical communication in a medical and political environment that is becoming less negotiable; while the US still allows vaccine exemptions based on moral objections in the majority of states, Prime Minister Tony Abbot announced on April 15th, 2015 that Australians who do not vaccinate their children will no longer be eligible for welfare benefits beginning in 2016. As states and countries further restrict voluntary exemptions, anti-vaccination debates will inevitably grow more emotional and urgent.

Before a story can be told by either party in a medical discourse setting, both members must speak from the role of carefully constructed characters. As explored in my overview of ethos-based motives, acceptance of medical messages is heavily influenced by how a health care provider is perceived and with whom she is perceived to be associated. As more health care providers build social media presences, their own networks, community memberships, collaborations, and even webtext tags will define their trustworthiness (Noseworthy, 2012). When we communicate health information across social media interfaces, our discourse operates differently than it would between two speaking subjects meeting face-to-face. We are instead two, or many, constructed characters communicating in rule-mediated ways within a designed environment. Our digital environments allow certain

attributes to be communicated while keeping others undisclosed or outside the current range of options, thereby selecting for a set of especially persuasive interactions. Identifying and understanding the impact of the allowable range of discussion, gestures, and characterizations will be invaluable for the promotion of health literacy (and agency) in socially networked media.

CHAPTER FIVE: WHY NETWORKED GAMING THEORY MATTERS IN THE SCIENCE COMPOSITION CLASSROOM

I would like to present an overview of the current state of communication training for students in health science fields before suggesting new interventions and approaches to teaching networked composition and ethics. Writing in health and medicine is perhaps best known for its formulaic structure, specialized language, and veneer of perceived impenetrability. However, standards and practice of medical communication have begun to emphasize the need for perceptive and flexible writing skills. To provide a quick glance at the rule-driven nature of scientific discourse, I will show an excerpt from the 2014 Harvard Medical School admissions requirements:

Creative, complex, and compelling discoveries in medicine, as in other fields, involve grappling with good questions borne from close-reading analyses and careful observations. Therefore, effective courses in science and nonscience disciplines should focus on analytical and writing skills. . . . Because effective communication among the medical care team and between physicians and patients is so crucial to the delivery of care, all matriculants should be fluent and have a nuanced facility in English.

Additionally, the admission criteria list as crucial skills for matriculation:

- a. Writing logically and with clarity and style about important questions across disciplines.
- b. Articulating persuasively, both on paper and in oral presentations, focused, sophisticated, and credible thesis arguments.
- c. Appreciating the methodologies that particular disciplines apply for understanding and communicating results effectively.
- d. Approaching evidence with probity and intellectual independence.
- e. Using source material appropriately with scrupulous and rigorous attribution.

At my home institution of UNC Chapel Hill, Medical School admissions requirements are far more briefly summarized, but also include selection criteria based on “communication skills,” as demonstrated by essay and interview. I include these excerpts in my argument on the importance of understanding the process of networked communication in medical rhetoric and its implications in literacy training in order to stress the common ground between rhetorical pedagogy and practice and the contemporary American expectations for competence in health care. Before a student may begin the transition from undergraduate studies to specialized training in health care, she must be highly competent in a style of communication that remained long divorced from the production and dissemination of knowledge in Western medical education. Rudimentary communication skills are an obvious necessity in a profession based on team operation and doctor-patient interaction. The skills detailed above demonstrate the ongoing shift from one-way instruction in medical writing to multi-way and multi-layered communication strategies aimed at reaching a broad and diverse audience whose interests are valued in the field.

Consider the use of communication strategies recommended for the health care provider (HCP) recruited into a modern medical school. The abilities to conduct careful and critical observation, analysis, and inquiry are immediately tied to facility in written and oral language by HMS admissions. Communication skills are framed in this document not only in terms of information exchange among members of medical teams, but among HCPs and patients as well. The language needs of the patient are not relegated to an afterthought. The medical student’s skill in English should be not only well-developed, but also “nuanced.” The detailed requirements for communication skills reflect preparation familiar to educators who have participated in curricular development or design for the most widely taught college

course in America: First Year Composition. While not all FYC courses follow the design currently upheld as “best practice” by cutting-edge scholarship in the field, outcomes in logical argument, source attribution, research practice, oral argument development, evaluating evidence, thesis construction, and cross-disciplinary applications find their place in many writing courses.

Whether these courses are successful at meeting these outcomes is another question altogether. Claims that FYC ultimately fails, or that students still “can’t write” after taking such courses pervade much current scholarship and public discourse about higher education in America (Bartlett, 2003). Even after establishing these requirements as prerequisite for entry, Jules Dienstag (2008) makes the seemingly contradictory claim in the report on which the HMS bases its entry requirements that “In recent years, calls have come from various quarters for medical schools to require and for colleges to teach ethics, altruism, compassion, listening skills, and skills relevant to health policy and economics -- at the expense of science requirements. In my view, these aspects of medicine are best reserved for medical schools, where they can be taught in the meaningful context of interactions with patients.” By this logic, students should be prepared to wield diverse analytical and critical communication skills before entry; however, the true establishment of the usefulness of such skills is really the place of the medical school itself. Because of the centrality of communication situated within an ethically sensitive distributed network, this facility must be introduced, practiced, and analyzed from the beginning of a science student’s career. Systems literacy cannot be left as an afterthought or a pinnacle skill that can be added after the rest is in place; it must form a foundation for study of and interaction with human subjects.

Currently, medical writing instruction primarily appears in the undergraduate curriculum in Writing Across the Curriculum (WAC) and Writing in the Disciplines (WiD) courses that fulfill a communication requirement, often within a first year composition program. Both models offer useful points of intervention in the alignment of scientific and humanistic study and each could be tailored to include training in the networked and gameful composition that is shaping the era of Health 2.0. WAC courses are housed in departments outside of English, but incorporate writing into subject courses. These courses typically stress writing-to-learn, low stakes assignments that allow iterative practice, and collaborative instructor workshopping. WiD courses are taught by composition faculty and foreground writing within the context of interdisciplinary application. WiD courses can present staffing complications because instructors must be comfortable evaluating writing that addresses topics outside of the instructor's field. WAC courses provide subject matter expertise, but instructors may lack familiarity with best composition practices or may have difficulty fitting extra material and assignments into preexisting subject courses, as Dienstag cautions.

Medical writing in composition studies, including both WAC and WiD model courses, is an under-researched and under-discussed field. Cowles et al. (2001) tackle the prevailing opinion that writing is unimportant in health science and present strategies for implementing WAC pedagogies in a nursing program in spite of student and faculty resistance resulting from already crowded curricula. The authors ground their argument that WAC is beneficial to nursing students in the importance of writing-to-learn to the acquisition of critical thinking skills. The assignment genres they determine most useful for enhancement of learning include clinical journals and logs because they have a meaningful

relation to the tasks students will complete in the field and because they require clear, critical thought and organization.

Scholars favoring the WiD approach include Moskowitz and Kellogg (2005) who address what they see as a lack of acceptance of scientific writing in first year composition courses. They seek to increase attention to and incorporation of primary scientific communication, which they define as original research formally communicated by scientists for scientists. Scientific writing can be usefully incorporated into first year composition as an object of study, as examples, or as sources of content. Composition courses need to incorporate non-literary texts and to recognize their rhetorical importance. Moskowitz and Kellogg argue that scientific writing is no more specialized a discourse than humanities genres and that it is no less likely to result in transfer of generalizable communication skills. They believe that the tendency of scientific writing to make its arguments clear and easy to recognize can be helpful to many developing writers. According to this study, there is no clear reason to ground first year composition in humanities genres.

Within specialized medical communication courses offered to upper level students, scientific pedagogy researchers also borrow from composition models. Chávez et al. (2006) examine the shortcomings of training offered for the public health workforce and suggest that the state of education could be improved by attention to WAC and to pedagogies that stress the communal nature of language. They approach the problem in terms of how to better train students to develop the proper mindset that will result in interest in keeping members of a society healthy. Culture, they claim, is primary in health care interactions. Health science communication has specific disciplinary practices that distinguish it from the formal sciences and which must be given attention when training students to write. As instructors train

students, they must build mutually collegial and respectful relationships in order to model provider-patient communication. Writing should value diversity, participatory research, and accountability. Chávez et al. stress the importance of “professional socialization,” which requires us to tailor our writing pedagogies to disciplinary specificities and understand the ethos of the field for which we are training our students.

As we train our students to enter the market through professional programs or to apply for medical school or other graduate programs in health fields, we need to pay attention to both writing strategies and disciplinary practice. Whether communication is taught in WiD, WAC, or upper division composition courses, in order to ethically introduce the construction of health knowledge and patient-provider interaction that engages that knowledge, our curricula should guide students to understand writing as networked, systems-based, and collaborative. Students should have opportunities to participate in emergent systems of information that call attention to patient and patient-in-waiting ethics and that demonstrate how the rules of the system structure and allow the play that creates meaning. The divide proposed by Moskovitz and Kellogg between scientific and humanities composition is collapsing as the “human” in humanities transitions into a more pervasively digitized and quantified self. Students should become familiar with the rhetorical and ethical impacts of self-quantification on communication contexts and outcomes.

Composition pedagogy informed by gaming theory recognizes the central role played by persuasive algorithms that define the rules of the computational systems that structure our communication online. Bringing our students into networked spaces should be standard practice in scientific discourse training. Scientific knowledge is not only composed of evidence derived from methodological practice, but the persuasive discourse surrounding that

practice. Persuasion is exerted by social communities and by the technology that enables them to function, and students should be trained to recognize the influence of both factors. Composition practice and writing-to-learn should occur in spaces of emergent practice that will show learners the processes behind knowledge making. Gaming theory provides a useful classroom heuristic that can demonstrate these processes in terms of the rules that define systems, the play that occurs within those rules, and the culture that shapes and is shaped by play. Medical study is not antithetical to play, but encourages experimentation, learning from failure, attempts at rule breaking, and collaborative negotiation of standards.

Several key principles common to much game studies pedagogy apply to medical communication as well. James Paul Gee's game-based learning principles of situated meaning, intertextuality, distributed knowledge, dispersed meaning, affinity, and insider learning are particularly well-suited to health communication studies (2007). We learn from studying the online knowledge making communities surrounding gluten sensitivity and vaccine avoidance that "the meaning of signs (words, actions, objects, artifacts, symbols, texts, etc.) are situated in embodied experience." When the sanctioned symptoms for a diagnosis don't match the symptoms of the sufferer, generalized definitions no longer hold, but must be modified to encompass the personal, embodied pathology experience of the patient. We learn from the research collected, curated, endorsed, and produced by these communities that each text takes its meaning from a larger, intertextual body of texts that shape and transform the meaning of its members. A parent's narrative of their child's suffering is shaped by our acceptance or rejection of the symptoms and causes explained in relation to the research conversation and its distribution throughout the community. Gee argues that "Meaning/knowledge is distributed across the learner, objects, tools, symbols,

technologies, and the environment” and further that “Meaning/knowledge is dispersed in the sense that the learner shares it with others outside the domain/game, some of whom the learner may rarely or never see face to face.” The knowledge created in social media health communities is shaped by the tools available: Google Docs, Pinterest boards, Scribd, RSS feeds, and simple image embeds and hyperlinks constrain what types of persuasion can be active in the chosen interface. The dispersal of this knowledge across systems, communities, and people is equally relevant to health discussion in lay communities online and scholarly medical research. Patients share and build knowledge with a network of peers who are often physically distant, and doctors and researchers similarly participate in a dispersed network of institutions, journals, and teams. In both lay and professional medical research, members are bound by affinity -- “shared endeavors, goals, and practices” rather than shared identity features, except insofar as identity drives affinity. Gee believes that these principles are embedded within all “good games,” and I would add that they exist within many other functional gameful networks, including both popular and scholarly medical communities.

Gee’s final principle explains that “the learner is an ‘insider,’ ‘teacher,’ and ‘producer’ (not just a ‘consumer’) able to customize the learning experience and the domain/game from the beginning and throughout the experience.” In gameful systems, this holds true both for students studying health care and the patients with which they will someday engage. Patients are not simply consumers, but empowered negotiators who can use sophisticated tools and trackers to persuade their communities and sometimes their doctors to understand new parameters for wellness and diagnosis, customizing their play within the system. Students need to recognize the role played by patients and patients-in-waiting in shaping their field of study while they themselves take on insider status in their learning

experience. How can we empower students and enhance their critical capacity by integrating gameful concepts without trivializing or appropriating their learning spaces?

Incorporating a gameful approach to learning should open rather than restrict the ability of the learner to understand and control the systems in which they gain knowledge. By recognizing the larger context of the health 2.0 conversation, students will be able to better situate the meaning of individual texts as information building units. Once a rhetorical study of health communication establishes the complex role of social, computational, and scholarly texts as important participants in generative dialogue, we can introduce more nuanced situations for emergent writing practice. For example, a blogging assignment about popular flu prevention methods functions as a displaced informal essay when assigned as a standalone assignment on a course web page, but situated within an active community network, it can be used as an opportunity to understand how community inputs structure collaborative knowledge about appropriate care behaviors, source validation, and writer ethos. A blog can enact a number of productive roles that will be taken up strategically by linked social communities in accordance with those communities' rules of practice, provided that it meets the rhetorical needs of the community. Christian Sinclair, a medical doctor of palliative care and active blogger, argues for educational emphasis on employing the voice of an "approachable professional" when doctors and researchers educate patients online:

By blogging as an approachable professional, you establish yourself as a learned professional; one who actually reads the primary literature and not just USA Today headlines about medical research. This establishes trust and confidence in the clinical reader (because they don't all read the stacks of journals on their desks) and the nonclinical reader (who expects you to read all the stacks of journals on your desk (qtd. in Mayo Clinic Center for Social Media, 2012).

Sinclair's approach to understanding blogging roles in relation to multiple audience communities online demonstrates the type of networked rhetorical evaluation that we need to

foster in all medical writing courses in order to align our pedagogy with current best practices in new media literacy. In an active space of health knowledge construction, the prevailing community opinion will influence measurable health action outputs, leading to further validation or questioning of accepted health values in the community. The affordances for linking and embedding, combined with human-enforced community rules, can produce different bodies of knowledge (e.g.: Flu shots are only 60% effective at reducing contraction rates this year, so it's not worth the risk, versus the community opinion that flu shots have minimal risks and flus are potentially more harmful, so patients should take pride in getting their shots anyway).

Ian Bogost (2007) calls to attention to the importance of contextual education structures and the need for gameful approaches to learning by critiquing “the state of current educational practice, in particular the tendency to teach either specific knowledge divorced from context or abstract principles divorced from specific knowledge.” In gameful systems, including social media and networked health communities, each group-endorsed fact belongs to a broad conversation built through extensive linking, collaborative database construction, sharing boards and documents, and by establishing a rationale for granting trust to a certain set of authority voices. However, we cannot summarize the state of knowledge within the community or formulate an effective approach to interventions within it unless we understand how specific endorsed facts gained their acceptance. As explained in chapter 4, dismissing the research of a single study linking the MMR vaccine with autism doesn't productively address the conversation that drives patient action. Understanding the network as a gameful system draws attention to the plurality of inputs and the complexity of their results. Bogost further elaborates, “I argue that videogames' usefulness comes not from a

capacity to transfer social or workplace skills, but rather from their capacity to give consumers and workers a means to critique business, social, and moral principles.” Gameful systems, sharing many computational and structural actions and capacities with video games, provide a heuristic and an angle of approach to gaining critical understanding of network functions. Again, games are not meant to trivialize or to routinize learning. Adding games to the classroom certainly does not equate to making learning fun, and superimposing a gamelike structure onto a learning environment will not facilitate learning without careful attention to what that game or gameful approach is actually teaching and whether or not the actions it prompts match the desired outcomes for the experience. Gamifying a class by adding points, quests, badges, and achievements may have mixed results if it is not structured to promote understanding of communal, distributed, and dispersed knowledge, productive play within clearly defined rules, and opportunities for agency and ownership of the assumed player role. Handing out badges for achievements on a course website doesn’t reach much further than putting star stickers on an essay.

Gamifying classrooms is a popular strategy in American colleges and universities. Some course software management systems, including the popular Blackboard platform, include onboard support for establishing achievements, scoreboards, and badge awards. Jane McGonigal (2011) claims that including game features like levels in place of grades positively impacts learning: “Leveling up is a much more egalitarian model of success than a traditional letter grade based on the bell curve. Everyone can level up, as long as they keep working hard . . . This system of ‘grading’ replaces negative stress with positive stress, helping students focus more on learning and less on performing.” I am hesitant to endorse the imposition of gaming language onto a course that must eventually produce a final grade,

because this is a strategy that must be firmly situated in a conceptual model of experiential learning, and may require implementation across a full curriculum or learning institution rather than a single class. If a student has three courses assigning grades and one that assigns levels, they will map the concept of grades onto the gamified course, knowing that the outcome will be the same. Inevitably, students will want to know which level will correspond with an A and what they need to do to get that A level. Pre-medical students in particular are difficult to unmold from the grade rank system because of firmly entrenched beliefs in the necessity of presenting a 4.0 on their medical school applications. I believe that the best application of gaming in the composition classroom resides in crafting approaches to learning and providing contexts for writing rather than reframing the apparatus of evaluation.

Gameful learning offers interventions into the problems of decontextualized writing situations that frequently arise in WAC and WiD composition courses. Teaching gamic structures and calling attention to the role of design and procedurality in online environments can be a means of discovery and theorization of meaning-making practices. Rhetorically aware application of gaming theory supports current best practices in encouraging multiple technological literacies in the composition classroom (Selber, 2004). Cheryl Ball and Ryan Moeller (2007) present a webtext manifesto to show that “Rhetorical theory is a productive way to theorize how meaning is made among new media texts, their designers, and their readers.” Construction of meaning is significantly different in the context of online rather than traditional print texts insofar as “designers and readers enter into a space of negotiated meaning-making when converging upon new media texts. That negotiated space offers a new-media space for earning critical literacies by means other than research papers.”

For students of health and science writing, gameful social media communities are important spaces for the negotiation of meaning, and rhetorical analysis of these spaces is crucial to developing networked new media literacies. Game scholar Franz Mäyrä argues that “games constitute interactive cultural systems, with a specific emphasis on *meaning making through playful action* (ludosis), as contrasted with meaning-making as decoding of messages or media representation (semiosis) typical for such cultural systems as television shows or contemporary poetry” (2008). Understanding that new media rhetoric benefits from clarification of the gamic elements of information negotiation in social media allows us to study the role of play in systems of meaning.

Gameful networked and system literacies belong in disciplinary writing curricula and should be taught by composition specialists who have studied their operation within the discourse communities surrounding specific course outcomes. James Dubinsky (2004) argues that teaching writing within technical and scientific fields “requires a broad extra-disciplinary understanding, as well as an understanding of key evolving issues in the discipline itself.” Interactive media represent a rapidly evolving source of persuasion in health care. Johnson-Eilola and Selber (1996) established early in rhetoric and composition discussions of new media communication that the rules (which they call laws) of discourse communities online shape the language use of participants. By arguing that “the discourses in which we write also write us” they show that it is the place of researchers in technical writing to examine these rules: “we, as network users and members of professional online communities, have come to ‘police ourselves’ . . . individuals and groups learn and internalize discourse laws as they operate in online forums and they learn the consequences of breaking these laws.” Teachers of technical, professional, and scientific writing should understand the rule-based

nature of online communication and how it impacts the flow of knowledge in discipline-specific composition.

Instructors of health and medical writing in particular should situate classroom discussions of scientific knowledge in an understanding of the relation between fact and persuasion. Scientific persuasion did not originate with online negotiation, although it has been extensively reshaped by contact with digital networks. Students should become familiar with the role of persuasion and negotiation of facts throughout the history of modern scientific discovery. Randy Allen Harris (1997) demonstrates the centrality of argument to science, as well as to the making of knowledge: “The virtues of a scientific claim come not only from the way it is mapped against nature, but from the way it is mapped into the context of specific approaches and communities.” Scientific knowledge is not shaped by abstract forces of persuasion, but by the persuasive strategies employed by specific discourse communities. Harris’ work draws heavily on the famous arguments of Thomas Kuhn, who, as discussed in chapter one, demonstrated that “the process of scientific development is a process of persuasion.” Kuhn’s work focused on arguments within the physical and formal sciences, but persuasion and rhetorical argument are especially important within the health sciences. Segal (2005) echoes Kuhn’s thesis by claiming that “persuasion is a central element in many medical situations. Patients may have to persuade physicians that they are ill and in need of care.” Because of the centrality of persuasion to medical discourse, she proposes that medical writing should be read rhetorically. She stresses that medicine itself is rhetorical “as a system of norms and values operating discursively in doctor-patient interviews, in conversations in hospital corridors, in public debate on health policy, and in the apparatus of disease classification.” I would add that medicine is now increasingly rhetorical as it operates

discursively in rule-bound networked media, in gameful online communities, and in complex interrelations between doctors, researchers, and patients online.

Johan Huizinga, widely recognized as the founder of ludology (game studies focused on structure and rules), wrote in 1938:

If we apply to science our definition of play as an activity occurring within certain limits of space, time, and meaning according to fixed rules, we might arrive at the amazing and horrifying conclusion that all the branches of science and learning are so many forms of play because each of them is isolate within its own field and bounded by the strict rules of its own methodology.

Medical rhetoric must address the nature of science as persuasive play bounded by a set of methodological rules that make experimentation possible, as well as a socially negotiated construction shaped by rules or laws of digital discourse (Ball and Moeller, 2007). The “nuanced facility in English” requested in the Harvard Medical School admissions guidelines should encompass understanding of the roles of both rules (methods) and persuasive rhetoric in the shaping of scientific knowledge and the language in which it is structured. Chris Boyer (in Mayo Clinic Center for Social Media, 2012) argues that doctors and practitioners should understand that in the world of health 2.0, patients seek personalized medicine and will increasingly bring their questions online because “social media is natural for patients.” Facility in English must include fluency in social media operations. Ed Bennett (in Mayo Clinic Center for Social Media, 2012) also writes that medical education should include attention to the ways that “Empowered patients use these social media to take charge of their own health and encourage others to do the same.” From the beginning of a student’s medical education, while they are learning the practices of college-level writing, and before they enter medical school, students should be trained to acquire health literacy skills that include facility with digital inputs and networked persuasion.

Ideally, a course in scientific writing and rhetoric should offer students the opportunity to analyze and engage with an active social media health community. Health care providers are often encouraged to maintain a networked media presence through blogs or interactive sites, and patients are increasingly likely to congregate in social forums in order to synthesize and construct knowledge bases and beliefs about wellness and illness. Celia Pearce's concept of communities of play that enact proceduralized practice provides a productive model for understanding the "shared imagination space generated collectively by players" (2011). The invocation of "imagination space" does not trivialize the role of reimagining medical processes of diagnosis and measures of wellness; the spaces opened by gameful procedurality are equivalent to the spaces of negotiated meaning addressed by Ball and Moeller. Virtual worlds, as discussed by Pearce and Yee, are spaces of emergent knowledge creation that enable students to observe the processes of persuasion that lead to acceptance or rejection of scientific fact and to participate in living discourse while observing the social rules of a chosen community. Colby and Colby (2008) suggest a pedagogy of emergent composition that asks students to participate in social communities surrounding games. Colby and Colby transform their classroom into a "gamespace" by guiding students to encounter active rhetorical discourse surrounding the game World of Warcraft (WoW). I believe that Warcraft, a complex, 10 year old massively multiplayer online role playing game with a fantasy setting, shares many structural operations and affordances with other gameful systems that feature less entertainment-oriented play. Colby and Colby's framework can be usefully applied to participation in gameful health systems as well:

With an emergent pedagogy, teachers introduce writing principles and strategies in order to open up a studio-like space for students to work through those strategies on their own. When gameplay such as WoW is added to an emergent pedagogy, students discover exigencies within the gamespace that need to be addressed through playing

the game. They then determine the game audience these exigencies affect and compose documents that address those exigencies. Thus, this pedagogy creates a playful space that allows students to pursue their own discovery process and create their own challenging assignments. (2008)

Incorporating this pedagogy in a health science composition course would lead us to introduce our students to a rhetorical understanding of social network participation, with careful attention to community values and strategies for knowledge construction. Mäyrä reminds us that “There are various social values and norms that do not belong to the actual written game rules, but nevertheless regulate game playing” (2008). Students would use their observations to identify exigencies within lay networks of health care and employ a carefully calculated response. For example, a student who participated in the *r/glutenfree* community might see that the community is seeking an updated list of peer-reviewed but readable sources that affirm patient agency in seeking diagnosis, while avoiding claims regarding quick weight loss, universal applicability, or shame tactics. They would have to learn how to position themselves in relation to their work (e.g., as a student at a research university, a helpful community member offering advice in good faith, or a minimally prefaced offsite link). As Segal (2005) explains, “in rhetorical productions reside community values.” Students must study the rhetorical productions of a community in order to act in ways that will sufficiently honor its values. Physician Lee Aase, in his 2012 dispatch “Seven Thoughts on Social Media Strategy,” instructs providers and researchers: “Pay attention to community norms. If you watch and listen and approach online connections with humility, it’s unlikely you’ll become ‘that guy.’ Don’t act in ways wildly outside community norms for a community if you want to become a trusted member” (in Mayo Clinic Center for Social Media, 2012). Aase stresses that in social media communities, carefully built relationships are often more valuable than knowledge, and that “altruism pays.” Many communities

maintain what Yee calls “altruism as a system trait,” in which the system is designed to produce altruistic behavior. Norms for respect and for rejection should be carefully noted by students because even well-researched and methodologically sound information is likely to offer ineffective persuasive power if it is introduced in rhetorically inadequate language. Kata (2012), discussed in chapter four, argues that it is imperative for health care practitioners to be aware of the methods of persuasion used in anti-vaccination communities, including their tactics and tropes or they will be unable to offer their patients the correct tools to critically evaluate the information they encounter. Critical evaluation of communal knowledge building should be incorporated into even introductory health communication curricula.

In addition to communal beliefs and strategies, diversity within networks will be an important factor in instruction in scientific rhetoric. The Institute of Medicine 2004 report on health literacy states that “A definition of health literacy that does not recognise the potential effect of cultural differences on the communication and understanding of health information would miss much of the deeper meaning and purpose of literacy for people.” The IOM report also found that “More than 300 studies indicate that health-related materials far exceed the average reading ability of U.S. adults,” showing high levels of diversity in language facility and material access among patients. While Gee (2007) argues that knowledge making groups tend to be structured by affinity rather than identity, it remains important to guide students to recognize the influence of diverse culture on community discourse, whether that diversity exists in regional distribution, language difference, technological access, gender identification, or other situations that impact information construction or reception. Health care providers and researchers must build expertise in addressing multiple audiences who

have interpreted health information in a variety of ways influenced by individual identity and community affinity. Murray et al. found in a 2003 study of 3,209 patients that a provider's response to their patients' discussion of their online research had a significant impact on patient health decisions and future compliance: "If the patient perceived that the physician 'acted challenged' by the information the relationship was more likely to be damaged." Students should learn early to respect personal research practices and to respond carefully in ways that match the values of popular health communities.

Communities with strong defensive tactics may present steeper difficulties in gaining entrance. Students will be more likely to engage in valuable learning in communities that provide information or support for conditions of illness or wellness that are of personal interest to the student. Patricia Anderson (in Mayo Clinic Center for Social Media, 2012) tells researchers that "Each social media tool seems to attract communities of interest in different topics." Researchers should ask "where do your people live?" Even if a course restricts students to studying communities within a single platform (Facebook, Twitter, Reddit, YouTube, etc.) those communities will vary in their choice of which embedded interface features they choose to utilize and to which off-site resources they are most likely to link. No social network remains in isolation from the larger ecosystem of networked media, whether by linking or embedding practices or by platform interoperability features built into the interface structure (Van Dijck, 2012). Rebekah Colby (2015) recommends that students produce "design documents" addressing the features of interface, technological tools, rhetorical strategy, and human rules they will need to take into account while planning their composition. The equation of academic composition and design is supported by Frans Mäyrä, who explains that "rather than just playing a ready-made game, the work of a scholar is

actually much more like that of a *game designer*, who must develop and implement a systematic structure for new ideas and then see how the creation is ‘played with’ by members of the academic community” (2008). Mäyrä equates study, science, and game play because “playing involves creating, testing, and revising strategies as well as the skills necessary for progressing in the game” such that experimentation and hypothesizing reflect the “play impulse within the scientific network.” The health sciences are structured by a designed experience of play bound by methodology rules, and our experience of wellness is played out in response to the rules of scientific rhetoric. Galloway (2006) reminds us that play expresses the structure of larger cultural systems: we can gain a deeper understanding of the persuasive power of a rule-based system by studying how play occurs in spaces opened by that system.

As medicine becomes more personalized, quantified, and narrativized through data, Segal (2005) identifies the prevalence of “lives increasingly lived in the idiom of health and illness, more and more, our identities are health identities,” and she asks “what are possible lines of rhetorical thinking about this *medical us*, and what are possible rhetorically based interventions in customary discursive practice?” I believe that establishing a gameful understanding of networked health communities is a productive rhetorical intervention into discursive practices. The language, expectations, and values of a community gain significance as they are performed through embodied play. The system itself becomes meaningful as patients and patients-in-waiting construct their relations to that system in playful negotiation. Donna Haraway cautions us that “one must not think in terms of essential properties, but in terms of design, boundary constraints” (1991). The properties of a system are given significance by the collaborative and technologically designed rules that surround them.

We are tasked with guiding our students to gain a fluent and functional literacy in networked health systems that operate in gameful ways. Scientific knowledge has always been a product of persuasion, and medical care a complex negotiation of both personal and communal persuasion. The pervasive employment of social media for the construction of health and wellness, influenced by quantification of the self, wide distribution of personal health narratives, selective research evaluation and sharing, and the constraints of the technological interface suggests a strong potential for the application of gaming theory as an intervention in complex and unclear communication between health care professionals and lay communities. Attention to community values, diversity, and differential levels of access and skill is crucial to developing health literacy in current practice, which has been shown to have measurable and long lasting effects on patient health outcomes. Combining a gameful understanding of systems of health knowledge creation as rules, play, and culture with rhetorical study of the elements of scientific persuasion will better prepare students of health communication to participate in a distributed health network.

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