

UC Berkeley

UC Berkeley Electronic Theses and Dissertations

Title

Social Operational Information, Competence, and Participation in Online Collective Action

Permalink

<https://escholarship.org/uc/item/6171w73p>

Author

Antin, Judd David

Publication Date

2010

Peer reviewed|Thesis/dissertation

SOCIAL OPERATIONAL INFORMATION, COMPETENCE, AND PARTICIPATION IN ONLINE COLLECTIVE ACTION

by

Judd David Antin

A dissertation submitted in partial satisfaction of the
requirements for the degree of

Doctor of Philosophy

in

Information Management and Systems

in the

Graduate Division

of the

University of California, Berkeley

Committee in charge:
Professor Coye Cheshire, Chair
Professor Yale Braunstein
Professor Jenna Burrell
Professor Robert Willer

Spring 2010

Social Operational Information, Competence, and Participation in Online Collective Action

Copyright © 2010, Some Rights Reserved (*See: Appendix E*)
Judd David Antin

Abstract

Social Operational Information, Competence, and Participation in Online Collective Action
by
Judd David Antin

Doctor of Philosophy in Information Management and Systems
University of California, Berkeley
Professor Coye Cheshire, Chair

Recent advances in interactive web technologies, combined with widespread broadband and mobile device adoption, have made online collective action commonplace. Millions of individuals work together to aggregate, annotate, and share digital text, audio, images, and video. Given the prevalence and importance of online collective action systems, researchers have increasingly devoted attention to questions about how individuals interact with and participate them. I investigate these questions with the understanding that an individual's behaviors and attitudes depend in part on what they know and believe about how the online collaborative system operates — the "nuts and bolts," so to speak.

In this dissertation I examine how *social operational information* — information and beliefs about the other people who act in online collective action systems — can influence individuals' attitudes, assumptions, behaviors, and motivations with respect to those systems. I examine the role of social operational information from two distinct but related perspectives. First, I employed a social psychological laboratory study to examine the influence of a specific type of social operational information: *relative competence feedback*. Experimental findings demonstrate that individuals who received information that they were of low relative competence compared to others contributed less to a collective good compared to those who received either average or high relative competence feedback. Two key attitudes about abilities and responsibilities in inter-dependent situations — *self-efficacy* and *social responsibility* — mediated the competence–contribution relationship. Furthermore, individual participants' stable preferences about the distribution of rewards for themselves and other people (social value orientation) moderated the the observed changes in contribution rates across experimental conditions.

Secondly, I conducted a qualitative interview study of Wikipedia's infrequent editors and readers. The study focused on documenting and understanding participants' attitudes, beliefs, and assumptions about Wikipedia's social system and the other individuals who contribute to it. Interviews focused on questions about the nature of Wikipedia and its' user-generated system, the characteristics of the people who write Wikipedia, and the motivations

that encourage their participation. Qualitative analysis revealed a variety of tensions around the nature of Wikipedia as an open, user-generated system, as well as between widespread negative stereotypes of contributors as geeks, nerds, and hackers and equally prevalent positive assumptions about their pro-social motivations for contributing to Wikipedia. I argue that these tensions reveal a transition towards a view of online collaborative work as open, creative, and focused on collaboration, dominated by intrinsic motivations such as passion, interest, and a desire to contribute something to the world. This emerging view of work on Wikipedia is captured by Himanen's notion of *The Hacker Ethic*.

Finally, I explore how qualitative and experimental findings can speak to each other, and discuss some methodological challenges and best practices for combining experimental and qualitative methods. I argue that triangulating qualitative and experimental results in the context of this study facilitates: (1) lending detail and nuance to our understanding of complex attitudes such as social responsibility, and (2) improving the ecological validity of experimental findings by vetting assumptions about competence and social roles / responsibilities in a real-world context.

This dissertation is dedicated to Peter Lyman, whose stamp is indelibly inked on all of this, even though he always used a pencil.

CONTENTS

Acknowledgments	v
1 Introduction and Literature Review	1
1.1 Introduction	1
1.2 Outline of the Dissertation	3
1.3 Collective Action and Public Goods	4
1.4 Information as a Public Good	4
1.5 The Distinct Characteristics of Information Pools	6
1.6 Imperfect Public Goods	8
1.7 Production and Exchange	10
1.8 Free Riding and the Social Dilemma	11
1.9 Conclusion	20
2 Theory & Hypotheses	21
2.1 Introduction	21
2.2 Incomplete Information	21
2.3 Operational Information	23
2.4 Relative Competence Feedback and Participation in Collective Action	27
2.5 Social Value Orientation	37
2.6 Alternative Explanations	40
2.7 Conclusion	41

3	Experimental Methods	43
3.1	Introduction	43
3.2	Mixed Methods	43
3.3	Experimental Methods	45
3.4	Conclusion	53
3.5	Figures and Tables	54
4	Experimental Results	57
4.1	Introduction	57
4.2	Participants	57
4.3	Dependent & Independent Variables	58
4.4	Experimental Conditions	61
4.5	Results	61
4.6	Summary & Discussion	68
4.7	Conclusion	72
4.8	Tables & Figures	73
5	Qualitative Methods	108
5.1	Introduction	108
5.2	Why Study Wikipedia?	108
5.3	Why Study Infrequent Contributors?	109
5.4	Emic & Etic in Qualitative Research	110
5.5	Semi-Structured Interviews & The Interview Protocol	114
5.6	Recruitment	115
5.7	Qualitative Coding and Analysis	116
5.8	Conclusion	117

6	A Qualitative Study of Wikipedia	118
6.1	Introduction	118
6.2	Sample Description	118
6.3	Data & Analysis	119
6.4	Discussion	137
6.5	Conclusion	142
6.6	Figures & Tables	144
7	Synthesis, Implications, & Conclusion	149
7.1	Introduction	149
7.2	A Holistic View on Social Operational Information	149
7.3	The Marriage of Experimental & Qualitative	153
7.4	Design Implications: The Case for Adaptive Incentive Systems	155
7.5	Conclusion	157
	References	158
	Appendices	175
A	Experimental Instructions	175
B	Attitude and Disposition Scales Used in Experimental Studies	176
C	Interview Protocol	182
D	Interview Recruitment Survey	186
E	Creative Commons License	187
E.1	License	187
E.2	Creative Commons Notice	192

Acknowledgments

How does one begin to write acknowledgments for a dissertation? I can think of both abstract and specific ways to thank all the people who need thanking. I'll begin with the abstract. I have been lucky to learn from and work with some truly brilliant and generous researchers, professors, and students over my long, long career as a student. From my earliest experiences of excitement with scholarship, I have found mentors to guide me and be my friend. I have found fellow students who shared my excitement and taught me so much. Is a dissertation the culmination of all of that? In a way, I believe it is. While this document is far from perfect, it represents all that I have learned about the theory, logic, and practice of research. It is a synthesis, the best I could make it, of how I have learned to think about problems and marshal evidence to tackle them. As much of a culmination as this is, then, that is how abstract my thanks must be. Thanks to the multiple systems of institutions, people, and money who made it possible for me to be a professional graduate student for 8 long years.

But, of course, there are many specific people who need detailed thanks. First and foremost, I owe so much to my adviser, mentor, and friend Coye Cheshire. Coye showed me from the earliest days of our relationship what it was to think clearly and precisely, to examine the nuances of an idea and move it forward. He taught me so much about social psychology, about experiments, about the practice of research. He has helped me to be a better writer and a better thinker. He has always treated me with respect, more as a colleague and a friend than as a student. But, whether he knows it or not, I have been a student all along, learning from his example and his advice. For all that I am eternally grateful.

I would also like to thank the three other members of my dissertation committee who have been unnecessarily giving of their time and support over the years. Robb Willer provided me with a strong foundation in social psychology, and helped me to develop a good sense of experimental design (and a good sense of humor). Jenna Burrell always treated me as though I knew as much about qualitative work as she did, which is crazy. Even short conversations with Jenna kept me grounded, reminded me what qualitative work is all about. Finally, Yale Braunstein has been a tireless supporter of my work from the beginning, and has schooled me well not only in economics, but also in all the practical things I needed to know to finish a dissertation.

My path to the iSchool was a winding one, and along that path I was helped along by several fantastic mentors who pushed me in the right direction and supported all my crazy ideas. At Hopkins, my friend and mentor Felicity Northcott taught me what it meant to think anthropologically, and also how to be irreverent and foul-mouthed. At Maryland, special thanks are due to Tony Whitehead and Mike Paolisso, both of whom saw that the iSchool was the right place for me and helped me so much to get here.

I am a firm believer that I have learned as much through interactions with my fellow students as anywhere else. So many thanks are due to the various students who have passed through

the iSchool and helped me along the way, but especially: Joe Hall, Josh Blumenstock, Dan Perkel, Megan Finn, and Ashwin Matthew. I especially need to thank my good friend and partner in crime (in social psychology, BBQ, and so many other things...) Andrew Fiore. Andrew's unbelievable wisdom and all around fun nature kept me sane many times.

I have benefited immensely from my involvement with the Institute of Business and Economic Research (IBER) at the Haas School of Business, and the XLab, which hosted all of my experiments. Many thanks are due to Bob Barde, Brenda Naputi, Cesar Portillo, Miho Tanaka, Steve Gomas, and Steve Astrachan. I also could not have completed any of this work without financial support from both the XLab Small Grants program and the IBER Dissertation Support Grant.

The many people who support everyday life at the iSchool make my research possible in so many ways. Kevin Heard, Gary Lum, and Roberta Epstein have spent many hours responding to my requests, saving my computer from malware-induced oblivion, and generally keeping our computers, networks, and printers humming around here. Meg St. John has always put a cheerful and witty spin on the mundane bureaucracy that unavoidably accompanies getting a PhD. Lety Sanchez anchors an administrative staff that has provided generous and skilled assistance with every little thing I've needed, and done it cheerfully. Many, many thanks to all of the iSchool's support staff.

Over the years I have watched many graduate students suffer through stress and hard times along the road to filing a dissertation. But I never wondered why that stress never seemed too much for me because it has always been clear that I owe that to my family. I am lucky to have a group of interested, supportive, and patient people on both sides of my family who have seen me through many years of schooling. None has done it more gracefully or constantly than my wife, Tamar. Tamar is as brilliant as she is funny and practical, and listened to me talking about this project countless times. She feigned interest when she knew I needed it, read drafts, and comforted me when the deadlines came near. I could not have done this without her.

Finally, I feel the overwhelming need to write about Peter Lyman, the man who reached out to me and welcomed me first to the iSchool. Simple gratitude seems to fall short. Peter is the only reason I was able to negotiate the tricky transition from anthropology to this new field (whatever it is). He supported me, listened and offered advice in a completely unique way. Peter was able to say through silence more than most people can say in a long speech. He taught me patience and the importance of being flexible, open to new ideas, and completely open about one's own assumptions and biases. He helped me learn to apply the qualitative perspective in useful ways, and to talk about it amongst the communities of technologists that were so new to me. I stayed in touch with Peter throughout his long illness, and he always supported me. I'll never forget coming to visit him at his home one day. He was feeling quite sick after a round of chemotherapy, but welcomed me in and sat with me, listening and offering thoughts. When he heard that my wife had been diagnosed

with an illness, he immediately offered to call doctors he knew to help us find a specialist, despite the fact that he was himself so sick that he was having trouble speaking. That was the kind of generosity Peter showed me. His death was such a tragedy. I have vowed to remember him by practicing the things he taught me, and by passing them to others. This dissertation is just one small part of that.

INTRODUCTION AND LITERATURE REVIEW

1.1 Introduction

Recent advances in interactive web technologies, combined with widespread broadband adoption, have made online collective action commonplace. Millions of individuals work together to aggregate, annotate, and share digital text, audio, images, and video. Collectively, these behaviors not only populate some of the most popular and profitable websites in existence, but also form complex and enduring social systems of collaboration and exchange. Increasingly, in fact, innovation in interactive web technologies has been based on harnessing the group creative efforts of thousands of web users – bringing them together in large, computer-mediated systems of collaboration.

A large and growing number of online systems support massive collaboration to produce public repositories of information that benefit many at little or no cost to a few. In such an environment, promoting and sustaining participation has become essential. Popular notions, however, often devalue the important rewards that many individuals gain from participation, casting systems such as Wikipedia and Flickr as a last resort for bored Netizens, or as outlets for those who have nothing better to do than give away their time and effort. A recent New York Times article (with the mystical title “King Algorithm: An Oracle for Our Time, Part Man, Part Machine”) noted:

“No one but a utopian would have predicted how readily people will work for free. Were cheaper than hardware – a good thing considering how hard we are to duplicate.” (Johnson, 2007)

In reality, however, people rarely work for “free.” This perception reflects a misunderstanding about the important social and psychological rewards that come from online participation.

While individually these rewards can be small, in aggregate social psychological rewards — essentially good feelings — can be the primary driver of online participation. However, social psychological rewards can be harder to identify and measure, a fact which may have given rise to the popular notion that people on the web usually work for free. Understanding the true benefits individuals receive from their online activities requires closer scrutiny to the contexts in which they work.

Improving our knowledge of the motivations and incentives that drive online collaboration is an essential goal with respect to both theoretical and practical outcomes. With a more complete theoretical picture of incentives and motivations in online systems we can adapt and extend research in economics, communications, and social psychology to emerging computer-mediated environments. In turn, then, we will be able to improve the design of online systems, focusing incentives towards specific user groups, encouraging collaboration and knowledge sharing.

The broad goal of promoting participation has led to equally broad questions about the factors that motivate decisions to participate. These questions are the increasing focus of research and theory. In this dissertation I tackle only a small part of the many questions about the factors that underlie individuals' decisions to participate online. I examine how users' knowledge and beliefs about how online collaborative systems operate — the “nuts and bolts,” so to speak — can influence how they perceive of and participate in online systems. Users are likely to come to the online collaborative process from many different backgrounds. They have different bodies of knowledge, different habits, and different perceptions about the nature of online collaboration. The central question of this research concerns how what people know – or think they know – can influence their behavior in collaborative situations.

I call information about the *products*, *processes*, and *people* involved in an online system *operational information*. Each of these three types of operational information can be important to understanding participation for a variety of reasons which I discuss in detail later in this dissertation. However, the unifying theme of this study is a focus on information about people — what I call *social operational information*. Social operational information is the focus of this study for several reasons. First, one side effect of the increasing size of online information systems is that they have produced large and complex social systems. While the social and the technical aspects of online systems are usually unavoidably intertwined (hence the term “socio-technical systems”), as a social psychologist I am interested in how information and perceptions of various social dynamics are influential for individual and group behavior. Furthermore, social interaction has become a central feature of online collaboration and user-generated content (also called “Web 2.0” or the “Social Web”). Users could collaborate on collective products without ever coming into contact with each other, and instead merely donating content or work towards a group product. However, online collaborative systems increasingly include central social features. One reason for this is the assumption that social features can make collaboration more robust and/or improve participation. This is an assumption that requires investigation. However, even if we accept that

social interaction enhances online collaboration in general, a detailed investigation of specific contexts and the mechanisms by which social interactions influence behaviors and attitudes is necessary. Social operational information is likely to be a key part of that picture.

In this study I take two perspectives on social operational information. First, I employ a laboratory experimental study to examine how a specific type of social operational information — relative competence feedback — can influence contribution to a collective product. More importantly, I attempt to uncover the social psychological mechanisms for such an influence. Secondly, I use a qualitative interview study to take a broader and more holistic perspective on how social operational information can be important in the specific context of Wikipedia. In this qualitative case study I investigate what my participants know about how Wikipedia works, as well as their perceptions of the social system and of other contributors. What do they think about others who contribute to Wikipedia — the people who do the work to make it a valuable resource? What are their characteristics and motivations? A second goal of the qualitative study is to investigate subjective perceptions of the social dilemma in the context of Wikipedia. The social dilemma is a theoretical construct which has been used to illustrate the tension between individual and group outcomes. It is, however, fundamentally a social construct in that it relies on individual perceptions of how the system works, what others *can do*, and perhaps most importantly what they are *likely to do*. Do individuals perceive that the social dilemma is a relevant construct in the case of Wikipedia? Why or why not?

A final goal of this study is to explore the ways in which experimental and qualitative methods can enhance and support each other. From one point of view, qualitative and experimental research are epistemologically incompatible. Whereas experiment research is focused on tightly controlling and precisely varying conditions in order to explore causal arguments, qualitative research is generally aimed at a holistic exploration of habits, practices, values, and beliefs as they relate to the domain of inquiry. This incompatibility means that experimental and qualitative methods are seldom appropriate for addressing the same research question. However, in this study I explore the benefits to research that can be gained by using the two methods to explore distinct but related research questions that speak to each other in valuable ways.

1.2 Outline of the Dissertation

In Chapter 1 I briefly introduce the area of investigation, and then review literature related to the area. In Chapter 2 I present theory and hypotheses related to the experimental portion of this study. Chapter 3 describes the experimental methodology while Chapter 4 lays out and discusses the results. Chapter 5 presents methods and procedures for the qualitative study, and Chapter 6 presents qualitative results. Finally, Chapter 7 concludes this study by synthesizing experimental and qualitative results, discussing implications, and reviewing directions for future investigation.

1.3 Collective Action and Public Goods

This research focuses on online collective action — group activity on the internet to achieve a common goal. What is remarkable about collective action, researchers have noted, is that it is prevalent at all. Hardin introduces the concept, for example, by characterizing it as “*The Problem of Collective Action*” (emphasis mine). The problem, he notes, is the potential conflict of interest between the individual and the group: “The narrow rationality of self-interest that can benefit us all in market exchange can also prevent us from succeeding in collective endeavors” (Hardin, 1982, p. 6). Olson puts the problem in practical terms, noting that when contributing to a collective good is costly, individuals are simply less likely to give (Olson, 1965). Or, put another way: “The challenge is to induce individuals to contribute to common causes when selfish actions would be more immediately and personally beneficial” (Glance and Huberman, 1994, p. 76).

The “common cause” of interest in this research is the production of public goods. Olson has defined public goods as “any good such that if person X... in a group consumes it, it cannot feasibly be withheld from others in that group” (Olson, 1965, p. 14). In economic terms, this property has been described as non-excludability (Musgrave, 1959). When a common goal has been achieved, it is available to all members of a group or none of them; members cannot be selectively excluded.¹

A strict definition also requires that public goods be non-rivalrous — that they can be consumed by one individual without reducing the amount available to others (Kollock, 1998). Non-rivalry is also known as jointness of supply (Monge et al., 1998). High jointness of supply means that a good “costs the same no matter how many people enjoy it” (Oliver and Marwell, 1988, p.2). These are also referred to as collective consumption goods (Samuelson, 1954). Clean air, for example, satisfies both non-excludability and non-rivalry. It is not easily provided only to some — we all breathe easier or none of us do. Furthermore, one person’s breathing easier does not prevent anyone else from doing the same.

1.4 Information as a Public Good

When public goods consist of networked digital information, several special properties apply. First, the cost of contributing digital information can be extremely low. There remain some

¹Olson notes that any discussion of public goods must be conducted with respect to a specific reference group, and furthermore that a good may act as a public good to one reference group, and a private good to another (Olson, 1965). From this point of view, the concept of group does not necessarily require the boundaries and shared values that define a group from a sociological point of view (Cohen, 1985). Rather, it is “closer to the idea of an interest group or beneficiary constituency” (Oliver and Marwell, 1988, p. 2).

small costs associated with contributing, such as time, effort, or access to hardware and an internet connection (Cheshire and Antin, 2008). However, these low costs are often far outweighed by the potential benefit of the public good. When costs are small compared to benefits, it becomes much more likely that at least some individuals will contribute to the pool (Kollock et al., 1999, Varian, 1998).

Many types of public goods contributions, however, have a small cost. Choosing to recycle a can rather than throw it in the trash — an act which benefits the public good of a cleaner environment — imposes almost no cost when the two bins are side by side. When a public good consists of information, however, it has an additional property: it is replicable. Replication, a property of information by which perfect copies can be made at a near zero cost (Cheshire and Antin, 2007, Shah and Levine, 2003), is an important means by which digital information achieves high jointness of supply. Jointness of supply is fundamentally about the cost of reproduction. Replication drives the marginal cost of distributing information via the internet down until it is nearly non-existent (Shapiro and Varian, 1998).

In this respect the internet as a medium for digital information becomes an important factor. Other mediums — other physical instantiations of information — such as paper, CDs, or film, impose a cost each time another copy must be made, meaning that in practice information instantiated on paper or CDs is rivalrous. Though there are costs associated with the networking infrastructure that makes up the internet, those costs are typically borne indirectly by individual users (Cooper, 2006). Once these fixed costs are accounted for (by internet access fees, for example) copies of digital information on the internet are nearly costless.

Cheshire (2007) argues that replication is the key facilitator of information exchange on the internet. Replication is a property of communication and interaction via the web which is strictly enforced by technological means. One cannot view a web page without also making a copy of the information contained on that page and storing it locally. To illustrate the importance of this property, consider a book that could not be read without simultaneously creating a copy. No such book exists. This property of digital information may be, in part, what drove Kollock et al. (1999) to suggest that any information which is posted on the web can be considered a public good. In Kollock’s view, the large-scale distribution and access provided by the internet allows information to benefit “an unlimited number of people,” (Kollock et al., 1999, p. 225) and in doing so turns otherwise rivalrous instantiations of information into public goods.

While we might view any information on the internet as satisfying the conditions of non-excludability and non-rivalry, in this research I focus on digital information that is produced through collective action:

“When digital information goods from many different sources are collectively transmitted over a computer network so that they can be accessed by groups

of individuals, they create an information pool. In these systems, individual contributions of digital information combine to produce information products for public, club, or private consumption.” (Cheshire and Antin, 2008, p. 706)

1.5 The Distinct Characteristics of Information Pools

Information pools are not exactly like other forms of public goods. Rather, the unique properties of information and networks lend information pools some noteworthy characteristics.

1.5.1 Massive, Distributed Collaboration

Information pools support collaboration and exchange on a massive scale. Some have hailed the model embodied by systems such as Wikipedia as a fundamental shift in the organization and distribution of work. The traditional view of collective action suggests that large-scale information pools should not exist because of transaction costs (Coase, 1937). Coordination and other up-front costs should make only larger (and comparatively rarer) contributions efficient. Without the economy of scale provided by a fixed corporate entity, it would simply be too cumbersome and costly to organize the contributions of a large number of disparate contributors into a synthetic whole. As the internet reduces the transaction and coordination costs of massive collaboration, however, additional forms of production are made possible:

“the networked environment makes possible a new modality of organizing production: radically decentralized, collaborative, and non-proprietary; based on sharing resources and outputs among widely distributed, loosely connected individuals who cooperate with each other without relying on either market signals or managerial commands. This is what I call ‘commons-based peer production.’” (Benkler, 2006, p. 60)

As Benkler notes, the internet provides a platform for massive, distributed groups of people to bring together huge amounts of content. The unique properties of information pools and digital information goods — replication, combined with low costs of contribution, coordination, transaction, and distribution — make it possible to efficiently collect, synthesize, and distribute contributions even in these very large systems. The powerful organizational capacity of information systems also allows for the creation of what Fulk et al. (1996) call “distributed public goods.” In distributed public goods many individuals hold pieces of the collective puzzle, and “no subset of individuals can create the communal good for the benefit of the whole” Fulk et al. (1996, p. 73).

1.5.2 Multiple Simultaneous Goods

A single collective good can sometimes serve multiple purposes. Fulk et al. (1996) call these “multi-function public goods.” Fulk and colleagues argue that “as a consequence of the convergence of computing and communication, systems now increasingly provide for both connective and communal functions”² (Fulk et al., 1996, p. 76). While this definition deals explicitly with situations in which a single public good has multiple functions, information pools also have the capacity to support the production of multiple simultaneous public goods. In many public goods situations, once contributions are made they are either permanently dedicated to the good or they cannot be re-used without damaging the good to which they were originally designated. Again it is the property of replicability, combined with extremely low costs of storing, processing, and distributing digital information that makes it possible for a single contribution to work towards generating multiple simultaneous goods. The phenomenon by which digital information can be re-used and re-purposed has often been called “remix” (See, e.g., Lessig, 2008). Fulk and colleagues also note that when information is the object of exchange, it can be combined, synthesized, and derived into additional products that provide additional sources of value:

“Information sharing sometimes also produces more than the piecemeal exchange of divisible information units. Instead, information is assembled and analyzed to create something new” (Fulk et al., 1996, p. 68).

Wikipedia is indicative of many information pools that create multiple simultaneous goods. When a contributor edits a page — for example by adding a sentence about the life of a public figure — he contributes to several distinct goods with distinct sources of value. The facts contained within his contribution are added to the larger collection of facts on the Wikipedia page, and in doing so enrich that collection. At the same time, however, adding a sentence may be viewed as providing raw materials for the derivative collaborative process of editing and refining encyclopedic entries over time. Evidence suggests that this is how Wikipedia operates — the majority of new content is provided by a large and diverse body of contributors, but that content is edited and organized by a smaller group of heavy contributors and administrators (Swartz, 2006).

Fulk and colleagues argue that in the case of multi-function public goods, it is usually possible to identify “primary” and “auxiliary” functions (Fulk et al., 1996). Similarly, I argue that in the case of multiple simultaneous public goods, it is possible to identify primary and auxiliary goods. In many cases, valuable public goods are formed as auxiliary products

²Fulk and colleagues define a connective public good as “a jointly held system that provide[s] all members of the public with the means to communicate with each other” (Fulk et al., 1996, p. 67) and a communal public good as one in which “members jointly hold a single body of information” (Fulk et al., 1996, p.67).

of other primary actions. The “micro-blogging” platform Twitter is a good example of this phenomenon (Java et al., 2007). Individual posts to Twitter (a.k.a. “Tweets”) do not necessarily contribute to a collective good. Twitter is primarily used as a means for individuals to communicate directly, or to broadcast information to others who “follow” their stream of short updates.³ While some users choose to make their Tweets private, the vast majority of users (> 90%) allow anyone to view and search their Twitter stream (Moore, 2009). Because of Twitter’s capacity to store, organize, search, and distribute huge quantities of digital information over time, the body of public Tweets produces a kind of auxiliary public good: a near-real-time indicator of the “pulse” of the web — what people are talking about at any given time. Twitter’s own search feature leads with the tagline “See what’s happening — *right now.*”

The example of Twitter highlights a key issue for the production of multiple simultaneous goods: when a single contribution of digital information can be re-used and re-purposed many times through different processes, users often find themselves contributing to public goods without being aware of having done so. The result of this phenomenon is that, as a result of a lack of information about how her contribution is likely to be used, a user may be unaware of the potential value of his contribution.

1.6 Imperfect Public Goods

Though many information pools are public goods, they need not be. Public goods are defined according to two strict properties: non-excludability and non-rivalry. In practice, few information pools meet this high standard. Olson acknowledged that even for his chosen examples, “few if any would have the degree of jointness needed to qualify as pure public goods” (Olson, 1965, p. 14). For Olson, as well as for later commentators, non-rivalry was viewed as a continuum. Oliver and Marwell, for example, argued against a strict dichotomous view by noting that “jointness of supply can be a matter of degree” (Oliver and Marwell, 1988, p.2), and instead suggested that goods which are partially non-rival are similar to pure public goods in most practical respects.

Theorists have also discussed forms that differ from public goods with respect to either excludability or rivalry. Club goods, such as cable TV, are those which are non-rivalrous but excludable (Buchanan, 1965). Common goods, or common-pool resources, on the other

³Fulk et al. (1996) might disagree with the notion that Twitter’s communication function does not provide a public good. They argue for the notion of a “connective public good,” in which the good consists of the capacity to freely communicate with anyone else in the group. A connective public good is non-rival if “use of the system does not reduce the accessibility of the system to any other... [and does] not deplete its capabilities over time thereby hindering the free communicative capabilities of others users” (Fulk et al., 1996, p. 76).

hand, are non-excludable but rival (Gordon, 1954) For example, while clean water is a public good, a fishery contained in that water is a common-pool good. Everyone has access to the fish, but each fish that is caught depletes the fishery.

Similarly, many types of information pools fail the strictest public goods tests. In 2009, for example, Wikipedia blocked all contributions from IP addresses assigned to the Church of Scientology (Metz, 2009). By demonstrating the potential for excludability, Wikipedia showed it can act like a club good. In other situations, information pools may function like common-pool resources. Consider the example of an information pool focused on aggregating information about special discounts from online retailers. Though everyone can access the information, once enough people have taken advantage of information about the discount and the retailer no longer offers it, that information becomes useless — it is made effectively rivalrous. Finally, consider the case of digital video sharing sites (e.g. Youtube.com). Though these sites do not explicitly block potential users, use usually requires a fast broadband connection that some users do not have. Furthermore, when these sites receive too much traffic, their servers may become inaccessible. In this way over-use of the information pool mirrors the traditional example of the town bridge — the bridge is a public good until too many people try to use it at the same time, at which point “crowding” effects (Barry and Hardin, 1982, p. 196) present barriers for some potential users.⁴

These nuances illustrate why the exact boundaries of a public good have remained in flux. Theorists of public goods have found a constant need to create new divisions of public goods and rethink existing divisions.⁵ What counts as a public good is in part a function of the current technology. Lighthouses were once used as paradigmatic examples of public goods. New technology, however, has made lighthouses largely obsolete as a means of finding the shoreline, and so their operation no longer provides a public good. The increasing availability of cheap hardware and internet access along with more prevalent basic computer skills shifts the boundary of excludability based on the accessibility of information pools (Stanley, 2003). Finally, the legal restrictions of copyright have a profound influence on who can benefit from a body of information, in what ways, and for how long (Varian, 1998). Digital rights management (DRM) systems, for example, have attempted to combine technological and legal restrictions to restrict digital information.

So, while the theory of public goods seems stark and definitive, many economic, social, cultural, and legal barriers complicate the situation significantly. I agree with Olson and Kollock, however, that while the fundamental properties of a good are essential to understanding it, a good that is mostly non-excludable and mostly non-rival (as I would argue many information pools are) is subject to nearly all of the interesting properties as a pure public good.

⁴Olson (1965) calls public goods that are susceptible to the problem of crowding “exclusive” public goods, despite the significant potential for confusion between “exclusive” and “excludable.”

⁵Ordober and Willig (1978), for example, define what they call “sometimes shared goods”, or goods that act both as private good and public goods.

1.7 Production and Exchange

So far I have discussed the nature of information pools as public goods, but just as important is how they are produced. Social exchange theory provides a framework for understanding this process. Whereas economics situates the market as the principal mediator of interactions, social exchange theory deals with actors' interactions with each other (Emerson et al., 1972). Developed over the last 50 years by Homans (1958), Blau (1964), Emerson et al. (1972), Ekeh (1974), Cook and Emerson (1978), and others, a key feature of social exchange theory is its classification of forms of exchange.

Some information pools can be classified as generalized exchange systems. Generalized exchange is a form of indirect exchange (Blau, 1964, Ekeh, 1974).⁶ Individuals contribute goods without the expectation of direct reciprocity. Importantly, in this type of exchange “what one party gives to another is not directly contingent on what he or she receives from the other” (Yamagishi and Cook, 1993, p. 236).

A further refinement of the notion of generalized exchange is group-focused generalized exchange (Ekeh, 1974), also known as group-generalized exchange (Yamagishi and Cook, 1993). In group-generalized exchange, “group members pool their resources and then receive the benefits that are generated by pooling” (Yamagishi and Cook, 1993, p. 237).⁷ The public good itself, rather than another individual, is the partner in exchange. Unlike traditional public goods situations, in many (but not all) group-generalized exchanges, the distribution of benefits is unequal: an individual benefits less from his own contributions than from the contributions of others (Cheshire and Antin, 2009). If an individual contributes wood, nails, or labor towards a town bridge, for example, he benefits from that contribution in the same proportion as others do: an equal share of the collective good. This would be a classic public goods situation. Consider, however, the example of a community cookbook to which everyone contributes. In such a situation, an individual does not receive equal value from his contributed recipe because he already has that recipe. Each individual's benefits come only from others in the group. (Ekeh, 1974, p. 209).

Information pools can also operate as productive exchange systems. In productive exchange, interdependencies between the components of a good make collaboration necessary (Emerson et al., 1972). Importantly, in productive exchange the whole is greater than the sum of its parts. Emerson notes that “unlike the direct transfer of valued items in simple exchange, here items of value are produced through a value-adding social process” (Emerson, 1976, p. 357). For example, if Adam has raspberry filling and Jane has doughnuts, Adam and Jane

⁶Direct exchange, on the other hand, concerns exchanges in which two individuals exchange directly with each other.

⁷Ekeh (1974) makes a further distinction between generalized exchange that is focused on pooling resources for the benefit of the group (group-focused) and exchange that is focused on pooling resources for the benefit of one individual at a time (individual-focused.)

can engage in productive exchange to make tasty jelly doughnuts that are more valuable than the sum of their ingredients. According to Emerson (1976), the value of the collective product (e.g. the doughnuts) would then be divided evenly among the contributors, as in a traditional public goods situation.

Open source software projects are a good example of both group-generalized and productive exchange systems. Individuals can choose to contribute individual portions of code towards the overall software product, for example by writing a more efficient algorithm or fixing an outstanding bug. However, those programmers receive benefits only from the group (i.e the group-generated software product). In addition, each algorithm, graphic, or test can be conceptualized as a part of the value-adding social process of productive exchange. Open source software takes advantage of the inter-dependencies between the constituent contributors to parts of the software process. Indeed, a foundational part of open-source ideology is the notion that those inter-dependencies create a better product (Weber, 2004).

1.8 Free Riding and the Social Dilemma

A key feature of public goods situations is that an individual's benefits are not necessarily tied to his contributions, and contribution is not a precondition of consumption. This situation opens the possibility of free-riding. Free riders take advantage of the non-excludability of public goods. They are individuals who partake of a good without contributing to it. In a public goods situation, free-riding becomes the most "rational" behavior (Yamagishi and Cook, 1993). However, if everyone made that same individually rational decision, the collective outcome would be deficient for all: the public good would not be produced. So, if too many individuals free ride there may not be enough contributions to generate the public good (Rafaeli and Raban, 2005, Yamagishi et al., 1995).

Like any public goods situation, the production of information pools can present a social dilemma (Cheshire, 2007). A social dilemma is a system in which an individual's strategy is always dominant, regardless of the actions of others within the system. That same strategy, however, ultimately leads to a deficient outcome for the group (Dawes et al., 1991). Kollock defines it in this way:

"All social dilemmas are marked by at least one deficient equilibrium. It is deficient in that there is at least one other outcome in which everyone is better off. It is an equilibrium in that no one has an incentive to change their behavior."
(Kollock, 1998, p. 184)

So, contribution would lead to a better group outcome, but non-contribution would lead to a better individual outcome. Overcoming the social dilemma is central to the study of collective action and public goods. Kollock (1998) provides a review of potential solutions, which he groups into three categories: strategic, structural, and motivational. Strategic and structural solutions change the nature of the dilemma through strategies of cooperation and defection or by altering the costs and benefits. Motivational solutions are based on the notion that most individuals in collective action situations tend to consider the outcomes of others. Research has shown that an individual's unique values, norms, and world-view can change his behavior in a social dilemma (See, e.g. McClintock and Liebrand, 1988). Understanding how those values and norms are formed may provide an opportunity to influence them towards more cooperative behavior. Kollock also notes the widespread finding that, when individuals are allowed to communicate they collaborate more often (Kollock, 1998). Finally, individuals have been shown to collaborate more often when they identify with a common group (Brewer and Kramer, 1986).

Another classic solution to the social dilemma is the provision of selective incentives. Selective incentives are benefits provided selectively, only to those individuals who contribute to a public good (Olson 1965). Selective incentives can help solve the social dilemma because, when an additional benefit is provided as a consequence of contributing, the deficient equilibrium is broken. The gifts (e.g., tote bags, coffee mugs) which are often given out during public radio funding drives are examples of selective incentives. This solution, however, introduces its own set of problems. Though selective incentives can be effective at encouraging contributions (See, e.g. Winett et al., 1978), tangible or monetary selective incentives create what has been called a second-order social dilemma (Oliver, 1980). Who will provide the tote bags and organize their distribution?

One way to avoid the second-order social dilemma is to use selective incentives that rely on internal, social psychological processes to provide rewards (Cheshire, 2007). Social psychological processes are perceptions that occur within individuals based on their reactions to a given situation and its surrounding social context. When social psychological selective incentives are effective, those who contribute to the collective good receive additional benefits that are provided internally through their own perceptions, beliefs, and expectations about a given environment. These incentives can be built-in to the design of information pools with very low or no ongoing costs. The benefits they provide can be quite small, but when the costs of contributing to information pools are also small, social psychological selective incentives can have a relatively large impact on individual motivations to contribute while circumventing the second-order social dilemma (Cheshire, 2007).

A small but growing body of literature has begun to examine incentives for participation in information pools. That literature can be broadly divided into two areas: descriptive studies and experimental studies. Descriptive studies classify and analyze the variety of rewards that drive participation in real-world contexts. Experimental studies, on the other hand, examine the use of informational feedback such as rankings to encourage participation.

1.8.1 Descriptive Studies: “Why We _____”

Researchers have increasingly begun to investigate motivations and incentives for participation in information pools. This strain of research has examined not only social psychological selective incentives, but other types of incentives and motivation that are related to online interaction. However, the vast majority of research has illustrated that task-oriented motivations (e.g. tagging to organize content, blogging for catharsis...) are often intertwined with motivations that stem from social interactions and feedback. Following the trend of several early publications, many papers in this area have adopted titles that take the declarative form “Why We X ”.

In the sections below I review the variety of literature that documents self-reported motivations for participation in information pools. This literature contains research on motivations for many forms of information sharing and collective effort. While the information pools covered below have many different characteristics, in each case individuals contribute digital information towards a shared body of information — text, images, audio, video, or other types of data — which has collective value. Cheshire and Antin (2009) suggest a typology of information pools, and argue that their characteristics can differ significantly, partly as a function of the order and coordination inherent in the technological structure and patterns of use of a given context.

Open-Source Software. Well before the internet or the web were widespread phenomena — not long after computing and networking technologies began to develop in the 1960’s — the ideologies and social structures of open collaboration around computing and code began to form (Weber, 2004). Since these early days, and especially since the development of practical and popular software such as Linux, Apache, and sendmail, there has also been a great deal of interest in the question of why developers devote their time and effort “for free”. Only in the last ten years or so have researchers really begun to tackle that question directly. In a study of contributors to Apache’s “field support” system, users of the system self-reported they are motivated by factors such as a belief in the open-source ideology, the expectation of future reciprocity, or a sense of obligation drawn from previous interactions with the system (Lakhani and von Hippel, 2003). In a broader, survey-based study of open-source software contributors, Lakhani et al. (2005) helped to debunk the myth that contributors to open-source are motivated primarily by skill building and career advancement. Instead, open-source contributors reported that “enjoyment-based intrinsic motivations” — social interaction, a sense of creativity, or having fun, for example — were the most important motivators. Based on a review of the literature on open-source contributors, Jrgen et al. (2005) argue for the importance of three types of intrinsic motivations: (1) the value of the software itself, (2) fun / entertainment, and (3) a culture of gift exchange. Oreg and Nov (2008) add significant nuance to these findings by examining the role of context (content versus software) and disposition (what they call “personal values”) in contribution behavior. Oreg and Nov find evidence that contributors to software projects are more concerned

with developing a reputation and developing their skills compared to contributors to open content repositories. Furthermore, they find evidence that “personal values” (e.g. achievement orientation) predispose individuals towards preferring certain rewards (e.g. reputation building).

Blogging. By the turn of the millennium, the read-only web had already begun its transformation to the read/write-web. One of the first tools to which individuals turned for online interaction and participation was blogs. In a qualitative interview study, Nardi et al. (2004a) identified five primary motivations for blogging: “documenting one’s life; providing commentary and opinions; expressing deeply felt emotions; articulating ideas through writing; and forming and maintaining community forums” (p. 43). Nardi and colleagues’ participants found powerful intrinsic value in the act of writing and sharing. Indeed, Herring et al. (2004) suggest that many discussions of blogging wrongly downplay the individualistic, self-expression oriented motivations that come from writing and being read. Other research by Nardi and colleagues focused on the “social nature” of blogging. Nardi et al. (2004b) noted that several bloggers in their sample had been urged to blog by their friends and that the size and makeup of their audience (or potential audience) was an important factor. The importance of the audience as a motivator is echoed by Trevino (2005), who interviewed bloggers and found that commentary from readers encouraged bloggers to continue writing. Finally, Stoeckl and Rohrmeier (2007) used an online survey to look for differences in motivations between bloggers and video-bloggers. They found that video bloggers were more likely to report entertainment as a primary motivation, while textual bloggers more often reported the distribution of information and self-expression as important motivations.

Micro-Blogging. Since 2006, the practice of micro-blogging has been gaining popularity. Micro-blogging is exemplified by services such as Twitter⁸, Jaiku⁹, and Facebook’s Status Update functionality. Micro-blogging is similar to blogging in that one uses the service to publish thoughts, links, and updates to readers who subscribe to a feed of updates. However, micro-blogging services differentiate themselves by severely restricting the length of posts (or, as Twitter calls them, “Tweets”), usually to fewer than 200 characters. A large scale data mining analysis conducted in 2007 found that users of Twitter were likely to follow others who had similar interests, and that “daily chatter”, explicit back-and-forth conversations, and information sharing were the most common motivations for using the service (Java et al., 2007). A more recent content analysis of nearly 3400 messages from 150 randomly selected Twitter users also found that approximately 80% of messages were self-focused, leading the authors to dub this style of user the “Meformer” (as opposed to the “Informer”) (Naaman et al., 2010). These studies do little to reveal the specific motivations that drive the use of micro-blogging services. They suggest, however, that motivations for micro-blogging may be similar to motivations for blogging. Like bloggers, micro-bloggers can derive valuable rewards from the act of writing and sharing with others, as well as from interacting with their audience.

⁸ See:<http://twitter.com>

⁹ See: <http://jaiku.com>

Tagging. Tagging — the practice of applying keywords to media, text, and web pages to organize content and render it searchable — forms the backbone of many information pools. As individuals upload huge amounts of content, organizing and classifying that content is a key challenge. Based on a series of qualitative interviews with the users of Flickr and a related mobile photo capture and tagging system called ZoneTag, Ames and Naaman (2007) suggested that organization and “social communication” are common motivations for tagging. In a second study building on these results, Nov et al. (2008) argued that social presence in the form of both contacts and groups encourage tagging behavior on Flickr. After eliciting potential motivations for tagging in a series of interviews, van Velsen and Melenhorst (2009) used a survey to collect rankings of the elicited motivations. Survey participants ranked practical motivations around searching and indexing content more highly than social or communicative motivations (van Velsen and Melenhorst, 2009). In a study of the web site tagging system del.icio.us, Golder and Huberman (2006) suggested that “a significant amount of tagging, if not all, is done for personal use rather than public benefit” (p. 207). Building on this work, Lee (2006) found that using del.icio.us’ social network features¹⁰, subscribing to other user’s tags, and listing more detailed (but optional) personal information were predictive of increased contribution of tags. The authors interpret the use of these features as increased awareness of the social presence of other del.icio.us users.

Wikipedia. As perhaps the most prominent single information pool with respect to both usage and media attention, Wikipedia has been the subject of a great deal of research. That interest has to a large degree been driven by the desire to improve online civic participation — to encourage more web users to contribute to systems with positive, large-scale social outcomes (e.g. a freely-accessible repository of human knowledge). In an early and influential qualitative study, Bryant et al. (2005) examined the process by which infrequent or new Wikipedia users become heavy and engaged contributors (“Wikipedians”). A key finding of their study is that while casual contributors tend to view Wikipedia as a collection of information and articles to which they might contribute, Wikipedians view the site as a community of contributors. Drawing from a pilot study of students at New York University, Kuznetsov (2006) found that civic engagement and the perceived benefits to society were key motivations for contributors to Wikipedia. In a survey of heavy Wikipedia users, participants reported that fun, a belief in Wikipedia’s ideology, and general beliefs about helping others were the most important motivations for participation (Nov, 2007). Interestingly, Nov and colleague’s participants self-reported that social motivations — motivations based on giving “people the chance to be with their friends or to engage in activities viewed favorably by important others” Nov (2007, p. 62) — were the least important motivators for contribution. Rafaeli et al. (2008) report results similar to Nov and colleagues, suggesting that learning and having fun are among the most important motivators for Wikipedians.

Other research has examined factors that negatively influence motivation on Wikipedia. Based on an analysis of all Wikipedia entries and edits posted between 2001 and 2006,

¹⁰See <http://del.icio.us>.

Zhang and Zhu (2006) argue that when others edit an article it repeatedly harms the sense of self-determination of the article’s creator, making him less likely to contribute again. A regression analysis supports the authors’ assertion, although they also find that the effect was reduced for more experienced Wikipedians who, they argue, are less likely to interpret repeated editing as criticism or rebuke.

Q & A Sites. A variety of information pools have been developed with the goal of allowing users to ask direct questions and receive answers from other participants. Harnessing the notion that “everyone knows something” (Adamic et al., 2008), these sites attempt to organize and categorize questions so that users can find questions and provide answers within their own areas of expertise. One of the earliest examples of large scale online communication and collaboration was Usenet, a system of thematic discussion groups. A key strain of research on Usenet used social network techniques to map the structure of participation and social interaction on Usenet (Turner et al., 2005). This research revealed, for example, that many individuals choose distinct social roles as “Answer People” (Fisher et al., 2006). These individuals devote significant amounts of work towards answering others’ queries, but also appear to garner rewards from their status as an Answer Person.

Two other dedicated question and answer websites have been developed by internet giants Google and Yahoo!. The now defunct Google Answers allowed participants to ask questions with dollar values attached. A cadre of Google-vetted answerers could then research and answer questions and receive monetary rewards. Rafaeli et al. (2005) examined Google Answers in order to understand the interplay of monetary and non-monetary rewards and their influence on contribution. Perhaps unsurprisingly, Rafaeli and colleagues find that the simple explanation that higher priced questions are more likely to be answered is insufficient. Instead, they find evidence that factors related to social interaction on the site also account for some variance in which questions are answered and which are not. In a follow-up study with more detailed analysis, Rafaeli et al. (2007) show specifically that questions on which others had commented before they were answered were also more likely to be answered, even controlling for price (Rafaeli et al., 2007). In a series of interviews with the most active users of a South Korean Q & A site, Nam et al. (2009) reported that helping others, learning new things, and self-promotion were important motivators. Nam and colleagues also asked participants about the site’s explicit points system (which awards points to more active users). Interestingly, although participants said the points were not a factor in their decisions to participate, many also noted the pleasure that came from watching points accumulate and revealed their assumption that others might take their answers more seriously if they had accumulated more points (Nam et al., 2009).

Distributed Work Systems. Distributed work systems — often called “crowdsourcing” systems — allow individuals or organizations who need large amounts of work to distribute that work to thousands of providers in small chunks. The first example of a distributed work system was NASA’s ClickWorkers project¹¹, which asked thousands of distributed

¹¹See <http://clickworkers.arc.nasa.gov/>.

workers to contribute to the massive task of labeling craters on the moon. Not long after, Project Gutenberg, which digitizes public-domain books and makes them freely available on the web, started the Distributed Proofreader's Project¹² to distribute the work of verifying and correcting digitized books. In 2005, Amazon released a service called Mechanical Turk which remains the most widely used, general purpose platform for distributed work. Worker motivation is a particularly interesting question in the context of systems like Mechanical Turk. Workers from around the globe complete small tasks in exchange for payments on the order a few cents. Initial analysis of the system painted Mechanical Turk as a "virtual sweatshop," (Mieszkowski, 2007) and assumed that most of the work would be completed by individuals in the developing world for whom even a few cents was a lot of money. However, according to web-tracking firm alexa.com, most of the work continues to be done by individuals in the continental United States.

Given the ongoing popularity of the Mechanical Turk and the continued enthusiasm of many contributors, it is reasonable to hypothesize that monetary rewards must combine with other rewards to motivate contributions. Popular press has speculated that reputation, social interaction, and entertainment accounts for some of the continued participation on Mechanical Turk (Mieszkowski, 2007). No peer-reviewed research has examined individual motivations for participating in Mechanical Turk. However, in an informal analysis using Mechanical Turk itself to survey participants, Ipeirotis (2008) reported that earning additional income and entertainment were the two most often cited motivations. More research is needed around this crucial and growing type of information pool.

1.8.2 Experimental and Quasi-Experimental Studies

In addition to research that has aimed to document what participants say about their motivations to participate in information pools, some researchers have applied social psychological theory to examine whether specific incentive types can encourage participation.

In their work with MovieLens, a movie rating and recommendation system, Ling et al. (2005) focused on reminding individuals of the unique characteristics of contributions they had already made. With the goal of encouraging more contributions to MovieLens' online discussion board, the researchers sent weekly email messages which included a topic for the week's discussions and one of two experimental messages to participants. Participants in the "uniqueness" condition received a list of movies that they had already rated highly, but which few other users had rated. Those in the "non-uniqueness" condition received no such list. Not only did participants in the uniqueness condition post more discussion messages, they also rated more movies overall (Ling et al., 2005). The difference between conditions was both significant and large: participants in the uniqueness conditions contributed 74%

¹²See <http://www.pgdp.net/>.

more posts than those in the non-uniqueness condition (mean uniqueness = 4.24, mean non-uniqueness = 2.43), and 146% more movie ratings (mean uniqueness = 8.98, mean non-uniqueness = 3.64).

Ling and colleagues also found that pointing out participants' distinct areas of knowledge encouraged them to continue contributing in those areas. Participants who were reminded of movies they had previously rated, but which were seldom rated by other participants, contributed more ratings overall compared to those who were not reminded of their previous actions (Ling et al., 2005). Importantly, not only did these participants contribute more, but they contributed more in their unique areas of knowledge. In other words, reminding participants of their unique knowledge encouraged them to contribute specifically in those areas. When rarely rated movies were taken as the dependent variable in the analysis, those in the uniqueness condition contributed 40% more than those in the non-uniqueness condition (Ling et al., 2005).

A variety of other research has used the MovieLens system as a platform for testing social psychological incentives. For example, Rashid et al. (2006) explored how perceptions of the value of one's contributions could influence participation. Using "smiley faces" as a metric for value,¹³ Al Mamunur and colleagues found that using the faces to signify the value of contributions increased participation in a variety of circumstances. Furthermore, the authors found that reminders of value were more effective when the reminder signified value for smaller sub-groups and for groups with whom participants felt more similar. Hypothesizing that "social comparisons" to other users would increase participation, Harper et al. (2007) sent email reminders telling participants whether the number of movies they had rated was at, above, or below the median number for all users. The results suggested that people who were in any of the comparison conditions (as opposed to a control condition) rated more movies, although they did not use the system more overall. Finally, Sen et al. (2006) employed a field experiment to illustrate that displaying tags that others used to describe movies influenced the vocabulary that participants' used in their own tags.

Cheshire and Antin (2008) also examined the potential for "social comparisons" to improve participation. Cheshire and Antin explored three feedback mechanisms and their influences on repeated contributions using a field experiment based on a system called Mycroft. Cheshire and Antin describe Mycroft in this way:

"Mycroft is a web-based network which allows large tasks to be widely distributed and the results efficiently collected so that thousands of individual contributors can work on the same project at the same time. Mycroft accepts large jobs which

¹³While this research presents an interesting design case study, its primary weakness is in the operationalization of value. Using "smileys" is attractive from a user interface perspective, but it is difficult to determine how the metric might be interpreted across participants. Furthermore, the authors implemented a measure with no neutral or negative value, which constrains the manner in which we can interpret findings.

cannot technically or efficiently be completed by computers and breaks them down into many constituent parts called puzzles. The puzzles are distributed via banner ads on existing websites. . . As each puzzle is answered, the results are combined with others at successively larger levels until the top-level job is complete.” (Cheshire and Antin, 2008, p. 714-715)

Immediately following each small contribution, the contributor viewed either no feedback (a control condition), or one of three forms of textual feedback: *Gratitude*, in which the participant was thanked for his or her contribution; *Historical Reminder*, in which the participant was presented with a current count of how many times he had contributed, or; *Relative Ranking*, in which he was presented with a percentile ranking against all other contributors based on his or her total number of contributions to date. Participants in the study contributed more information when they received any one of the three forms of feedback, compared to when they received no feedback at all. While these results do not tell us who is likely to contribute in the first place, they do demonstrate that these forms of incentives can be effective at increasing overall contribution size.

Findings drawn from the same online system (Mycroft) also showed that providing additional information about the recipient of the collective effort increased contribution for some users. Cheshire and Antin (2009) found that, for users who were already intrinsically motivated to participate, decreasing uncertainty about the recipient of the collective effort by displaying the logo of the beneficiary improved participation. For those who had not already expressed any interest in participating, however, the logo appeared to have no effect.

Cheshire (2007) examined the influence of two types of incentives — *observational cooperation* and *social approval* — on rates of participation. Cheshire created an experimental system in which individuals created lists of their favorite books, music, or movies. Over a series of rounds, participants chose whether or not to contribute items from their list to a collective list. In the observational cooperation conditions, participants were shown feedback indicating either that a high or low percentage of other participants in the study had contributed on that round. In the social approval conditions, participants viewed either a high or low “popularity rating” if they chose to contribute on that round. Cheshire’s results showed that participants who saw feedback showing high levels of cooperation increased their participation in the short-run (compared to a control condition), but those increases were reduced over time. Results also illustrated that providing participants with evidence about how much others like or approve of their contribution improved participation. Importantly, feedback about social approval was effective at increasing participation in both low social approval and high social approval conditions.

This body of results shows that rewards based on social psychological processes can act as selective incentives. Notably, in each case the stimulus for reward was a piece of information — a simple textual prompt or feedback, sometimes accompanied by a visual aide. Researchers

provided historical information about past contributions and their characteristics, feedback about the number of others who were contributing, or information about the opinions of others. Competitive incentives provided rankings and ratings against other contributors. In each of these cases, the experimenter presented a specific piece of information which might not have been otherwise available, and by doing so encouraged the participant to consider that information as salient to the situation at hand. Collectively, these studies support the argument that the judicious provision of information about the collective action system, especially information about the actions and attitudes of others within the system, can influence participation. Researchers capitalized on details they were able to collect and make relevant to the task at hand, and which users would not otherwise have known or had access to.

1.9 Conclusion

In this chapter I have laid the groundwork for this research by reviewing a variety of extant literature on public goods, exchange, and social psychological incentives for participation. I have also discussed the unique properties of information pools, and illustrated how social-psychological incentives can capitalize on some of those properties to promote participation. In the next chapter, I begin by introducing the idea of operational information, defined as information about the operation of a collective action system, and arguing that it is important to theorize about and examine operational information in the context of information pools. I then put the focus on one particular kind of operational information — information about the one's competence compared to others in a collaborative system. I argue that relative competence feedback can promote or deter participation, and present theory and hypotheses that explore the social psychological mechanisms by which this may occur.

THEORY & HYPOTHESES

2.1 Introduction

In this chapter I first review existing research related to incomplete information. I then present the notion of *operational information* — information about the processes, products, and people involved in collective action. I argue that providing operational information can improve participation in collective action by reducing the uncertainty that can be a barrier for some potential participants. I then address the dynamics of a specific type of social operational information, relative competence feedback, and present 12 hypotheses about the relationships between relative competence information and pro-social behavior.

2.2 Incomplete Information

In the previous chapter I reviewed literature examining the effectiveness of a variety of incentives at promoting certain kinds of contribution. These incentives take the form of information or feedback which the designer or researcher has collected and made available at a moment when it could be salient to a decision at hand. In many cases, the incentives operate by informing users about details which they would not otherwise know or consider relevant. So, many social psychological incentives take advantage of a natural condition of interaction and exchange: many individuals will have incomplete information about their environment and about the systems in which they act. Decision making under uncertainty, with incomplete or imperfect information, has been a topic of much research in economics. Perhaps the broadest area of research to tackle this question has been bounded rationality. Generally thought to have begun with the work of Herbert Simon (Simon, 1955), bounded rationality is a field of research concerned with understanding the ways in which humans make decisions in the real world. Simon frames the issue in this way:

“Traditional economic theory postulates an ‘economic man,’ who, in the course of being ‘economic’ is also ‘rational.’ This man is assumed to have knowledge of the relevant aspects of his environment which, if not absolutely complete, is at least impressively clear and voluminous. He is assumed also to have a well-organized and stable system of preferences, and a skill in computation that enables him to calculate, for the alternative courses of action that are available to him, which of these will permit him to reach the highest attainable point on his preferences scale.” (Simon, 1955, p. 99)

This assumption is problematic, Simon goes on to suggest, primarily because it reflects a view on how individuals should act, rather than how they actually do act. Even in making assumptions about the ideal, however, rationality is problematic for at least two reasons. First, any assumption of rationality fails to account for the drastically different goals that people carry into decision-making situations (Blau, 1964). Second, if we could accurately account for these disparate goals, our definition would still be confounded by the inaccurate predictions of rewards that individuals use to make cost / benefit analyses (Blau, 1964). Simon expresses Blau’s critique’s in more technical terms, noting that there are four unmet conditions for a model of rationality:

1. complete knowledge of all possible outcomes;
2. a definitive pay-off structure for all possible outcomes;
3. a completely ordered set of pay-offs from best to worst, and;
4. if outcomes are uncertain, definite probabilities attached to them. (Simon, 1955)

In practice, human decision-makers can never meet these conditions, either because some information about the environment is unknown, or because it is beyond any human’s reasonable cognitive capacity to consider all combinations of outcomes, payoffs, and behavioral options in a real-world setting. Bounded rationality, then, is the study of the shortcuts and simplifications that humans use for real-world decision-making. This boundedly rational view of decision making has become the norm in social psychology and economics.

Simon and Blau’s critiques are directed towards economic models of rationality. We can accept that these models are unrealistic “straw men,” however, and still argue that individuals use a principled set of assumptions and preferences to structure their decisions. In other words, people may not follow rational “rules” but they do follow rules nonetheless. In the words of economist Dan Ariely, individuals are “predictably irrational” (Ariely, 2008). It is this set of assumptions, Emerson argued, that made psychology and sociology so essential to the formulation of social exchange theory. Social exchange theory deals with the social interactions, in uncertain situations, that influence exchanges in the real world. Social exchange is messy and uncertain, but nonetheless tends to abide by a set of principles related

to social phenomena such as status, power, justice, and authority. Emerson, furthermore, focused on the importance of individual value (cardinal utility) because of his belief that value exchange was an essential way of understanding the movement of resources in imperfect markets (Emerson et al., 1972).

2.3 Operational Information

This research deals with the fundamental question of what people know or do not know about the processes, products, and people involved in the production of an information pool. Two lines of inquiry in economics inform this broad question: optimal search and information asymmetries. Optimal search literature attempts to understand how individuals conduct searches — for cars, houses, or jobs, for example — without complete information about the market. For example, a job seeker is unlikely to have complete information about how many jobs are available or what salaries are offered, and as a result must decide whether to accept a given job based under a measure of uncertainty. Lippman and McCall (1976a,b) review a variety of literature in the area of job search. Research has focused primarily on modeling job search by varying the conditions of the search: time horizons, discounting of future offers, or reservation wages, for example. Research into information asymmetries, on the other hand, has examined the consequences when buyers and sellers in a market have different information. In perhaps the most influential paper in this genre, Akerlof (1970) suggests that when sellers have more information than buyers, if buyers cannot easily distinguish high quality from low quality goods, low quality goods will ultimately drive high quality goods out of the market. Judgment, intuition, and decision making is a third key area in which psychologists and economists have examined the influence of incomplete information. In this research, however, I do not focus on this issue. However, reviews of literature in these areas have informed the direction of inquiry (Kahneman, 2003, Gigerenzer, 2007).

While these strains of research have addressed the lack of complete information *coming from* the market, they have rarely addressed the lack of information *about the operation of the market itself*. In doing so, researchers have missed a key source of uncertainty. It is this issue that I wish to tackle in the context of information pools. While there are many reasons that people do not contribute to Wikipedia, for example, one of the most prevalent may be that *they do not know it is possible to do so*. Complete ignorance about the possibility of contributing is an extreme example, but there are likely to be many more subtle variations. A potential contributor may know that it is possible to contribute, and still lack information about how to do so. He may know in a technical sense how to contribute, but be ignorant of the format that his content should take. He may have information about the format, but be unsure of whether he has the appropriate characteristics or expertise to contribute effectively to the collective product. These examples illustrate that a lack of information about how the collaborative system operates can present a significant barrier to participation.

I call information about the operation of a system or market *operational information* (Antin, 2009, Antin and Cheshire, 2010). Operational information has three primary components: (1) information about the *products* of individual or collective effort, (2) information about the *processes* by which a system operates, and (3) information about the other *people* who are involved in the system or market.

Information About Products. Product operational information refers to details about the characteristics of the products which are produced by a collective action, and specifies the uses to which an individual contribution will be put. After all, a central question for any potential contributor to a collective action is likely to be “What are we producing?” The answer is not always self-evident, especially in the context of information pools for at least two reasons. First, there may not be a clear consensus on the desired product(s). Cheshire and Antin (2009) have suggested that a key characteristic of some information pools is a degree of flexibility about the outcome. A blog, for example, suits many individual uses and contexts precisely because of the flexibility of its products (boyd, 2006). Secondly, I have already argued that information pools often support the production of multiple simultaneous goods. These goods can be complex and derivative, and an individual may not even be aware of what she is contributing to. As a result, contributors to information pools may lack complete information about the products of collective action.

Information About Processes. Process operational information refers to details about the processes through which individuals may contribute, as well as the manner in which contributions are combined, organized, and/or synthesized to produce collective products. Here again, the size and complexity of many information pools means that production and exchange processes can be complex. In complex information pools there tend to be many operational details related to how contributions should be made. Furthermore, derivative information pools are often created through a series of successive processes, each of which depends on the others and each of which has its own rules or guidelines. Certainly, processes will sometimes be simple and/or straightforward. However, even in such cases there may still be important and relevant information concerning the collection and organization of contributions.

Information About People. Information pools are often examples of group-generalized or productive exchange. In both forms of exchange, the rewards of exchange come not from any individual but rather from the abstract amalgam of “the group.” As a result, what individuals know about the group can be a key part of their decisions about contribution, as well as their perceptions of the value of the collaborative product. Furthermore, many online collective actions encourage group identity and solidarity among contributors as a means of increasing loyalty, promoting additional contribution, and enhancing the collaborative experience through social interaction. However, computer-mediated systems can present significant ambiguity about who contributors are and why they do what they do. I call this type of information *social operational information*. Social operational information refers to details about the other people with whom one may work on a collective action. Who

are they? What are their characteristics, behaviors, attitudes, or motivations? How many others are in the contributing group? This type of information is particularly essential in information pools because information pools can grow to incorporate the regular efforts of thousands or millions of individuals. In this environment, there is often a great deal of available and relevant information about others.

2.3.1 Incomplete Operational Information & Uncertainty

There are a wide variety of reasons that a specific piece of operational information could encourage or discourage participation. These reasons may be tied to potential participants' perceptions, beliefs, or goals, and are highly context specific. In this section I argue at a much more general level that the provision of operational information can encourage participation in online collective action by reducing uncertainty associated with the system and its environment.

Uncertainty refers to a perception created by incomplete information about potential outcomes. Research has examined the influences of several types of uncertainty in social dilemma situations. In interpersonal relationships, uncertainty about the range of others' possible intentions or behaviors combines with risk — the possibility for loss — to generate a need for trust (Cook et al., 2005). More generally, social uncertainty refers to uncertainty about the decisions and behaviors of other actors in a group (Messick et al., 1988). Environmental uncertainty refers to a lack of information about the characteristics of the collective action situation at hand (Messick et al., 1988), and corresponds very well to the concept of incomplete operational information that I have already presented:

“...in experiments on public good provision participants know exactly the number of endowments all group members possess, the threshold for the realization of the public good, the value of the public good, and how the public good will be distributed among the group members. In reality, however, people may often be uncertain about aspects of the dilemma they are facing. For example, people may be uncertain about the extent to which it is possible for group members to further the collective interest, about the exact benefits of reduced energy consumption, the consequences of recycling for the environment, etc.” (van Dijk et al., 1999, p. 111).

In information pools, environmental uncertainty is often related to the architecture of the socio-technical system that facilitates collective action (Cheshire and Antin, 2009). In these cases, ambiguity created by design and/or patterns of use create uncertainty about how

interactions and contributions will be managed in a given system. Environmental uncertainty is salient for potential contributors because the decision to contribute may ultimately be tied to the perceived reliability, credibility, and security of the information system. This is especially true when the quality of goods is uncertain (Kollock, 1994), when commitment relationships with specific partners cannot be formed (Cook and Emerson, 1978), and when reputation information is not available (Ubois, 2003).

So, in the absence of other assurances, individuals often fall back on their knowledge of the operation of an information pool as the basis of contribution decisions. When that information is lacking, individuals may perceive a high degree of environmental uncertainty when making participation decisions. Importantly, this will only be true when individuals perceive operational information to be salient to the interaction or decision at hand. Consider the analogy of a poker game. I may be more likely to play if I know the rules of the game, the relative strength of hands, how long the game is likely to take, or who I am slated to play against. If I view these types of operational information as relevant to my decision on whether or not to play, they can reduce my contextually-relevant perception of environmental uncertainty. Other types of operational information, however, may not be relevant to my decision at all — information about the weight of the poker chips or the age of the dealer, for example — though they still provide additional information about aspects of the environment. Furthermore, in the absence of operational information I may feel uncertain about my chances to do well in the game. In other words, if my uncertainty is such that I don't feel I can gain significant value from participation, I may not play. It is important also to consider that uncertainty alone may not be enough to influence my decision — I also need to understand the risk involved in the game. If the stakes are low (e.g. pennies instead of dollars), I may be more likely to play a game I don't know well against unknown opponents.

It is easy to extend this analogy to the case of information pools. I may view information about the open source wiki platform that runs Wikipedia¹ as relevant to my decision to contribute, for example, because it enhances my perception of the system's reliability. Information about the operating system on Wikipedia's servers, on the other hand, might not be relevant. My understanding of Wikipedia's standards for writing may be important because my contribution is unlikely to be successful unless it conforms to stated standards. On the other hand, if the cost of contributing or the risk of a failed contribution is extremely low (as, perhaps, in the case of fixing a typo), I may be more likely to contribute despite having incomplete operational information.

A long tradition of experimental research in economics and psychology has shown that individuals prefer to make decisions in situations where all possible outcomes are known (Camerer and Weber, 1992, van Dijk et al., 1999). In other words, individuals tend to avoid making decisions in situations that are characterized by uncertainty or ambiguity. Curley et al.

¹MediaWiki (See <http://www.mediawiki.org/>) is the open-source software platform that runs Wikipedia.

(1986) note at least five psychological explanations for this phenomenon, including the perception that an uncertain choice is a hostile choice and the belief that one's choice will be evaluated by others and so the selection of the most justifiable choice is warranted. This pattern of uncertainty or ambiguity avoidance, "created by missing information that is relevant and could be known" (Camerer and Weber, 1992, p. 330), can encourage individuals to avoid taking action altogether (Heath and Tversky, 1991), thereby removing themselves from the uncertain situation. As a result, when individuals perceive that relevant operational information is missing, they may react to that environmental uncertainty by choosing not to contribute. When operational information is available, however, it may decrease environmental uncertainty and thereby increase participation.²

2.4 Relative Competence Feedback and Participation in Collective Action

In the preceding sections I have argued at a general level that the absence of operational information can be a barrier to participation, and that the provision of operational information can encourage participation in information pools. In this section, I move beyond these general arguments and focus on a class of social operational information which I call *social comparisons*. Social comparisons are, as the name suggests, information which compares an individual to others, often in the form of a ranking, rating, or percentile, rather than comparison to an agreed upon, known, or understood metric (if such a metric even exists). I discuss these issues in detail later in this chapter. In the experimental portion of this study I test the potential influence of a specific type of social comparison: feedback about one's own *competence* relative to others. Competence has been defined as "an organism's capacity to interact effectively with its environment" (White, 1959, p. 297). Those who are competent possess the skills, abilities, and knowledge to effectively act in a given context or with respect to a given task. Competence, similar to the term efficacy, refers to an individual's actual abilities in a given context, regardless of what that person believes about those abilities.

Beliefs about competence have played a key role in social psychologists' explorations of human motivation. One of the pillars of self-determination theory, which seeks to explain intrinsic motivation and the effects of external rewards, is the notion that most people have an innate desire to succeed (Harter, 1978, Deci, 2002). Perceptions about competence are also a key element of self-efficacy beliefs. In the context of self-efficacy, however, what is essential is what an individual *believes* about her own competence. The literature on self-efficacy refers to the concept using a wide variety of terminology. In actual practice, self-efficacy,

²An exhaustive test of relationships between operational information, environmental uncertainty, and participation in collective action is beyond the scope of this study. However, the notions of operational information and environmental uncertainty are key antecedents to the discussions that follow.

self-efficacy beliefs, self-percepts of efficacy, and perceived self-efficacy all refer to the same underlying theoretical construct. In this study I use the term “self-efficacy beliefs” in order to highlight the key distinction between terms such as competence and efficacy, which refer to an individual’s actual capacity, and self-efficacy, which refers to an individual’s beliefs or expectations about his competence or efficacy.

Albert Bandura defines self-efficacy as “people’s beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives.” (Bandura, 1994, p. 71). Bandura argues that self-efficacy beliefs have two constituent parts: efficacy expectations and outcome expectations (Bandura et al., 1977). Efficacy expectations are “the conviction that one can execute the behavior required to produce [an] outcome” (Bandura et al., 1977, p. 193). Bandura’s definition of efficacy expectations essentially refers to an individual’s beliefs about his competence. Outcome expectations, on the other hand, are “a person’s estimate that a given behavior will lead to certain outcomes” (Bandura et al., 1977, p. 193). Gecas (1989) suggests that self-efficacy “refers to people’s assessments of their effectiveness, competence, and causal agency” (p. 292). Bandura and Gecas’ definitions imply that both perceptions of competence and agency are required elements of self-efficacy beliefs: belief in the ability to complete an activity when doing that activity can and will influence a desired outcome. Whereas competency beliefs bear on the question of how well equipped an individual is to act in a given situation, agency refers to the degree to which he is able to do so. Personal and situational factors often prevent an individual from acting even though she is competent enough to do so.

Some research has illustrated a link between competence feedback and pro-social behaviors, although taken together the research suffers from theoretically inconsistent manipulations of competence feedback. Berkowitz and Connor (1966) showed that college students worked harder on behalf of a dependent other after an experience of success (versus failure or a neutral experience) at an unrelated task (a wood-block puzzle). The authors explain this result by arguing that “people who have recently attained desired goals may be especially willing to tolerate the occasional inconveniences and barriers to immediate gratifications that are established by moral prescriptions” (Berkowitz and Connor, 1966, p. 665). Several experiments focused on children echoed these results, also suggesting that experiences of success can encourage sharing (Staub, 1973). In their qualitative study of helping responses in natural disasters, Form and Nosow (1958) show that people who tend to help are those who have prior competencies with respect to the challenge at hand. This research suggests that providing explicit feedback about one’s own high absolute competence can *encourage* pro-social behavior. The influences of specifically low competence feedback and experiences of failure on pro-social behavior are somewhat less examined. Berkowitz and Connor (1966) found that, compared to participants in a control condition, participants who had an experience of failure worked significantly less hard on behalf of a highly dependent other. Berkowitz & Conner suggest this effect may be the result of “frustration” which deters individuals from adhering to a norm of social responsibility (I will discuss the issue of social responsibility extensively later in this chapter). Finally, a number of studies have found that experiences

of failure which harm another can actually *encourage* pro-social behavior in children (Isen et al., 1973, Staub, 1973) and in adults (Darlington and Macker, 1966) through a process of “reparative altruism.”³ This will only be true, however, when failure actively harms another and an altruistic act assuages the feelings of guilt that accompanied the failure.⁴

The above-referenced research does a poor job of specifying the mechanisms for the observed relationships. Berkowitz and Connor (1966) suggest that experiences of success increase adherence to moral prescriptions while “frustration” deters such adherence. In his review of research on altruism, Krebs states that “in experiments, the experience of success seems to increase self-esteem, which leads to increased positive affect and altruism” (Krebs, 1970, p. 266). However, these amount to guesses (albeit educated guesses) which are not directly supported by the data.

2.4.1 Absolute vs. Relative Competence

In the studies reviewed above participants encountered unambiguous success or failure, or were provided with competence feedback in which they were measured against an established metric. These measures, such as an IQ score or a grade on a scale from 0 to 100, are “absolute” in the sense that they tend to be widely agreed-upon and have known minimum and maximum values. Often, however, only *relative* feedback about an individual’s competence will be available. Relative and absolute competence feedback convey distinct types of information. Absolute competence feedback compares an individual against a specific metric or scale. The specified metric will often be partially or wholly socially constructed (and so not truly “absolute”), but it is nonetheless accepted, agreed-upon, and widely known. Relative competence feedback, however, provides information about competence by comparing

³Before discussing the research related to competence beliefs and participation in collective action it is essential to resolve some of the confusion around the notion of pro-social behavior (Simpson and Willer, 2008). Pro-social behavior refers to any behavior that is beneficial to others, regardless of the motivation for undertaking that behavior. Batson et al. (2007) identify four potential goals for pro-social behavior: “self-benefit (egoism), benefiting another individual (altruism), benefiting a group (collectivism), and upholding a moral principle (principlism)” (Batson et al., 2007, p. 281). As Batson and colleagues note, these four goals are not mutually exclusive. In practice, pro-social behavior is likely to be motivated by several of these factors in combination. Much of the research on competence beliefs, however, uses the term altruism to refer more generally to pro-social behavior. Other research simply refers to “helping behavior” and largely avoids the question of whether it is only others who benefit from a particular act. A great deal of scholarship has helped to refine the notions of altruism and pro-social behavior over the last 40 years. So, the fact that most of the research on competence beliefs (which I review below) was published in 1960’s and 70’s may help to explain the inconsistent use of terminology. In information pools, a key form of pro-social behavior is contribution of information towards the collective pool. So, in the hypotheses that follow I refer to contribution or contribution rate over time as the outcome of interest.

⁴Krebs (1970) review describes in-press research which also showed evidence for reparative altruism in adults. However I have been unable to locate that publication, and it appears never to have made it into print.

individuals to each other. Importantly, either type of feedback presented by itself leaves some ambiguity. For example, an individual may receive absolute feedback that he scored 5 out of 10 on an assessment. However, he has no basis for comparison, and so cannot know whether 5 out of 10 reflects higher or lower competence compared to others. On the other hand, that same individual may receive relative feedback that his assessment is in the top 20% compared to others, but that social comparison gives him no direct information about whether his absolute score on the assessment was high or low.

Absolute measures are often unavailable in the context of information pools. The tasks which constitute participation often have no agreed upon metrics associated with them. Many information pools are characterized by uncertainty about the goals of the system or how to participate (Cheshire and Antin, 2009). In these systems there can be significant ambiguity about the definition of a competent contribution, a fact which makes it difficult to define a widely agreed upon measure of competence. Furthermore, information pools regularly synthesize contributions into new, derivative forms (Fulk et al., 1996), and in so doing add additional layers of distance and complexity to the link between individual acts of contribution and collective information products. Without transparency about the derivative process, the complexity of some information pools can present a barrier to direct assessments of absolute competence.

Relative competence feedback in the form of social comparisons, however, is relatively common in information pools. For example, Q&A site Yahoo! Answers awards points for doing a variety of activities on the site, and then ranks individuals according to their total points. Similarly, as players in Microsoft's XBox Live social gaming service engage in various activities, they improve their "Gamerscore," which is then used to pit participants against each other. Participants in many different systems view competitive rankings, or are provided with popularity or "trust" ratings, for example. These rankings and ratings are sometimes based on complicated algorithms which combine available information about contributors in an unknown fashion. In other cases, social comparisons are based on more transparent criteria, such as counting the number of times individuals have performed a given task. However, it is not always clear how the task is counted or what the boundaries of the relative measure are. For example, an individual may know that a ranking is based on the number of times he has tagged an image. However, without knowing how frequently other users tag on average, or how many images the most frequent contributors tag, a social comparison based on tagging frequency can be difficult to interpret.

In an especially relevant study, Kazdin and Bryan (1971) explicitly manipulated competence feedback in an experimental setting to address the relationship between competence feedback and pro-social behavior. However, the study contains several methodological problems which make it difficult to interpret its results. Kazdin and Bryan (1971) manipulated participants' beliefs about their own competence at either a physical or a creative task by giving them either average or high competence feedback. Researchers then asked participants to donate blood. Results showed that participants in the high competence conditions were both more

likely to volunteer to give blood and more likely to actually follow through with the donation compared to those in low competence conditions. Kazdin & Bryan do not offer evidence of a specific mechanism for the observed relationship. They opine that positive competence feedback and higher competence beliefs may promote risk-taking or that “obtaining special status produces special sensitivity to the plights of others” (Kazdin and Bryan, 1971, p. 96). However, these findings are difficult to interpret for two reasons. First, Kazdin & Bryan provided average or high competence feedback about two separate domains — physical aptitude and creative ability — and argued that physical aptitude was “task relevant” while creative ability was not. However, it is not immediately clear that there is a direct relationship between donating blood and either measure of competence, and the authors provide no evidence about what participants believed in that regard. The indeterminate relationship between the dependent variable and competence measures which participants may have perceived to be unrelated makes it difficult to understand the observed effect or why it might occur.

More problematically, the experimental manipulation actually conflated absolute and relative competence feedback in the physical aptitude conditions. In practice it can be difficult to construct feedback that is purely relative and which does not imply, at least to some degree, absolute feedback as well. However, Kazdin & Bryan’s manipulation did much more than imply absolute feedback, instead providing effusive and specific commentary about absolute competence. For example, participants were given the following feedback:

“Now we can tell you something about your general physical condition and health. First of all, let me say generally that on the basis of our recordings you are in very good health (for low-competence; in fair condition and about average in health). Your physiological reactions to effortful activity as indicated by your respiratory cycles and nervous system activity clearly indicate that you are (not) superior (nor very inferior) to your peers in your physical condition. This conclusion is also supported by our ratings of your exercise and by a number of rather complex criteria used to measure physical fitness and health.” (Kazdin and Bryan, 1971, p. 90)

Participants in the high competence conditions were told both that they were “in very good health” and that they were in superior health compared to others. So, participants were provided with *both* absolute and relative competence feedback. While the observed increase in blood donation in the high competence conditions is interesting, the results do not allow us to untangle the potential differences between the two types of social operational information.

Prior research in online contexts has suggested that relative competence feedback in the form of a social comparison could be successful at encouraging pro-social behavior (See, e.g., Cheshire and Antin, 2008). The primary goal of this research is to expand on prior

studies and examine the influence of relative competence feedback given a specific set of scope conditions which are common in information pools. Furthermore, this study aims to provide theoretical clarity about why the relative competence–contribution relationship exists by focusing on how relative competence feedback could lead to changes in a variety of attitudes.

The existing research on competence and pro-social behavior has provided little in the way of concrete evidence or theory about why high competence feedback should promote pro-social behavior or low competence feedback should deter it. I argue that self-efficacy beliefs and its constituent attitudes (efficacy expectations and outcome expectations) are likely to be a big part of the link between competence feedback in general and pro-social behavior.

A large number of studies have documented positive relationships between self-efficacy beliefs and pro-social behavior. Some research has specifically noted the importance of an individual’s beliefs about his ability or capacity to handle the social and emotional demands of engaging in pro-social behavior (“interpersonal self-efficacy beliefs”) (See, e.g. Caprara, 2002, Caprara et al., 2010). Many other studies, however, have traced a diverse array of attitudes and behaviors related to social success, achievement, and pro-sociality to higher self-efficacy beliefs of various kinds. For example, research on education, learning, and child development has demonstrated that increased self-efficacy beliefs promotes increased academic achievement, social development, and consideration for others (See, e.g. Schunk, 1989, Bandura et al., 1996) as well as general cognitive functioning (Bandura, 1993). Higher self-efficacy beliefs and pro-sociality have been linked as predictors of fewer deviant and risky behaviors in young people (Ludwig and Pittman, 1999). Self-efficacy has also been connected to increased motivation and contribution in social dilemmas. Indeed, Oliver (1993) suggests that “some term for efficacy, the perception that one’s actions make a difference in accomplishing goals” (p. 278) is a part of almost all models of behavior and motivation in collective action situations. Finally, Kalman and colleagues found that self-efficacy beliefs were a key predictor of contributing information to “discretionary databases” in which individuals make decisions about voluntary contributions of information to shared repositories (Kalman et al., 2002). Together, this large body of extant research suggests a robust positive correlation between increased self-efficacy beliefs and increased pro-social behavior:

Assumption 1 – Increased self-efficacy beliefs encourage increased pro-social behavior while decreased self-efficacy beliefs discourage pro-social behavior.

2.4.2 The Link Between Information and Beliefs

A key issue in this study is the link between *information* about relative competence in the form of a social comparison and *beliefs* about self-efficacy. Absolute competence feedback provides direct and unambiguous information to inform an individual’s judgement of his

self-efficacy. High absolute competence feedback provides information that one is skilled or knowledgeable on an absolute scale. As a result, high absolute competence feedback should encourage high self-efficacy beliefs. Low absolute competence feedback, on the other hand, informs an individual that he is unskilled or ignorant, and should encourage low self-efficacy beliefs. Indeed, this may help to explain the observed relationships in prior studies (e.g. Berkowitz and Connor, 1966, Kazdin and Bryan, 1971, Staub, 1973). This potential link was not explored in earlier research, however, because self-efficacy theory was not sufficiently developed (and indeed the term self-efficacy had not yet been coined) at that time.⁵

Relative competence feedback still provides significant information about skills or knowledge. It is more indirect in the sense that information is provided in the form of a social comparison, but relative competence feedback nonetheless can help bolster or reduce self-esteem. So, while the link between feedback and self-efficacy beliefs might be weaker than it would be in the case of absolute competence feedback, receiving high relative competence feedback should still encourage higher self-efficacy beliefs compared to receiving average relative competence feedback. Those who receive low relative competence feedback, on the other hand, must face information which could be explicitly damaging and deflating for their self-efficacy beliefs. As a result, receiving low relative competence feedback should encourage lower self-efficacy beliefs compared to receiving average relative competence feedback.

Hypothesis 1a – Individuals who receive feedback indicating that they are of *high* relative competence will express higher self-efficacy beliefs compared to those who receive feedback indicating that they are of *average* relative competence.

Hypothesis 1b – Individuals who receive feedback indicating that they are of *low* relative competence will express lower self-efficacy beliefs compared to those who receive feedback indicating that they are of *average* relative competence.

Assumption 1 expresses a positive correlation between self-esteem and pro-social behavior. Because of this correlation hypothesized above, the dynamics predicted in Hypotheses 1a-1c suggest a concomitant relationship between relative competence feedback and contribution rate:

Hypothesis 2a – Individuals who receive feedback indicating that they are of *high* relative competence will contribute more over time than those who receive feedback indicating that they are of *average* relative competence.

Hypothesis 2b – Individuals who receive feedback indicating that they are of *low* relative competence will contribute less over time than those who receive feedback indicating that they are of *average* relative competence.

⁵Note that I do not directly test the influence of absolute competence feedback in this study. An early version of this study included additional conditions to specifically examine absolute competence feedback, but those conditions were eliminated for practical reasons. I intend to explore this issue further in future research.

So far I have hypothesized that relative competence feedback will have direct consequences for two variables which I can measure: self-efficacy beliefs and contribution rate. Discerning whether changes in self-efficacy beliefs and changes in contribution rates are related — whether changes in self-efficacy beliefs help explain changes in contribution rates — is a more complex matter. First, changes in many attitudes, many of them unobserved, are likely to play a role in the competence–contribution relationship. Secondly, making a causal claim with regards to relative competence feedback, self-efficacy beliefs, and contribution rate would require a specialized research design which was not implemented. However, given the theoretically grounded expectation of a mediating effect, it is still possible to examine the relationship between the three variables using a variety of techniques. These techniques can tell us statistically, for example, whether the variance in self-efficacy beliefs helps explain some of the variance in contribution rates across conditions (if those differences are indeed observed). The arguments presented above present a clear case for the mediating influence of self-efficacy beliefs, and while that case cannot be demonstrated with the same causal process as Hypotheses 1a-1c and 2a-2c, it can nonetheless go supported or unsupported by experimental results:

Hypothesis 3 – An individual’s self-efficacy beliefs will partially mediate the relationship between relative competence feedback and contribution rate.

2.4.3 Perceived Social Responsibility

“From each according to his ability, to each according to his need!”

—Karl Marx, 1875 Critique of the Gotha Program

In his description of the communist ideal, Lenin envisioned “a system under which people become accustomed to the performance of public duties without any specific machinery of compulsion, when unpaid work for the common good becomes the general phenomenon” (Lenin, 1937, p. 239). It is thought to be this which inspired Marx to make his famous proclamation that in the final phase of the communist revolution, each would provide what he could and each would take only what he needed (Marx et al., 1938).⁶ In this vision, the foundation of the state was a kind of embedded egalitarianism in which the equitable division of resources required that some provide more and some provide less, with no inducements of any kind.

⁶Although Marx largely popularized the phrase, the principles it represents are evident (though not in so many words) in earlier works of philosophy, as well as in the bible.

While the communist ideal has largely gone from the world, arguably what remains is the sense of equitable provision: that people who can provide in a given domain have a responsibility to do so. Berkowitz and Daniels (1964) suggest that many individuals engage in pro-social behavior as a result of just such a “social responsibility norm,” which prescribes that we should help and provide for others when they are dependent upon us. Cialdini and Kenrick (1976) argue that through a variety of studies, Berkowitz and his colleagues have developed a strong array of evidence that there is a societal norm of social responsibility. Recent experimental research has validated the relevance of social responsibility in predicting pro-social behavior (De Cremer and Lange, 2001). However, Berkowitz himself later concluded that the influence of a general norm of social responsibility may have been exaggerated (Berkowitz and Berkowitz, 1972). The problem, according to Batson and colleagues, may be the norm is both too general and too specific:

“The norm may be too general in that everyone in our society adheres to it. If this is true, the norm cannot account for why one person helps and another does not. The norm may be too specific in that along with it comes a complex pattern of exceptions, situations in which an individual may feel exempt from acting in accordance with the norm.” (Batson et al., 2007, p. 245)

As the utility of a generalized notion of social responsibility has been questioned, some attention has turned towards personal expressions of the norm. These individual norms concern specific situations or conditions in which social responsibility encourages helping (Schwartz, 1977).

While some public goods can be provided for everyone by a single person, most information pools involve what Fulk et al. (1996) call distributed resources: the public good is a puzzle whose pieces are spread throughout the population of potential contributors. So in information pools, as in a communist society, individuals must rely on each other to succeed. This will be especially true when some individuals are better able to provide for the group than others. Indeed, research has suggested that public goods are more likely to be produced by heterogeneous groups. Diverse groups are more likely to contain a few individuals who are able to bear an inordinate amount of the burden of producing the good (Marwell et al., 1988). However, these so-called “privileged groups” do not necessarily contribute because of perceived responsibility to do so. Rather, they are often individuals who would benefit so much from the collective good that it is squarely in their best interest to single-handedly provide it. Still, research on collective action and social dilemmas has long had an interest in the consequences of key differences in individuals’ ability to further group goals. Variations in perceived competence are one such key difference.

Prior studies have suggested a link between competence and perceived responsibility to help. The aforementioned findings by Berkowitz and Connor (1966) show that, compared

to participants in a control condition, participants who had an experience of failure worked significantly less hard on behalf of a highly dependent other. Berkowitz and his colleagues explain these findings by suggesting that experiences of failure can create “frustration,” and that “frustrated people will display a low level of conformity to the social responsibility norm” (Berkowitz and Connor, 1966, p. 665). Schopler and Matthews (1965) review a variety of other factors which have been shown to influence the engagement of the social responsibility norm. Kazdin and Bryan (1971) also explain their finding that participants in a high competence condition tended to help more by invoking the notion of perceived social responsibility:

“Additionally, it is possible that obtaining special status produces special sensitivity to the plights of others. The increase of status may thus produce feelings of noblesse oblige, whether they be in response to the hard-working blood solicitor or to unknown recipients.” (Kazdin and Bryan, 1971, p. 96)

The notion that the perception of high competence produces a kind of “noblesse oblige” is exactly the sort of practical link that Marx and Lenin would suggest. Furthermore, a corollary to the norm of social responsibility — that those who are better equipped to help should do so — may be that those who are less well equipped to help need *not* do so. These two statements are not merely logical opposites. This is an essential distinction. The norm of social responsibility does not simply dictate that people should work as hard as they can for the group at all times. Rather, there may be a direct two-way correlation. When individuals are less able to help and they are aware that others in the group are more able to, they may engage in less pro-social behavior because of the belief that an equitable distribution of effort means they *should not* contribute as much. Put differently, a better equipped individual who helps may do so partly because of the belief that it was a fair, equitable, and responsible way to behave. A poorly equipped individual, on the other hand, may choose *not* to help because of that same belief.

Relative competence feedback provides information not only about oneself but about other potential contributors in the group. An individual who receives low relative competence feedback, for example, learns not only that he is potentially less well equipped to help the group, but implicitly that there are others in the group who are better equipped. As a result, higher relative competence feedback should encourage increased social responsibility and vice-versa:

Hypothesis 4a – Individuals who receive *high* relative competence feedback will perceive greater social responsibility to help the group compared to individuals who receive *average* relative competence feedback.

Hypothesis 4b – Individuals who receive *low* relative competence feedback will perceive less social responsibility to help the group compared to individuals who receive *average* relative competence feedback.

As in the case of self-efficacy beliefs, this study does not allow for a directly whether attitudes about social responsibility explain differences in contribution rates. However, statistical analysis can reveal findings that suggest a mediating relationship of the type that I explained above:

Hypothesis 5 – An individual’s perception of social responsibility will partially mediate the relationship between relative competence feedback and contribution rate.

2.5 Social Value Orientation

A key factor which unifies my arguments regarding group benefit expectations and social responsibility is that both attitudes require that an individual consider the potential outcomes of others in addition to the potential outcomes for themselves. Research has shown that individuals differ in the manner that they consider rewards for self and other. Liebrand et al. (1986) argue that:

“... [individuals] reevaluate alternatives in a given matrix according to the personal value or weight they place on alternative own/other outcome distributions. An assessment of this outcome transformation or weighting process provides insight into the social values that underlie the social decision making of individuals in outcome interdependent situations.” (Liebrand et al., 1986, p. 204)

Stable preferences or orientations towards the distribution of rewards between self and others have been called social values (Griesinger and Livingston, 1973, Kelley, 1978). Some classifications of social value orientation (SVO) have included as many as four types: altruistic (maximize rewards for others), cooperative (maximize rewards for both self and other), individualistic (maximize rewards for self), and competitive (maximize the difference between rewards for self and other) (Messick and McClintock, 1968). More recent research has tended to reduce this classification into simply pro-social, self-interested, and unclassified individuals (De Cremer and Lange, 2001, Simpson and Willer, 2008).⁷ The latter category refers to individuals who do not express stable preferences towards one distribution of rewards or another.

⁷Individuals with a competitive SVO tend to be rare. While the rationale for collapsing competitive and self-interested individuals has been debated, it remains a common practice in the extant research.

SVO has been shown to predict differences in behavior. A number of studies have shown that, compared to pro-social individuals, self-interested individuals tend to engage in less pro-social behavior in social dilemmas (See e.g., Kuhlman and Marshello, 1975, van Lange et al., 1998, Fehr and Fischbacher, 2002). As Caprara et al. (2010) puts it, “it is unlikely that people engage in activities aimed to benefit others, unless they assign value to others’ ‘well being’” (p. 38). In line with previous research, then, I expect SVO to moderate pro-social behavior independently of competence feedback:

Assumption 2 – Individuals who are pro-social will contribute *more* more towards a collective task, while individuals who are self-interested will contribute *less* less towards a collective task.

Recent empirical research has also suggested a link between SVO, perceptions of competence, and pro-social behavior. Utz et al. (2004) found that a subtle manipulation of competence beliefs influenced cooperation rates in a social dilemma. Utz and colleagues primed some participants for general competence using a scrambled sentence task (See e.g., Bargh et al., 1996), and then asked them to participate in a “give-some dilemma.” They hypothesized that individuals would respond differently to the competence prime as a result of their SVO. Based on the goal-prescribes-rationality principle (Lange and Kuhlman, 1994), which suggests that pro-social individuals see cooperation as the “smart” course of action while self-interested individuals see defection as the “smart” course, Utz et al. (2004) argue that the competence prime should increase cooperation for pro-social individuals and decrease it for self-interested individuals. Their results supported the notion that priming competence reduces cooperation for self-interested individuals, but provided only modest support for the expected increase among pro-social individuals. Results for unclassified individuals were not reported.

Applying this same logic, we might expect explicit competence feedback to have a similar and potentially stronger influence than the more subtle competence prime applied by Utz et al. (2004). However, Utz and colleagues primed a general notion of competence which was unrelated to skills and abilities related to the task at hand. The abstract and general nature of the prime is, perhaps, what allows it to trigger the “smart” reaction as the goal-prescribes-rationality principle would suggest. In this research competence feedback relates specifically to the task at hand, a fact which may make it more difficult for the primed notion of competence to transpose to more general notions of rationality.

At the same time, the context-specific nature of relative competence feedback and its relationship to social responsibility points towards a different pattern for the moderating influence of SVO. Pro-social individuals are those who are predisposed to concern themselves with the rewards of others in inter-dependent situations. An individual’s sense of her social responsibility for contributing should be bolstered by a pre-existing disposition towards caring about others rewards. Indeed, De Cremer and Lange (2001) find “evidence that social responsibility represents a motivational process underlying behavioural differences between prosocials

and proselfs” (De Cremer and Lange, 2001, p. S11).⁸ Self-interested individuals may be less likely to perceive a social responsibility to help by virtue of their tendency to concern themselves with their own outcomes. Alternatively, self-interested individuals may perceive a degree of social responsibility, but be less likely to act on it because of their decreased concern for the outcomes of others. So, if the positive influences of high relative competence feedback work (at least in part) through attitudes about group outcomes in inter-dependent situations (e.g. social responsibility), the influence of high feedback should be particularly strong for pro-social individuals. Conversely, a self-interested SVO should present a barrier to the operation of social responsibility which, in turn, could mitigate the positive effect of high relative competence feedback. In either case the prediction is the same:

Hypothesis 6a – Compared to those who receive average relative competence feedback, the positive influence of high relative competence feedback on contribution rate will be greater for pro-social individuals than for self-interested or unclassified individuals.

These arguments should apply to the case of low relative competence feedback. By virtue of their tendency to privilege their own rewards, self-interested individuals should be quick to respond to low relative competence feedback by deciding it is not their responsibility to help. This decision may be influenced in part by perceptions of the changing costs and benefits of helping. Increased self-efficacy reduces the perceived cost of contributing because an individual risks less by contributing to a task he knows he can do well at (Kazdin and Bryan, 1971). However, this will partly depend on the costs required for an individual contribution. As I have already discussed, in information pools those costs can often be quite small (Cheshire, 2007). One who believes himself to be less competent may perceive higher costs of contributing, even if the costs of contributing information to a collective product are small overall. Furthermore, in a situation where higher competence contributions are more beneficial to the group, the potential benefits (and the perception of those benefits) can be greater for someone who has high self-efficacy beliefs and smaller for someone with low self-efficacy beliefs. By reminding individuals of the skewed cost/benefit balance, low relative competence feedback can encourage individuals to conclude that the costs outweigh the benefits. However, this calculation is likely to be particularly appealing to those who are more sensitive to their own outcomes anyway. So, self-interested individuals should be particularly susceptible to the negative influences of low relative competence feedback:

Hypothesis 6b – Compared to those who receive the negative influence of low relative competence feedback on contribution rate will be greater for self-interested individuals than for pro-social or unclassified individuals.

⁸Interestingly, De Cremer and Lange (2001) chose to measure social responsibility in its general or societal incarnation. Their measure of social responsibility was based on a Likert-style response to a single question which asked “participants to what extent they felt it was their responsibility to further the collective interest” (De Cremer and Lange, 2001, pp. S10-S11).

Utz et al. (2004) primarily discuss the moderating role of SVO for individuals who are classified as pro-social or self-interested. However, in most studies on SVO between 15 and 20 percent of individuals are unclassified — they express no consistent SVO (See e.g., van Lange et al., 1997). The logic of the arguments presented above suggests that relative competence feedback may be less influential for people without a clear preference about the distribution of rewards to self and other. First, the goal-prescribes-rationality principle requires that an individual have a distributional goal he seeks to achieve. Without such a goal, neither self-interest nor pro-sociality is the “smart” or competent behavior, and so priming competence should be less influential for pro-social behavior. Similarly, unclassified individuals should be more neutral with respect to social responsibility. As a result, the influence of relative competence feedback — both positive and negative — should be dampened for those who do not express a consistent SVO.

Hypothesis 7a – The positive influence of high relative competence feedback will be less strong for individuals who do not have a stable social value orientation compared to those who are pro-social or self-interested.

Hypothesis 7b – The negative influence of low relative competence feedback will be less strong for individuals who do not have a stable social value orientation compared to those who are pro-social or self-interested.

Because it can work through a variety of intervening attitudes, providing relative competence feedback should still have an influence on individuals of any SVO. However, these arguments suggest that the positive influences should be greater for pro-social people, the negative influences greater for self-interested people, and the overall magnitude of influence reduced for unclassified people.

2.6 Alternative Explanations

In the course of exploring the mediators and moderators I argue for above, it will be important to explore alternative explanations for any observed relationships between relative competence feedback and pro-social behavior. In this section I briefly review three alternative explanations which I account for in my experimental design.⁹

2.6.1 Self-Esteem

Krebs (1970) suggests that a primary mechanism for the relationship between competence and pro-social behavior is changes in self-esteem, despite the lack of direct empirical evidence

⁹I will explain my experimental design in detail in Chapter 3.

for the claim. Receiving low competence feedback, he argues, can decrease self-esteem and induce a negative affect. Negative affect or mood has been shown to increase pro-social behavior while positive affect has been shown to increase it (Carlson et al., 1988).

2.6.2 Task Enjoyment

Research has suggested that people prefer to perform tasks that they are good at, and they perform better at tasks they like more than those they do not like (Puca and Schmalt, 1999). Indeed, task enjoyment has been thought of as a key element of the intrinsic motivations that encourage individuals to perform a task purely for the sake of the enjoyment and satisfaction it provides (Deci, 1972). While research on task enjoyment has not yet specifically examined the context of social dilemmas, there is good reason to suspect a similar relationship between task enjoyment and performance. Low relative competence feedback may simply discourage some individuals from liking the task, and thereby reduce pro-social behavior. High relative competence feedback, on the other hand, may encourage task liking and in doing so promote pro-social behavior.

2.6.3 Egalitarianism

Egalitarianism refers to the belief that resources and efforts should be equally and fairly distributed between members of a group (See e.g., Charlton, 1997). As an attitude, egalitarianism is similar to but broader than a pro-social SVO. While SVO deals specifically with the distribution of rewards for self and other, the value of egalitarianism also concerns broader issues such as beliefs about human and civil rights (i.e. gender and racial equality). Research has shown that individuals differ in their belief in egalitarianism (Katz and Hass, 1988). Although it has not been directly studied, egalitarianism may influence an individual's behavior in a social dilemma, as well as his response to relative competence information. A predisposition towards an equal distribution of efforts should lead individuals who are highly egalitarian to engage in more pro-social behavior, but only to the extent that they believe others should as well.

2.7 Conclusion

In this chapter I introduced the concept of operational information and argued for its general importance in the context of social dilemmas and collective act. I then presented a variety of hypotheses about a specific type of operational information — relative competence feedback

— arguing that individuals should engage in more pro-social behavior when they receive average or high relative competence feedback compared to individuals who receive low relative competence feedback. I then suggested that self-efficacy beliefs and attitudes about social responsibility mediate the influence of relative competence feedback on pro-social behavior. Finally I argued that an individual's social value orientation — his stable preferences about the distribution of rewards for self and other — should moderate the influence of relative competence feedback on pro-social behavior. In the next chapter I will present the methodology for a laboratory experience in which I test these hypotheses, as well as for a qualitative interview study which examines related issues around social operational information.

EXPERIMENTAL METHODS

3.1 Introduction

In this chapter I describe my overall methodological approach as well as the methods and procedures used in the experimental portion of this mixed-method study. Chapter 5 covers methods and procedures used during the qualitative portion. I begin by discussing the justification for conducting a mixed-methods study, and reviewing some of the literature related to mixed-methods. I focus in particular on the benefits of strategies that combine experimental and qualitative methods. I then describe the methods and procedures used for the experimental portion of this study.

3.2 Mixed Methods

Tashakkori and Teddlie suggest that mixed-method research designs are defined not simply by the use of multiple methods, but by the use of multiple methods that span the qualitative / quantitative divide (Tashakkori and Teddlie, 2002, p. 11). A mixed-method research design provides two primary benefits to this study. First, when the research questions that drive a project are multi-faceted, choosing a single method to address all facets can lead to the use of methods which are inappropriate for some sub-questions. A primary factor in any research design should be the selection of a method that is appropriate to the research question at hand (Creswell, 2003). A mixed-method design allows the researcher to choose methods best suited to the individual aspects of the overarching research questions (Creswell et al., 2003).

Secondly, while the experimental and qualitative phases of this study are distinct, together they speak to larger questions around the role of social operational information in online collective action. The application of several methods to explore the same research problem has been called triangulation (Campbell and Fiske, 1959). Triangulation adds to reliability and validity by mitigating the methodological weaknesses of individual methods. This has been

called methodological triangulation (Denzin, 1970). A second type of triangulation, data triangulation (Denzin, 1970), focuses on comparing data on similar issues drawn from multiple sources in order to improve confidence in the validity and reliability of results. By taking multiple points of view on a research problem, and collecting data in a variety of forms, the researcher can also gain a deeper and richer understanding of a phenomenon and its context. In doing so, the researcher is better able to analyze and interpret findings and meaningfully discuss their implications. For example, narratives and beliefs about the competency of other participants in Wikipedia enrich laboratory data on the relationships between competency beliefs and participation in a (necessarily) abstract and simplified experimental system.

Creswell (2009) draws attention to the relative roles and importance of the multiple methods involved in a study. He argues that methods may be mixed in at least three ways. First, methods may be combined sequentially so that each informs a subsequent phase of the study. Second, the researcher may design a strategy such that one method is “dominant” while other methods play a supporting role. Finally, methods may be integrated equally such that the strengths and weaknesses of the methods counterbalance each other, and neither is more dominant than another. In practice, however, these distinctions are hard to isolate. Whether one method or another is “dominant” will depend, after all, on findings which cannot be guessed beforehand. After data collection and analysis, the results drawn from one method may speak to the research questions more strongly than those drawn from another, thus creating an expected relationship between methods. As a matter of research design, however, it is useful to consider these issues: whether the sequence of methods is driven by time and resources or by research design goals, whether the primary research questions of a study are addressed more directly by one method than another, or whether practical issues such as funding or audience mean that method should be constructed as primary and another secondary.

In this study I take two perspectives on the question of how operational information — more specifically *social* operational information — relates to participation in online collective action. On the one hand, I examine the role of a specific type of social operational information — perceptions of relative competency — on participation. Only through operationalizing and manipulating competency beliefs in an experimental study is it possible to speak to the causal relationship between relative competency feedback and participation, and to examine the potential mediators and moderators of that relationship. On the other hand, I also aim to document and understand what individuals do and do not know, think, and believe about the other people involved in online collective action. In order to deeply explore these issues and the context that surrounds them an inductive, qualitative method is most appropriate.

3.2.1 Mixing Experimental and Qualitative Methods

If the lack of available literature is any indication, few studies have attempted to mix experimental and qualitative research methods. However, mixing these two types of methods can

provide important benefits to research. First, mixed experimental and qualitative research designs can improve the ecological validity of experimental findings. Ecological validity concerns the degree to which the operationalization and context of an experimental study approximates the real-world (Brewer, 2000). A key limitation of experimental studies is that they necessarily occur in a controlled environment (the lab) which is often a simplified abstraction of real-world situations. As a result, experimental results can speak to real-world situations only through the theories they inform (Jr., 1968). Given this limitation, it can be difficult to know how behaviors and attitudes observed in the lab apply to specific real-world situations. For example, Prisoner’s Dilemma (PD) type games have been widely used to study behavior in social dilemmas. The results of these experiments have informed a great deal of theory that has, in turn, been applied in real-world contexts. It is difficult, however, to know whether the results of a given PD study are more applicable to Wikipedia, for example, than they are to Digg, Flickr, Yahoo! Answers, or any other information pools. Qualitative data and analysis provides evidence, from participants’ own point of view, about whether the issues operationalized in a lab study occur in a particular online system.

Qualitative data also helps us better understand the nature of the problems we decide to study in the lab and to further justify their importance. In Chapter 2 I explain several theoretical justifications for studying relative competence. Complementing those theoretical justifications with qualitative analysis grounded in a specific case study (in this case Wikipedia) can help to confirm or disconfirm assumptions about the role and importance of competence beliefs in participation decisions. Finally, experimental findings can help to direct qualitative interviews towards topics that would lend additional context to important issues. This is true, of course, for all extant experimental work. However, conducting experiments and interviews as a part of the same ongoing research development process allows for a distinct kind of synergy.

3.3 Experimental Methods

3.3.1 Recruitment, Facilities, and Software

The experimental portion of this study was completed with the assistance of the XLab at the Haas School of Business at UC Berkeley. XLab provided complete recruiting and payment services from a pool of more than 4,000 volunteer student participants. As a result, I had no interaction with participants before their arrival at the XLab on the day of the experiment. XLab staff handled all sign-in and payment procedures.

I also made use of XLab’s computer lab facility, which consists of approximately 36 laptop computers in a series of six rows. Each laptop station also included an external mouse and

over-the-ear headphones, and was surrounded on three sides by two-foot tall dividers. To prevent study participants from viewing other participants in the room before or during the experiment, six-foot tall portable dividers and sections of opaque cloth were also placed between each row of computers. These tall dividers completely blocked participants from seeing anyone in other rows.

3.3.2 The Web Experimental Framework (WEF)

The study was designed and implemented using a modular web-based experimental software of my own design called the Web Experimental Framework (WEF). I designed and coded WEF, which is based on the PHP programming language and the MySQL database, specifically to support this study and other studies on similar topics. The primary characteristics of the system are:

1. flexible, modular system design to support many types of experiments;
2. integration of any type of single-participant interaction that can be carried out inside of a web browser;
3. the ability to run a large number of subjects simultaneously;
4. the ability to quickly iterate experimental designs during pilot testing;
5. automatic, random participant assignment and management, and;
6. a robust, secure data-collection mechanism.

3.3.3 Experimental Design

The experiment consisted of a series of 30 rounds in which participants decided whether or not to complete an information task. Participants did not know in advance how many rounds they would complete. At the start of each round, the participant was presented with two large buttons each representing their decision for that round (see Figure 3.1). If a participant chose not to contribute, he simply viewed a “Waiting for the Next Round” message, and after five seconds was presented with the same choice in the next round. A participant could finish the experiment quite quickly by clicking “Do Not Contribute” on each round. If a participant chose to contribute, he immediately viewed an information task, described below (see Figure 3.2).

The Experimental Task. Participants in the experiment completed a series of text translation tasks. I compiled a corpus of short images of text (as seen in Figure 3.2) drawn from

public-domain books involved in Project Gutenberg.¹ Each image of text contained 6-10 words in one of several languages: English, German, Latin, and Italian. While the small scanned images culled from Project Gutenberg were of generally high quality, in order to enhance the difficulty of the task, I used photo editing software to blur and smudge the images making them more difficult to read.

Participants who chose to contribute were asked to type in the text that was portrayed in the image on the screen according to a specific set of rules. The text segments were chosen specifically because they contained ambiguous spacing, hard to read text, and/or non-standard characters. Participants were given the following instructions on how to complete the transcription task:

Your task is to type **exactly the text you see in the image** into the text box as carefully and accurately as you can. Many of the images contain text with unusual or ambiguous spelling, capitalization, and word spacing. Many images will also contain special characters that are not your keyboard. Finally, the text depicted in images may be in a different language, and vary in the size of the font. It is essential that you use your best judgment in following these guidelines:

1. Pay special attention to spacing. Do not assume that the text follows normal rules for spaces between words and characters. Enter one or more spaces between characters, words, or punctuation wherever you think it is necessary.
2. Whenever you encounter special characters that are not on your keyboard, enter the standard character(s) that you think most closely match the special character, and surround the character you have chosen with two sets of square brackets. For example, if you find a word with a \acute{E} or \grave{E} character, you would type: `[[E]]`. If you find a word with a \tilde{n} character, you would type: `[[n]]`, and so on.
3. You will find instances of both short and long dashes. Indicate a short dash with - (one dash) and a long dash with – (two dashes). In some cases the length of the dash is ambiguous. You should decide on the dash type that seems most appropriate to you.
4. Make sure to accurately reproduce the capitalization of words and characters in the text.

Keying in text presented in an image has proven to be straightforward in prior experiments, and is representative of a wide variety of real-world information tasks. However, this study

¹Project Gutenberg (<http://www.gutenberg.org>) is a volunteer distributed-work project aimed at creating freely accessible digital books. Public-domain books are scanned and processed by optical character recognition (OCR) software. The scanned images and the subsequent digital text are then compared and corrected by many distributed volunteers.

is designed to examine the influence of feedback about a participant’s competence at the information task relative to others. If the task was too simplistic, participants would be unlikely to believe that there could be significant variation in competence. In particular, participants in the “low competence” condition could be suspicious of the manipulation if they considered the task to be too easy. To mitigate this danger it was essential to create a task that was sufficiently difficult and complex (but not overly so). The instructions reproduced above created a variety of rules for the task that participants would need to recall accurately. In addition, instructions emphasized that issues such as spacing and dashes could be ambiguous, and that there was not a single correct transcription of the text. Finally, blurring and selectively smudging the images further increased the ambiguity and difficulty of the task.

Several important considerations drove the selection of the text transcription task. First, I sought a task that would improve the ecological validity of experimental findings. Text transcription is somewhat less abstract than the value exchanges that are often used in game theoretic experiments. The selection of this task had the additional benefit of enhancing the “cover story” for the study. Participants were told that our goal was to understand how individuals and groups can work together on text transcription tasks in order to improve computer algorithms. Finally, the text transcription task represents an appropriate balance between several key factors. It was at least minimally challenging, and doing well at the task would require some degree of dedicated attention. At the same time, pilot testing showed that the task was not too difficult, and did not require any special skills. Participants were likely to be at least minimally familiar with tasks of a similar genre (for example through the CAPTCHA tasks which are often used to verify the humanity of users on the web), and yet few were likely to have much practice with the specific incarnation of the task.

Iteration. Participants completed multiple rounds of the experimental task, each of which contained a separate decision about whether to contribute. However, in game-theoretic terms, the experimental design is different from traditional iterated games such as the Iterated Prisoner’s Dilemma (IPD) game (Axelrod, 1984) in one important respect: participants were not provided with any new information or feedback about prior rounds before making decisions in subsequent rounds. Rather, feedback determined by the randomly assigned experimental condition was constantly in view, and participants were explicitly told that the feedback would not be updated with new information. Given the one-time provision of feedback, one possible design of the experiment would have been to provide feedback and then ask participants to report a single contribution amount. However, an experimental manipulation with multiple rounds was important for two primary reasons. First, an iterated game allowed for an analysis of decision-making over time. Even in the absence of new or updated information, the experience of completing each task can influence the manner in which subsequent tasks are perceived. The same competence information, for example, may be perceived differently after an individual has gained sufficient practice by completing many tasks in a row. Furthermore, considering the influence of time could reveal differential influences of high or low relative competence over time. A one-shot decision would mask these

differences. Secondly, an iterated design added to the ecological validity of the experiment. In real-world systems, individuals rarely decide up-front how much they will contribute over time. Rather, they make a series of small decisions. So, using an iterated task helps to link the experimental experience with real world experience.

Limiting Social Presence. Through prior experiments of this type, we learned that the social presence of others in the room during the experiment might influence contribution rates of some participants. I used three strategies in order to minimize the potential influence of social presence. First, the number of participants in each session was strictly limited to ten. Secondly, participants were spaced throughout the room such that there were never more than three participants in a row, and no two participants were seated side-by-side. Finally, in addition to the short cubicle dividers that surrounded each laptop station, I made use of six-foot tall dividers between rows of participants. Using the dividers conveyed a sense of private space and prevented participants in different rows from seeing each other.

Prior experiments also led us to believe that the ambient noise in the room might be influential for some participants. Because the experimental task is a typing task, the volume of typing noise in the room at any given time could provide clues about the overall rate of participation. As a result, during the study participants wore headphones which played a combination of white noise and ocean sounds. Pilot testing showed that the combination of over-the-ear headphones and ambient noise eliminated nearly all ambient noise.

3.3.4 Procedures

Participant Arrival

Participants signed-up in advance for sessions spaced at least 90 minutes apart. However, many participants arrived at the lab up to an hour before their scheduled time. In order to prevent participants from interacting with one another during the waiting period, all participants were ushered into the lab as soon as they arrived. Furthermore, participants were seated from back to front in order to prevent participants seeing each other while walking in. Once seated, participants were told to read an instruction sheet placed at their seat (See Appendix A), and to read and sign consent forms at their leisure.

Once all participants were seated and the experiment was scheduled to begin, I collected consent forms and gave a short introductory speech. The speech instructed participants to use the keyboard and mouse to complete the experiment and to turn off all cell phones. I also emphasized that participants work at different speeds, and that they might have to wait for others to catch up at certain points in the study. This instruction was intended to encourage the belief that the provided competence feedback was based on a real-time comparison with others. Finally, I instructed participants to raise their hands if they had questions about any aspect of the experiment. At the conclusion of the speech, I asked participants to put on the headphones at their station, and not to remove them until told to do so.

General Procedures

Participants began the experiment by completing a series of attitudinal scales beginning with the Trust / Caution Scale (Yamagishi and Yamagishi, 1994), the Social Value Orientation (SVO) scale (van Lange et al., 1997), and the Humanitarianism / Egalitarianism Scale (Katz and Hass, 1988). Under ideal conditions, participants would have completed these scales prior to coming to the lab. Allowing some time to pass would have mitigated the risk that answering questions related to trust, SVO, or egalitarianism would influence participants' attitudes or behaviors during the experiment. However, due to the restrictions of XLab's recruiting procedure, this was not possible. Instead, after completing these two scales, participants completed a third scale, the Ten-Item Personality Inventory (TIPI) Scale (Gosling et al., 2003), in order to insulate the trust and SVO questions from the remainder of the experiment.

After completing these scales, participants were presented with the experimental task. Instructions explained that the purpose of the experiment was to understand how groups make judgments about text translations in order to improve computer text recognition algorithms:

“Your task is to type **exactly the text you see in the image** into the text box as accurately as you can. These images are difficult for computers to decipher for a variety of reasons: they are faded and smudged, they contain text with unusual spelling, capitalization, and word spacing, and special or unusual characters that are not your keyboard. . . The purpose of this study is to improve computer text recognition by learning about how individuals and groups interpret ambiguous texts.”

Detailed instructions for completing the experimental task and were then provided, and participants practiced the task several times.

Earning Points

After practicing, individuals then viewed detailed instructions on how they would earn points during the study:

When you complete a task, you **do not** earn any points for yourself, but you do earn points for other participants in this study. You only earn points when **other participants** complete tasks. So, you cannot earn points for yourself. You must rely on other people to complete tasks so that you earn points.

The points earned for every contribution are calculated by a computer algorithm. The algorithm assesses how well you followed the guidelines and how closely the entered text matches a computer model of the best answer. So, careful contributions that follow the guidelines will earn more points. Neither you nor other participants in this study will be told how many points you have earned until the end of the study. All participants earn points in exactly the same way.

Keep in mind that because each participant only earns points from the contributions of others, he or she can choose to never contribute but still earn points. However, if everyone chose not to contribute, everyone would earn fewer points or no points at all.

These instructions introduced several elements that were key to the experimental design. First, participants believed that their earnings would depend on the number of points they earned, but that they could not earn points directly. Participants could only earn points from the contributions of others. This earnings structure is a key element of the type of group-generalized exchange (Yamagishi and Cook, 1993) that is exemplified in many information pools (Cheshire and Antin, 2009). By structuring potential earnings in this manner I created a social dilemma — each participant could do nothing (i.e. devote no time or effort to completing tasks) and yet still earn significant rewards from the contributions of others. So, an individual’s most self-interested, maximizing choice would be to free-ride. However, all participants would be better off if everyone contributed, and if each participant made the self-interested decision, everyone’s earnings would suffer. Secondly, participants were told that the number of points any participant could earn for the group would depend on how well they completed the task. This instruction emphasized the salience of competence at completing the information task for both individual and group outcomes. Importantly, though participants believed that well-done tasks could earn more points, *all tasks regardless of accuracy or adherence to guidelines earned at least some points for the group*. Up to this point, every participant experienced exactly the same conditions.

Experimental Manipulation: Relative Competence Feedback

After receiving instructions on earning points, participants were reminded of the guidelines for completing information tasks, and then began a series of ten assessment tasks. Participants were not told the number of tasks they would complete during the assessment, only that the “assessment will be based on how well you follow the above guidelines and the comparison of your responses to an adaptive computer model.” The language related to the “adaptive computer model” or the “computer model of the best answer” was intentionally vague. The purpose was to convey that the assessment would be partly based on how well a participant followed guidelines for entering special characters and the like, but also to allow for an ambiguous second element of the assessment based on the combination of many

different responses. This second element was necessary to help maintain the believability of the manipulation.

After competing the ten assessment tasks, participants were told that they must wait for other participants to finish the tasks, and that the wait could be as long as a few minutes. After a pre-determined wait-time of one minute, participants were presented with their assessment results. While they believed that their results reflected their true performance, in reality all participants were randomly assigned to one of three conditions:

1. **Average Condition (Control).** Participants in the average condition viewed the following assessment results: “Assessment Results: **Average**. Your assessment score was within the margin of error of the average for all participants who have ever participated in this study. In other words, based on your score you completed tasks about as well as the average participant.”
2. **Low Competency Condition.** Participants in the low competency condition viewed the following assessment results: “Assessment Results: **Low**. Your assessment score was in the bottom 21.2% of all individuals who have ever participated in this study. In other words, based on your score you completed information tasks better than 21.2% of other participants.”
3. **High Competency Condition.** Participants in the high competency condition viewed the following assessment results: “Assessment Results: **High**. Your assessment score was in the top 19.6% of all individuals who have ever participated in this study. In other words, based on your score you completed information tasks better than 80.4% of other participants.”

Figure 3.3 provides an example of the visual feedback provided along with the above messages. The phrasing of the manipulation emphasized that each participant was compared not only to other people concurrently participating in the experiment, but also an unknown number of other participants in the study. This was essential to counteract the possibility that knowledge of the size of the comparative group could be influential: if a participant was told he was in the low condition, but believed he was being compared to only a few other individuals, that could lead to a markedly different perception of competence than if that same individual believed he was being compared to a large number of others.

The Dependent Variable: Contribution Rate

After completing the assessment series, participants moved immediately to real information tasks. Over a series of thirty rounds, participants were presented with thirty independent decisions about whether to contribute, where contribution took the form of completing an

information task that would earn points for the group. Throughout the 30 rounds, each participant's individual assessment results were displayed along the side bar of the screen along with a note to clarify that the results were not being updated after each round, but rather reflected the results of their one-time assessment. Each participant's average rate of participation (ranging between zero and one) over these thirty rounds constitutes the primary dependent variable in this study.

Closing Questionnaires

In the final step in the experiment, all participants completed a series of questionnaires. Participants first completed a manipulation check, and provided some basic demographic information. They then completed a series of scales focused on identification with others who took part in the experiment, perceptions of personal responsibility, perceptions of self-efficacy and self-esteem. (The validity of new scales is discussed in a later section, and the full text of all scales is available in Appendix B.) Finally, participants estimated the percentage of tasks that they completed during the recorded rounds.

3.4 Conclusion

This chapter described the design of the experimental studies used to test hypotheses explained in Chapter 2. The experiments began with scales to assess general trust / caution, social value orientation, and egalitarianism. Participants then moved on to the main section of the experiment. All participants in this study received relative competence feedback based on an assessment. The assessment consisted of 10 required text transcription tasks, at the end of which participants were provided with the assessment results. While participants were led to believe that the competence feedback they received reflected their true performance, in reality they were randomly assigned to one of three conditions: high relative competence feedback, low relative competence feedback, or average relative competence feedback (the control). Other than differences in competence feedback, all participants completed the exact same tasks.

Over a series of 30 rounds, participants chose whether or not to complete a text transcription task. While making these decisions, their relative competence feedback was prominently displayed on the side of the computer screen. The number of text transcription tasks that participants chose to complete constitutes the main dependent variable. At the conclusion of 30 rounds, participants completed a number of short questionnaires to assess two kinds of self-efficacy and social responsibility.

3.5 Figures and Tables

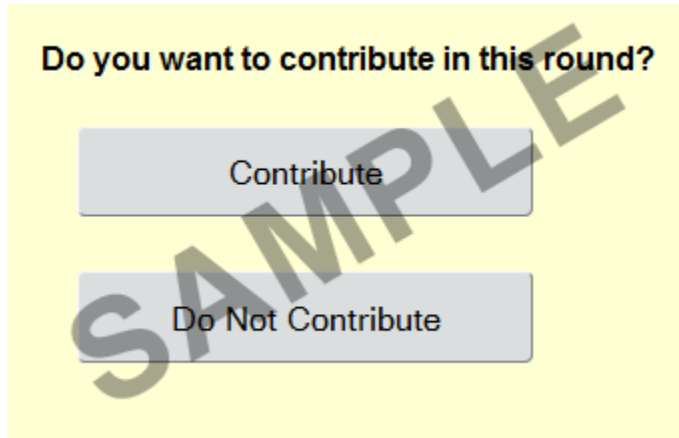


Figure 3.1: The contribution decision.

lines of holes in the ground, and fighting only just

SAMPLE

Figure 3.2: The information task.

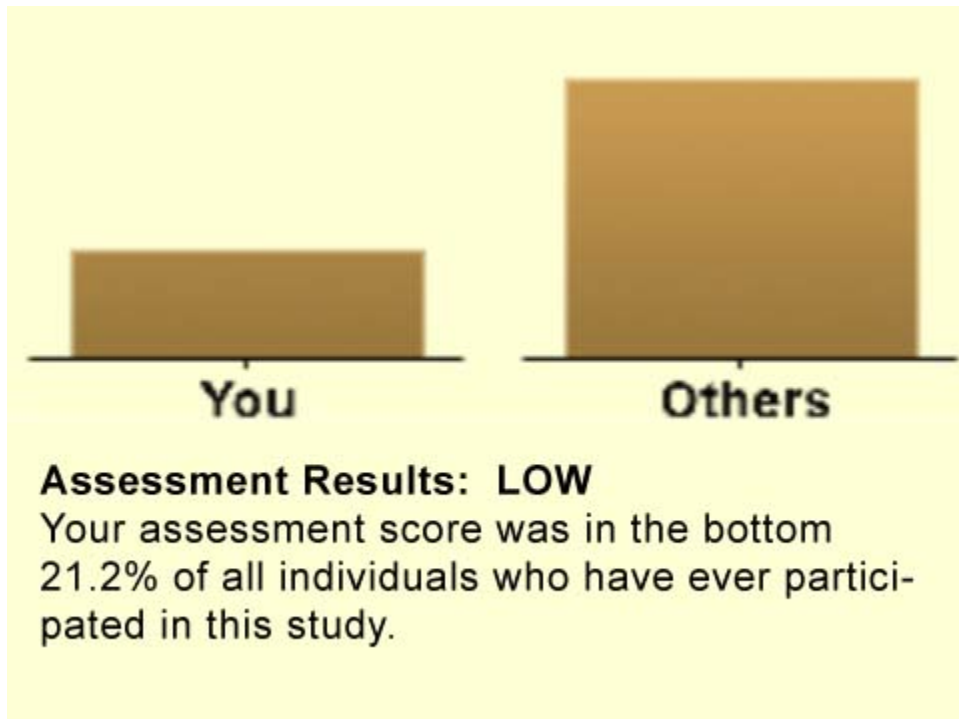


Figure 3.3: An example of relative competence feedback for individuals in the low condition.

EXPERIMENTAL RESULTS

4.1 Introduction

In this chapter I describe the results of the experimental portion of this study. I begin by providing a description of the experimental participants. I then explain the coding of both dependent and independent variables, and discuss the construction and validity of the attitudinal scales used to measure self-efficacy and social responsibility. Finally, I step through results as they relate to each of the hypotheses laid out in Chapter 2.

4.2 Participants

Participants were recruited through the standard recruiting process at the XLab at the Haas School of Business at UC Berkeley, from their pool of over 4,000 students at UC Berkeley. Over a series of three days, a total of 60 participants signed up for 6 experimental sessions. XLab’s standard procedure calls for over-recruiting for each session in order to ensure the desired number of participants. In each session, participants were seated on a first-come-first-served basis until 10 participants arrived. Any additional individuals who arrived were given a “show-up fee” by the XLab and did not participate in the experiment.¹ Of the 60 participants who completed the study, 2 failed the manipulation check.² Two others did not attempt the experimental task in good faith — they entered gibberish during many of the text transcription tasks — and were removed. Therefore, the final N for all results is 56. There were 17 participants in the high relative competence feedback condition, 20 participants in the low relative competence feedback condition, and 19 participants in the average relative competence feedback (control) condition. 35 participants (62.5%) were female and 21 (37.5%) were male. Participants’ average age was 21.³ Figure 4.1 shows the distribution of age in the sample.

¹All check-in and payment procedures were handled by an XLab employee.

²After completing all 30 rounds of the information task, I asked participants to report whether their competence level was high, low, or average. In two cases participants reported being in a condition other than the one to which they were actually assigned.

³All participants were between 18 and 30, and 73% were between 19 and 21.

4.3 Dependent & Independent Variables

4.3.1 Dependent Variables

All participants were presented with 30 binary choices about whether or not to complete an information task. In the following analyses I examine these binary decisions in two ways. First, I examine the contribution rate over all 30 rounds by dividing the total number of completed tasks by the total number of decisions (30). So, an individual who completed 15 total tasks out of 30 would have a contribution rate of .50. It is important to recognize, however, that each of the 30 decisions about whether or not to contribute are interdependent. Although no new information is provided between rounds, the experience of each task, combined with competence feedback, could result in changes in contribution behavior over the 30 rounds. Time must be considered as an important variable in the analysis. So, in addition to considering overall average contribution rate, some analyses group decisions into 6 trial blocks which each consist of 5 contribution decisions. The value for each block is the average contribution rate for those 5 rounds.

4.3.2 Experimental Condition

Differences in relative competence feedback constituted the experimental manipulation in this study. In many of the analyses below the three experimental conditions are simply labeled using the shorthand “Low,” “Average,” and “High.” However, in order to enhance the interpretability of some results, the experimental condition variable was recoded as an ordinal variable indicating the level of competence feedback as follows: 1 = “Low Relative Competence”, 2 = “Average Relative Competence,” and “High Relative Competence.” Wherever this recoded variable is used, I will refer to it as “Ordered Experimental Condition” or simply “Ordered Condition.”

4.3.3 Moderators and Mediators

In this section I describe the distribution of existing scales to measure attitudes and dispositions, as well as the construction of new scales where appropriate.

Moderators

The hypotheses and alternative explanations explained in Chapter 2 involve a variety of moderating variables. Social values figures prominently in several hypotheses. To measure social values, I used the social values orientation (SVO) scale developed by Messick and McClintock (1968), and used in a variety of more recent studies (e.g. van Lange et al., 1997, Simpson and Willer, 2008). The SVO scale asks participants to make a series of 9 choices between three options for the distribution of “points” to self and other. In each case one of the choices has been classified a priori as reflecting either a pro-social, self-interested, or competitive distribution of rewards. A participant who chooses options with the same classification with greater than 66% consistency is labeled with that classification. For example, a participant who makes the pro-social choice on at least 6 of 9 available opportunities is classified as pro-social. Someone who chooses options inconsistently is labeled as “unclassified.” The SVO scale has been shown to have high ecological validity (Bem and Lord, 1979) and overall predictive power (Lange, 1999).

Using the SVO scale, 26 participants (46%) were classified as self-interested, 20 (36%) were classified as pro-social, 2 (4%) were classified as competitive, and 8 (14%) were unclassified. In line with other research that has used the SVO scale (e.g. De Cremer and Lange, 2001, Simpson and Willer, 2008), for all analyses in this chapter I combine the competitive and self-interested orientations.

I used two other scales in order to explore alternative explanations for my results. First, I used the Egalitarianism / Authoritarianism scale developed by Katz and Hass (1988) to assess dispositions towards egalitarianism. The scale was highly reliable (Cronbach’s $\alpha = .68$), and Figure 4.2 shows the frequency distribution of the scale. To assess self-esteem I used the scale developed by Rosenberg (1965) and validated in a variety of other studies (e.g. Gray-Little et al., 1997, Baumeister et al., 2003). The self-esteem scale was also highly reliable (Cronbach’s $\alpha = .85$), and Figure 4.3 shows the frequency distribution of the scale.

Mediators

In Chapter 2 I present arguments about the potential mediating relationship of self-efficacy and social responsibility. Because existing scales were either unavailable or inappropriate for this study, I developed new scales to assess these attitudes. Participants received the following instructions regarding the group of self-efficacy questions:

“This group of questions is designed to help us get an idea of how you felt about the tasks we asked you to do in this study. We are interested in your

responses whether or not you chose to contribute at all. Please rate how certain you are that you were able to accomplish each of the following during this study. Again, consider how certain you are about your ability to accomplish the following things whether or not you actually chose to contribute during the study. Use the following scale: 1 = ‘Cannot do at All’, 4 = ‘Moderately Can Do’, and 7 = ‘Can Do’. ”

Responses were indicated on a numerical “can-do” scale (Bandura, 2006) which ranged from 1-7. The overall self-efficacy scale was created by combining two sub-scales intended to measure the two components of self-efficacy: efficacy expectations and outcome expectations. The efficacy expectations scale was created by combining responses about participants’ self-reported ability to: (1) “decipher ambiguous characters and spacing in images of text,” and (2) “complete information tasks accurately.” Responses to these two questions were closely related (Cronbach’s $\alpha = .71$). The outcome expectations scale was created by combining responses about participants’ self-reported ability to: (1) “complete information tasks that are beneficial to the group,” and (2) “maximize the number of points others earn in this study.” Again, the outcome expectations scale showed high reliability (Cronbach’s $\alpha = .84$). The overall self-efficacy scale, which was computed as the average of all for questions, also showed good reliability (Cronbach’s $\alpha = .79$). Figure 4.4 shows the frequency distribution of responses for each of these scales.

In order to measure perceptions of social responsibility I created a composite scale based on responses to four agreement statement-style questions. In each case participants responded on a 7-point scale from “Strongly Disagree” (1) to “Strongly Agree” (7). The four statements were: (1) “I felt it was only fair that I contribute information tasks,” (2) “It was my responsibility to contribute information tasks,” (3) “It was important to me that I do my share of contributing information tasks to benefit others,” and (4) “I feel personally responsible for contributing in order to benefit the group.” Responses to these 4 questions were highly cohesive (Cronach’s $\alpha = .89$). Figure 4.5 shows the frequency distribution of responses.

Finally, in Chapter 2 I suggested that since individuals tend to enjoy tasks they believe they are good at, differences in enjoyment of the task could provide an alternative explanation for observed differences in contribution. To measure task enjoyment I constructed a scale based on three agreement statements, each measuring an aspect of enjoyment. Again participants responded on a 7-point scale from “Strongly Disagree” (1) to “Strongly Agree” (7). The three statements were: (1) “I liked doing information tasks,” (2) “I found the information tasks to be entertaining,” and (3) “I found the information tasks to be interesting.” Responses to the three statements were highly cohesive (Cronbach’s $\alpha = .97$). Due to an error in the data collection software which was discovered midway through the experiment, data on task enjoyment was collected for only 26 out of 56 total participants. This unavoidably limits the inferences I can make from this data. However, it does provide guidance on the potential role of task enjoyment. Figure 4.6 shows the frequency distribution of responses.

4.4 Experimental Conditions

There are three conditions in this experiments. In each of the conditions participants receive feedback about their competence at completing the information task compared to others. In the high condition participants saw feedback indicating that they completed tasks better than 80.4% of other participants. In the low condition participants saw feedback indicating that they completed tasks better than 21.2% of other participants. Finally, participants in the average condition saw feedback indicating that they were “within the margin of error of the average” for all participants in the study.⁴ In all conditions the competence feedback was displayed prominently on the side of the computer screen throughout all 30 information tasks. The three experimental conditions constitute the between-subjects factor in all the analyses that follow.

4.5 Results

4.5.1 Demographic Variables

In this section I will briefly review results related to demographic variables in order to determine if they must be controlled for in other analyses. Figure 4.1 shows the overall distribution of age in the sample, and illustrates that there was a single 30 year-old outlier. A correlation between age and contribution rate appears to indicate a significant relationship ($r(54) = .27, p = .27$). However, removing the outlier eliminates the significant result ($r(53) = .09, p = .50$). So, age is not significantly related to contribution rate. Using a t -test, the difference in contribution rate between male (mean = .23) and female (mean = .37) participants approached significance ($p = .11$).⁵ However, the results of a Kolmogorov-Smirnov Test (which has the advantage of being both non-parametric and distribution free) only approached significance, $D = .32, p = .12$. Due to the lack of significant results, neither age nor gender will be considered in the analyses that follow.

4.5.2 Self-Efficacy

Drawing on Assumption 1, the first set of hypotheses predict that different levels of relative competence feedback will be influential for overall levels of self-efficacy. A one-way ANOVA

⁴The actual value for participants in the average condition was intentionally unspecified. I designed the feedback to use statistical language, but also to be sufficiently vague so as to provide the impression of average competence compared to others without providing a specific value that might actually be slightly more or less than 50%.

⁵All t -tests use the Welsh modification to degrees of freedom to account for differences in variance between comparison groups.

test for differences in self-efficacy across conditions shows a significant overall difference, $F(1, 54) = 19.68, p < .001$. Table 4.1 describes the full results of this analysis. Post-hoc t -tests were used to explore the individual differences between conditions. Hypothesis 1a concerns the relationship between the high and average conditions:

Hypothesis 1a – Individuals who receive feedback indicating that they are of *high* relative competence will express higher self-efficacy compared to those who receive feedback indicating that they are of *average* relative competence.

Hypothesis 1b – Individuals who receive feedback indicating that they are of *low* relative competence will express lower self-efficacy compared to those who receive feedback indicating that they are of *average* relative competence.

The difference between average self-efficacy in the high feedback condition (mean = 5.35) and in the average feedback condition (mean = 5.11) was not significant (See Table 4.2).⁶ So, Hypothesis 1a is not supported. Post-hoc t tests also reveal that average self-efficacy in the low condition (mean = 3.65) was significantly lower compared to the average feedback condition (mean = 5.11, $p < .001$). So, Hypothesis 1b is supported.

4.5.3 Contribution Rates

A one-way ANOVA test of average contribution rates across the three experimental conditions shows a significant overall difference, $F(1, 54) = 3.68, p = .06$. Table 4.3 describes the full results of the analysis. I used a repeated measures analysis of variance (RMANOVA) to test for between and within condition effects while accounting for the influence of repeated rounds over time. Figure 4.7 shows the pattern of contribution over the course of the experiment in each condition. The between conditions test shows a highly significant effect of condition on contribution rate over time, $F(2, 53) = 7.62, p = .001$. The within conditions test shows a significant decrease in contribution rates over the 6 trial blocks, $F(5, 265) = 9.07, p < .001$. However, there were no significant differences in rates of change between the three experimental conditions. Complete results of the RMANOVA model are displayed in Table 4.4.

Post-hoc t -tests were again used to explore the individual differences between conditions. Hypothesis 2a concerns the relationship between the high and average conditions:

Hypothesis 2a – Individuals who receive feedback indicating that they are of *high* relative competence will contribute more over time than those who receive feedback indicating that they are of *average* relative competence.

⁶I used the Bonferroni adjustment to account for multiple comparisons in all post-hoc t -tests. The adjusted significance value is always reported unless otherwise specified.

Hypothesis 2b – Individuals who receive feedback indicating that they are of *low* relative competence will contribute less over time than those who receive feedback indicating that they are of *average* relative competence.

The average contribution rate in the high relative competence condition (.50) is higher than in the average relative competence condition (.33), but the result did not approach significance ($p = .27$). Accounting for the effect of completing tasks over time, the between conditions test in a RMANOVA (see Table 4.5) shows a borderline significant difference in contribution rates between the high and average conditions, $F(1, 34) = 2.89, p = .09$. So, Hypothesis 2a receives mixed support.

Hypothesis 2b predicts a relationship between the low and average relative competence conditions. The average contribution rate in the low relative competence condition (mean = .15) is significantly lower than the average contribution rates in the average condition (mean = .33, $p = .09$). Complete results for all post-hoc t -tests are available in Table 4.6. RMANOVAs produce similar results. The between conditions test in a RMANOVA shows a significant difference in contribution rates between the low and average conditions over time, $F(1, 37) = 4.71, p = .03$. Complete model results for are shown in Table 4.7. Hypothesis 2b receives support.

While the experimental design does not allow for a direct test of the link from relative competence feedback through self-efficacy to contribution rate, several analyses shed light on the issue:

Hypothesis 3 – An individual’s self-efficacy will partially mediate the relationship between relative competence feedback and contribution rate.

Hypothesis 3 predicts that variation in self-efficacy by condition can help to explain variation in contribution rates. Self-efficacy was self-reported by participants after they had already completed all the tasks. It is possible that the experience of completing or not completing tasks itself influenced self-efficacy. However, an OLS regression analysis of the effect of both experimental condition and contribution rate on self-efficacy shows that contribution rate is not a significant influence (See Table 4.8). The results with regards to experimental conditions are identical to those reported in Hypothesis 1a-1c. To examine whether self-efficacy mediates the relationship between relative competence feedback and contribution rate, I used the procedure laid out by Baron and Kenny (1986) which specifies a structured set of regression models that produce results conforming to four criteria:

1. the independent variable (IV) significantly influences the mediating variable;
2. the IV significantly influences the dependent variable (DV) without accounting for the mediating variable;
3. the mediating variable significantly influences the DV, and;

4. the effect of the IV on the DV is reduced when accounting for the mediating variable in the model.

Figure 4.8 is a visual depiction of the relationship and the regression results. All four of Baron and Kenney's criteria for mediation are met. Accounting for the influence of self-efficacy, the effect of relative competence feedback on contribution rate was reduced, although feedback remained a significant predictor of contribution. To test the significance of the mediation effect, I used the "bootstrap estimates of variability" method (Bollen and Stine, 1990, Preacher and Hayes, 2004). Results of the bootstrap analysis reveal a mean mediation effect of $-.06$, $p = .05$. So, some of the variance in contribution rates is explained by variance in self-efficacy, and Hypothesis 3 receives support.

4.5.4 Social Responsibility

The next series of hypotheses concerns the the influence of high or low relative competence feedback on social responsibility. In both cases a relative prediction is made with respect to the control condition:

Hypothesis 4a – Individuals who receive *high* relative competence feedback will perceive greater social responsibility to help the group compared to individuals who receive *average* relative competence feedback.

Hypothesis 4b – Individuals who receive *low* relative competence feedback will perceive less social responsibility to help the group compared to individuals who receive *average* relative competence feedback.

I used a one-way ANOVA to look for differences in perception of social responsibility by condition (see Table 4.9). The results show that there are significant differences in social responsibility across all conditions, $F(1, 54) = 5.73$, $p = .02$. Post-hoc t -tests reveal that there is no significant difference in social responsibility between the average (mean = 4.69) and high (mean = 4.86) conditions, and Hypothesis 4a is not supported. However, social responsibility in the low condition (mean = 3.57) is significantly lower than either the average (mean = 4.69, $p = .07$) or the high (mean = 4.86, $p = .03$) conditions (see Table 4.10). Hypothesis 4b is supported. So, results with respect to social responsibility mirror those with respect to self-efficacy.

Hypothesis 5 again suggests a mediating effect of social responsibility on the relationship between relative competence feedback and contribution. As was the case with respect to self-efficacy, a direct test is not possible, although statistical techniques lend significant insight:

Hypothesis 5 – An individual’s perception of social responsibility to help the group will mediate the relationship between competence feedback and contribution rate.

As in the case of self-efficacy, social responsibility was measured after participants completed tasks. As a result, it is possible that the experience of completing tasks was itself influential. This may be especially true in the case of social responsibility because individuals who complete a lot of tasks, irrespective of their level of relative competence feedback, may decide after the fact that it was their responsibility to have done say as a way of rationalizing a decision to which they have already committed. And, indeed Table 4.11 illustrates that accounting for the effect of experimental condition, contribution rate is a significant predictor of social responsibility. It would be inappropriate to interpret these results causally. However, they do suggest that future studies should gather self-report measures after the experimental manipulation but before the task itself.

The results of mediation analysis are shown in Table 4.12 and Figure 4.9. The results meet all four of the Baron and Kenny (1986) conditions for mediation. Accounting for the influence of social responsibility, the influence of relative competence feedback on contribution rate was reduced. Again using a bootstrap procedure to estimate the size of the mediation and a confidence interval, a mean mediation effect of $-.06$ was significant at $p = .05$. Overall the effect of relative competence feedback remained significant, indicating a partial mediation effect. Hypothesis 5 is supported.

4.5.5 Social Value Orientation

In this section I present evidence on hypotheses concerning the influence of social value orientation (SVO) on contribution rate, and the moderating role of SVO on the effect of competence feedback. Before addressing the hypotheses, however, it is instructive to examine whether the results of this study echo the relationships, expressed in Assumptions 2 and 3, which have been found in so many prior studies. An ANOVA considering participants in all three SVO classifications — pro-social, self-interested, and unclassified — shows a marginally significant effect of SVO on contribution rate overall, $F(1, 53) = 2.70, p = .07$. See Table 4.13 for full ANOVA results. A RMANOVA shows similarly marginal results over time, $F(1, 47) = 2.33, p = .10$ (See Table 4.14).

To examine whether these results are in line with Assumptions 2 and 3, I created two binary variables to indicate whether a participant is classified as pro-social (1 = pro-social, 0 = not pro-social) or self-interested (1 = self-interested, 0 = not self-interested). Using these binary variables I conducted t -tests to examine potential differences in overall contribution rates. t -tests show that pro-social participants contributed significantly more compared to others (pro-social mean = $.44$, non-pro-social mean = $.25, p = .06$), but that the difference

between self-interested and not self-interested participants only approached significance (self-interested mean = .25, non-self-interested mean = .39, $p = .14$). Complete post-hoc test results are shown in Table 4.15.

The final hypotheses in this study concern the potential interactions between SVO and relative competence information. SVO was measured *prior to participants learning the nature of the task or making any choices about it*.

Hypothesis 6a – Compared to those who receive average relative competence feedback, the positive influence of high relative competence feedback on contribution rate will be greater for pro-social individuals than for self-interested or unclassified individuals.

Hypothesis 6b – Compared to those who receive the negative influence of low relative competence feedback on contribution rate will be greater for self-interested individuals than for pro-social or unclassified individuals.

Figure 4.10 shows the interaction of SVO and competence feedback, and Table 4.16 illustrates the average contribution rate for each interaction group as well as rates of change between experimental conditions. In order to examine the interaction between competence feedback and a pro-social SVO (Hypothesis 6a) I constructed an OLS regression model that included an interaction term between experimental condition and the binary pro-social / not pro-social variable. Table 4.17 shows the complete results of the model. The results show that, accounting for the interaction, the influence of experimental condition remains significant while pro-social orientation does not. More to the point, the interaction between a pro-social SVO and experimental condition is a significant predictor of contribution rate, $\beta = .15$, $p = .08$. This indicates a positive influence of competence feedback which was greater for pro-social individuals than for others. So, Hypothesis 6a is supported.

I used a similar procedure to test Hypothesis 6b. In an OLS regression model that included an interaction term between experimental condition and the binary self-interested / not self-interested variable, experimental condition was the only significant predictor. Table 4.18 shows the complete results for this model. So, Hypothesis 6b is not supported.

Hypothesis 7a – The positive influence of high relative competence feedback will be less strong for individuals who do not have a stable social value orientation compared to those who are pro-social or self-interested.

Hypothesis 7b – The negative influence of low relative competence feedback will be less strong for individuals who do not have a stable social value orientation compared to those who are pro-social or self-interested.

Figure 4.10 and Table 4.16 help to visualize the relative magnitude of positive and negative effects for individuals of different social value orientations. The visual contrast between lines

for the three SVO classes is stark (Figure 4.10) — relative competence feedback appears to have almost no differential effect on unclassified participants across conditions. Indeed, while the average rates of change across conditions for pro-social and self-interested participants was .27 and .14 respectively, the average rate of change for unclassified participants was an order of magnitude lower: only .01. However, regression analyses examining the interactions predicted in Hypotheses 7a and 7b show no significant differences in positive or negative effects between those who have a stable SVO (pro-social or self-interested) and those who do not (unclassified). Tables 4.19 and 4.20 show the full results of these models. Hypotheses 7a and 7b are unsupported.

4.5.6 Alternative Explanations

At the end of Chapter 2 I reviewed literature suggesting that three other social psychological factors could explain differences in contribution rates. The first alternative explanation concerns the role of self-esteem. Krebs (1970) suggested that absolute competence feedback may influence self-efficacy, which in turn encourages positive or negative affect and subsequently higher or lower contribution rates. However, a correlation shows no significant relationship between self-esteem and contribution rate, $r(54) = -.17$, $p = .20$. Furthermore, an ANOVA shows that self-esteem does not significantly differ between conditions, $F(1, 54) = .14$, $p = .70$ (See Table 4.21). So, differences in self-esteem do not appear to be a factor in my results.

Secondly, I suggested that task enjoyment could explain differences in contribution rates. ANOVA results show significant differences in task enjoyment across all conditions, $F(1, 24) = 4.13$, $p = .05$ (See Table 4.22).⁷ Individuals in the low competence condition (mean = 2.33) enjoyed the task less than participants in either the average (mean = 4.38, $p = .12$) or high competence conditions (mean = 4.44, $p = .10$), although both results were only borderline significant (See Table 4.23). There were no significant differences in task liking between participants in the average and high competence conditions. Furthermore, there is no correlation between task enjoyment and contribution rate, $r(24) = .003$, $p = .98$. These results suggest that although receiving low competence feedback discouraged individuals from enjoying the task, differences in enjoyment did not influence contribution rates.

Finally, in Chapter 2 I argued that differences in individual dispositions toward being egalitarian could moderate the influence of competence feedback on contribution rate. However, the Egalitarianism/Authoritarianism scale was not significantly related to contribution rate either in a baseline correlation, $r(54) = .12$, $p = .35$, or in an OLS regression model accounting for the influence of experimental condition, $\beta = .03$, $p = .45$. Complete OLS results are provided in Table 4.24. So, egalitarianism does not appear to moderate the relationship between relative competence feedback and contribution rate.

⁷Note that, as previously mentioned, data about task enjoyment was collected for only 26 out of 56 participants.

4.6 Summary & Discussion

Table 4.25 summarizes the results for each of the 12 hypotheses in this study. Overall, results show strong support for the argument that relative competence feedback can influence contribution to information pools. One of the most interesting dynamics revealed in Hypotheses 1a-1b and 2a-2b is that high relative competence feedback did not encourage higher self-efficacy beliefs or contribution rates compared to average competence feedback. The primary effect evident in the data is that low relative competence feedback drastically depressed self-efficacy beliefs and contribution rate compared to either of the other two conditions.

This observed pattern is likely to be the result of the distinct characteristics of social comparisons and relative competence feedback. Compared to absolute competence feedback, relative competence feedback is more abstract, and relies on an individual's attitudes and assumptions about not only himself but also about the group. As a result, the competence–contribution link may be less direct. An individual who receives high relative competence feedback may also take it as evidence that he is highly skilled or knowledgeable (and vice-versa). But there is less likely to be a 1-to-1 relationship between feedback and beliefs. Rather, the inference an individual makes may be subject to a variety of heuristics or biases that occur when individuals compare themselves to others. For at least 30 years (Weinstein, 1980), social psychologists have documented an effect that has variously been called the “above-average effect,” “illusory superiority,” or the “Lake Wobegon effect.”⁸ The above-average effect refers to individuals' stable tendency to perceive their own skills or abilities as above average compared to others. Many psychologists have suggested that the above-average effect is the result of motivated reasoning — people arrive at desirable conclusions by selectively recalling information that supports the favorable conclusion (See e.g., Kunda, 1990, Kruglanski, 1980). A second complementary explanation is that individuals base their assessments on their own abilities (which are more of a known quantity and are easier to recall), but fail to adjust them properly based on the abilities of others. Kruger (1999) explains it in this way:

“I argue that comparative ability judgments are inherently egocentric: People base their assessments of how they compare with their peers on their own level of ability (‘How skilled am I?’) and insufficiently take into account the skills of the comparison group (‘How skilled are my peers?’). As a result, people tend to see themselves as above average in domains in which absolute skills tend to be high (or the threshold for successful performance is low) and below average in domains in which absolute skills tend to be low (or the threshold for successful performance is high).” (Kruger, 1999, p. 222)

⁸For a thorough review of the voluminous literature on the above-average effect, I recommend Alicke and Govorun (2005).

Kruger argues that we should observe the above-average effect in situations where absolute skills are high, but not in situations where absolute skills are low. However, Kruger's study does not specifically deal with situations in which absolute skill levels are ambiguous or unknown, as is the case in many situations where information pools provide relative competence feedback. The above-average effect suggests that in the presence of uncertainty about absolute skills (because absolute competence information is unknown or ambiguous), individuals will tend to over-estimate their own absolute competence (Brown, 1986). Assuming, then, his own *high* level of absolute competence, an individual who receives feedback that he is of *average* relative competence may simply assume that others must be highly competent as well. The average level of feedback does not provide any information that would counteract an overly positive self-assessment. So, merely average relative competence feedback can still encourage higher (context specific) self-efficacy. We would also expect to observe higher self-efficacy among individuals who receive explicitly high relative competence feedback. So, as a result of the bias inherent in the social comparison, the above-average effect would predict the dynamics that I observed: no differences in self-efficacy beliefs and contribution rate between those who receive average and high relative competence feedback.

Those who receive low competence feedback, on the other hand, must face information which explicitly counters their rosy self-assessment. Whereas receiving feedback indicating either average or high relative competence implicitly allows for or confirms an individual's positive self-assessment, low relative competence feedback contradicts it. Because it represents a kind of deflating information, the observed lower self-efficacy beliefs and contribution rates in the low relative competence feedback condition are also theoretically consistent with the above-average effect.

Similar effects are likely to be observed in the case of other incentives which rely on social comparisons rather than absolute metrics. Social comparisons are implicit in many types of incentives which use competitive rankings, for example. Rankings often provide no specific metric which is used to assess performance. Rather, the only salient measures of performance are based on comparisons to others. When competitive rankings are related to competence in some domain of contribution, my experimental results suggest that the overall influence of the incentive may be net negative. If the above-average effect is influential, providing average or high relative competence feedback may not result in additional contribution since both types of feedback confirm already-held assumptions. At the same time, individuals who previously thought their competence was above average can experience a deflated self-perception and as a result contribute less than if they had received no feedback at all.

Another primary goal of this study is to fill in some of the gaps in the extant research with respect to the mechanisms by which competence feedback influences contribution rates. The results suggest that self-efficacy plays a primary role. Again, the experimental design did not allow a causal test, and such a test is planned in future work. However, the mediation analysis provides strong evidence that changes in self-efficacy beliefs help explain changes in contribution rates.

This analysis also suggests that attitudes about social responsibility are influenced by relative competence feedback, and mediate the competence–contribution relationship. There remains much work to do to clarify the exact nature of attitudes about social responsibility and their relationship to self-efficacy. It may be that increases in self-efficacy produce the sense of “noblesse oblige” that (Kazdin and Bryan, 1971) point to. However, it remains unclear whether self-efficacy beliefs create a sense of social responsibility or whether there is a pre-existing norm of social responsibility which is simply magnified by higher self-efficacy beliefs. The extremely robust correlation between social responsibility beliefs and contribution rate across all conditions ($r(54) = .63, p < .001$) suggests the latter, but future studies will need to address this issue in more detail.

This study also helps to resolve where the proper scope of social responsibility may lie. The experimental situation was not so general that the discussion would turn to an overarching norm that people should help each other. Rather, it was sufficiently specific — in that it concerned a given task, a concrete set of skills, a known (if abstract) group of collaborators, and a bounded set of potential outcomes — but not so specific that it invokes the many exceptions and complex contextual rules that Batson and colleagues worried about (Batson et al., 2007). Identifying the necessary scope conditions for a norm of social responsibility is not a goal of this study. However, the result suggests a starting place for future investigations.

Social responsibility is based on an individual’s perceptions of her relationship to the larger group of contributors. This is essential because it suggests that at least some of the attitudes that mediate the competence-contribution relationship are fundamentally group-focused. Social responsibility relies on a sense of inter-dependence which is not always present in group interactions. The strong mediating effect of these attitudes is particularly surprising, then, because of the minimal sense of “group-ness” which was provided for participants. I went to great lengths to decrease social presence by minimizing participants’ physical interactions with each other before the study, erecting visual barriers, and employing headphones and white noise. Participants learned nothing about each other during the experiment. Though many participants likely assumed that others were also students at Berkeley, it is difficult to know how much of a social connecting this abstract fact provided. Despite this extremely minimal sense of group-ness, however, putting participants in even an abstract situation with inter-dependent outcomes appeared to connect them to important attitudes about social responsibility and ability to help the group. In follow-up studies it would be interesting to vary group identification (either by assigning groups or allowing participants to self-select into them) to see if the mediating power of social responsibility and group-benefit self-efficacy varies as well.

Some of the most exciting results of this study concern the moderating effect of social value orientation on the competence-contribution relationship. Figure 4.10 shows strikingly different patterns between pro-social, self-interested, and unclassified participants. SVO concerns an individual’s stable preferences about the distribution of rewards for themselves and others. As such it represents a basic orientation towards group interactions, and should

be influential to an individual's perception of his own and others' work in collaborative situations. For individuals without a stable preference about the distribution of rewards, I argued that we should see a reduced influence of competence feedback. And, indeed, results show almost no difference in contribution rates between conditions for unclassified individuals. Not only was the average rate of change for unclassified individuals an order of magnitude lower than it was in either of the other two conditions (See Table 4.16), but the within-group variation in contribution rates was also lower. The standard deviation of contribution rates was .21 for unclassified individuals, .28 for self-interested individuals, and .33 for pro-social individuals.⁹

Results also show that pro-social individuals contributed significantly more than others (Assumption 1), but that self-interested individuals did not contribute less (Assumption 2). One explanation for this result can be seen in Figure 4.10. Providing pro-social individuals with low competence feedback reduced their contribution rates greatly, to a level that was even slightly lower than it was for self-interested individuals. This low contribution rate offset the significantly higher contribution rates observed in both the average or high feedback conditions, and eliminated the overall difference in contribution rate.

The results with respect to SVO shed light on the relative importance of dispositional characteristics and situational feedback. In this study, relative competence feedback appeared to largely overcome the barriers erected by a stable SVO. In spite of a self-interested SVO, individuals contributed more when they received high relative competence feedback. In spite of a pro-social SVO, individuals contributed less when they received low relative competence feedback. The latter result is particularly interesting because the magnitude of the drop between average and low competence was greater for pro-social individuals compared to self-interest individuals. While the important and overriding role of situational feedback suggests that there would be a decrease, a pro-social SVO should reduce the magnitude of any negative effects rather than increase it (as was observed). One potential explanation for this result is that the magnitude of decrease in contribution rates observed for pro-social people would be observed for self-interested people were it not for their already low contribution rates in the average relative feedback condition. Self-interested individuals in the average condition contributed at an average rate of 20%, or 6 tasks out of 30, while in the low condition they contributed at an average rate of 14%, or slightly more than 4 tasks out of 30. Many individuals are likely to do at least a few tasks before choosing not to contribute, and an average starting point of only 6 tasks could create a basement effect which constrains the possible difference between contribution rates in the average and low conditions. Pro-social individuals in the average condition, on the other hand, contributed at an average rate of 46%, or nearly 14 tasks. As a result, the measurement (contribution rate) allowed for much more room to drop in the low condition. Future studies will need to allow for more

⁹It is notable that, because of the small size of the experimental study overall, there were only 8 unclassified individuals. A larger sample would capture more unclassified individuals and allow for more reliable comparisons.

meaningful change in contribution rates — both higher and lower — to address this issue further.

Hypotheses predicting a reduced positive influence of high relative competence feedback and a reduced negative influence of low relative competence feedback for individuals without a stable SVO were unsupported. While the trends in the data match predictions, regression-based tests of the interactions showed no significant results. One key problem from a statistical point of view is that only eight individuals were unclassified in the sample — 3 in the low condition, 3 in the average condition, and 2 in the high condition. The extremely small N in each cell makes statistically significant results unlikely, especially given the high amount of variability in contribution rates across all conditions and SVOs. So, while the data do not provide support for Hypotheses 7a and 7b, the results suggest that a larger study could still reveal the predicted effects.

4.7 Conclusion

In this chapter I presented the results of an experimental study of relative competence feedback. Findings demonstrated that individuals who received information that they were of low relative competence compared to others contributed less to a collective good compared to those who received either average or high relative competence feedback. Two key attitudes about abilities and responsibilities in inter-dependent situations — *self-efficacy* and *social responsibility* — mediated the competence–contribution relationship. Furthermore, individual participants’ stable preferences about the distribution of rewards for themselves and other people (social value orientation) moderated the the observed changes in contribution rates across experimental conditions.

4.8 Tables & Figures

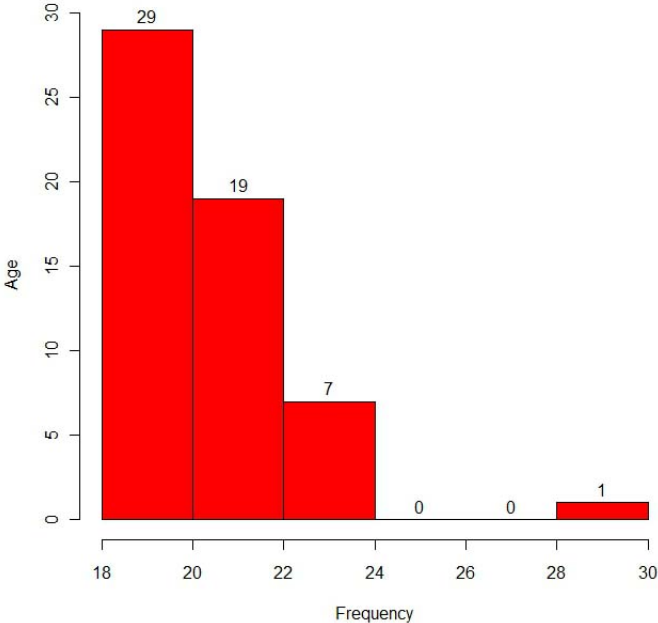


Figure 4.1: Frequency Distribution of Age in the Sample

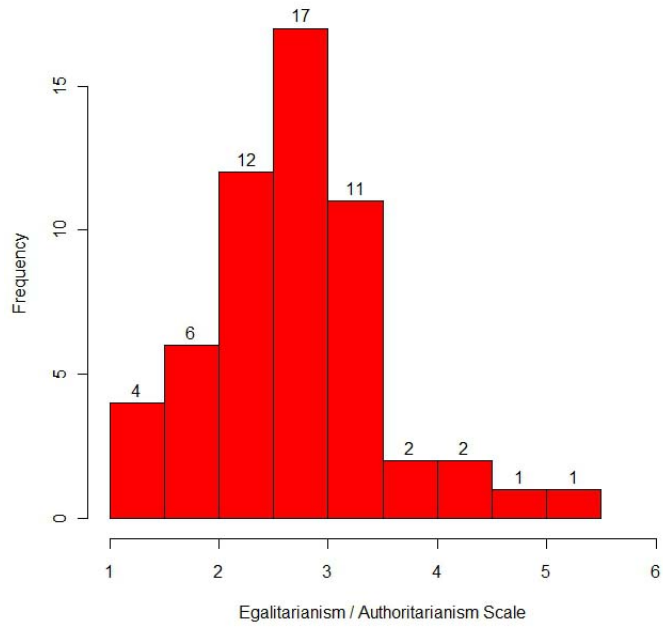


Figure 4.2: Frequency Distribution of the Egalitarianism / Authoritarianism Scale in the Sample

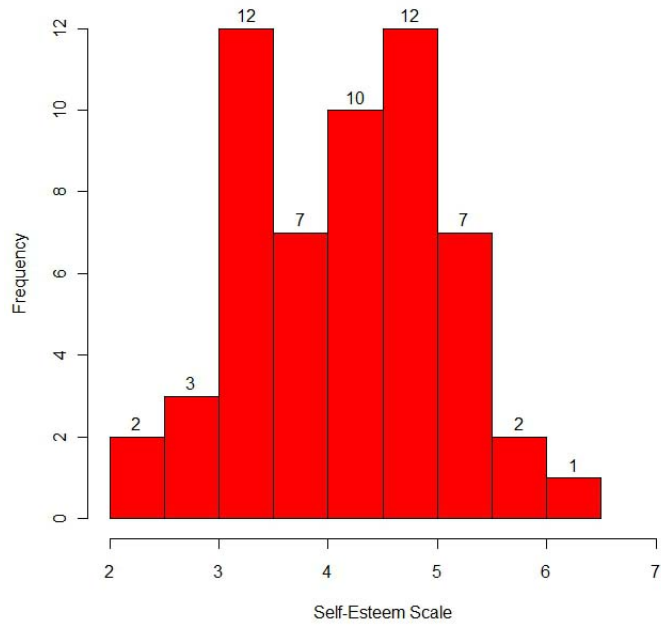


Figure 4.3: Frequency Distribution of the Self-Esteem Scale in the Sample

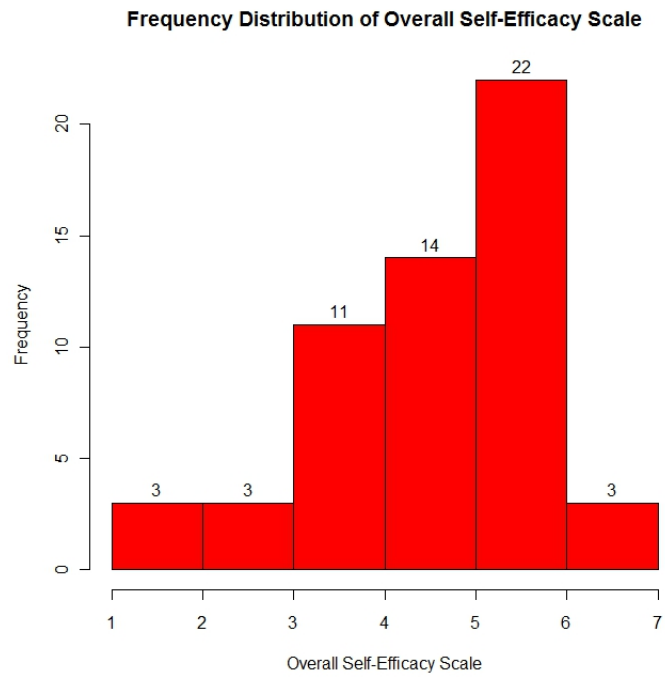


Figure 4.4: Frequency Distribution of the Overall Self-Efficacy Scale in the Sample

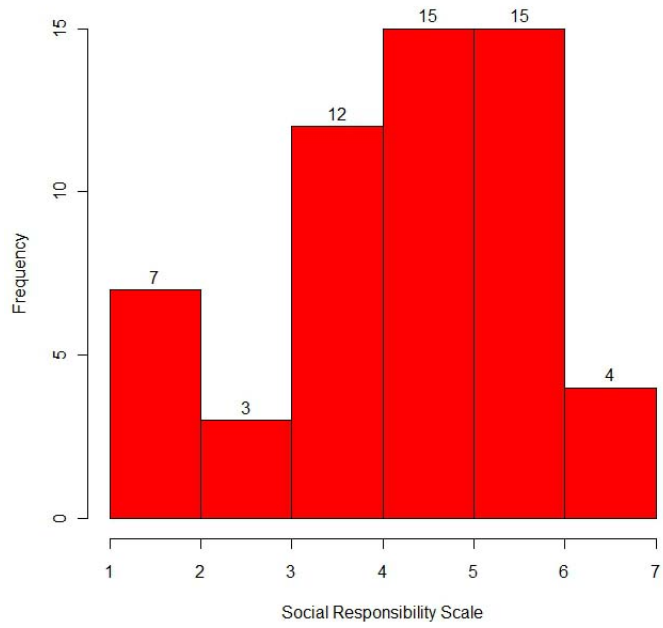


Figure 4.5: Frequency Distribution of the Social Responsibility Scale in the Sample

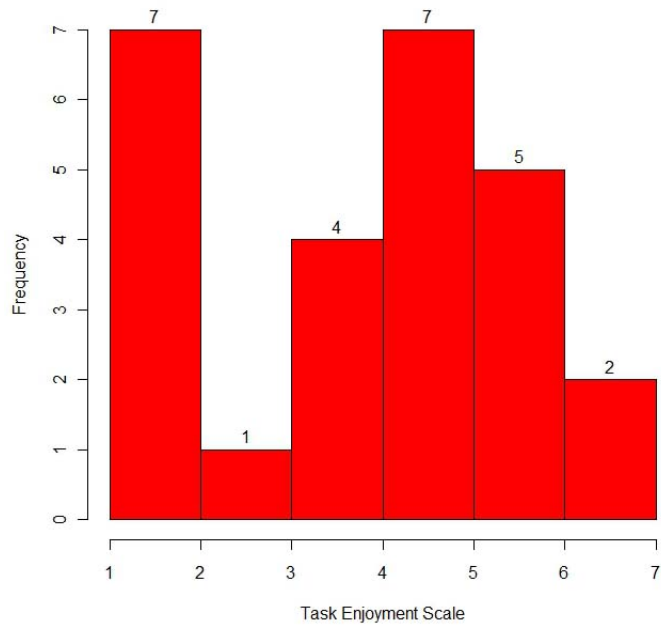


Figure 4.6: Frequency Distribution of the Task Enjoyment Scale in the Sample

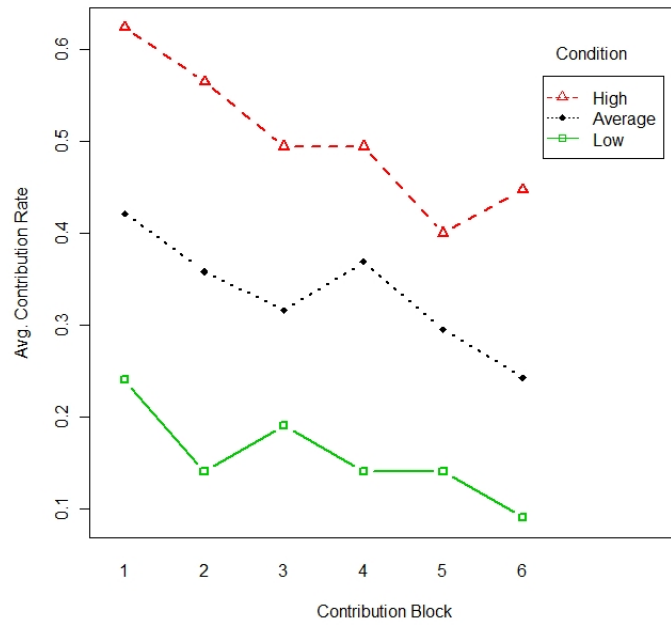


Figure 4.7: Plot of Contribution Rates Over Time by Condition

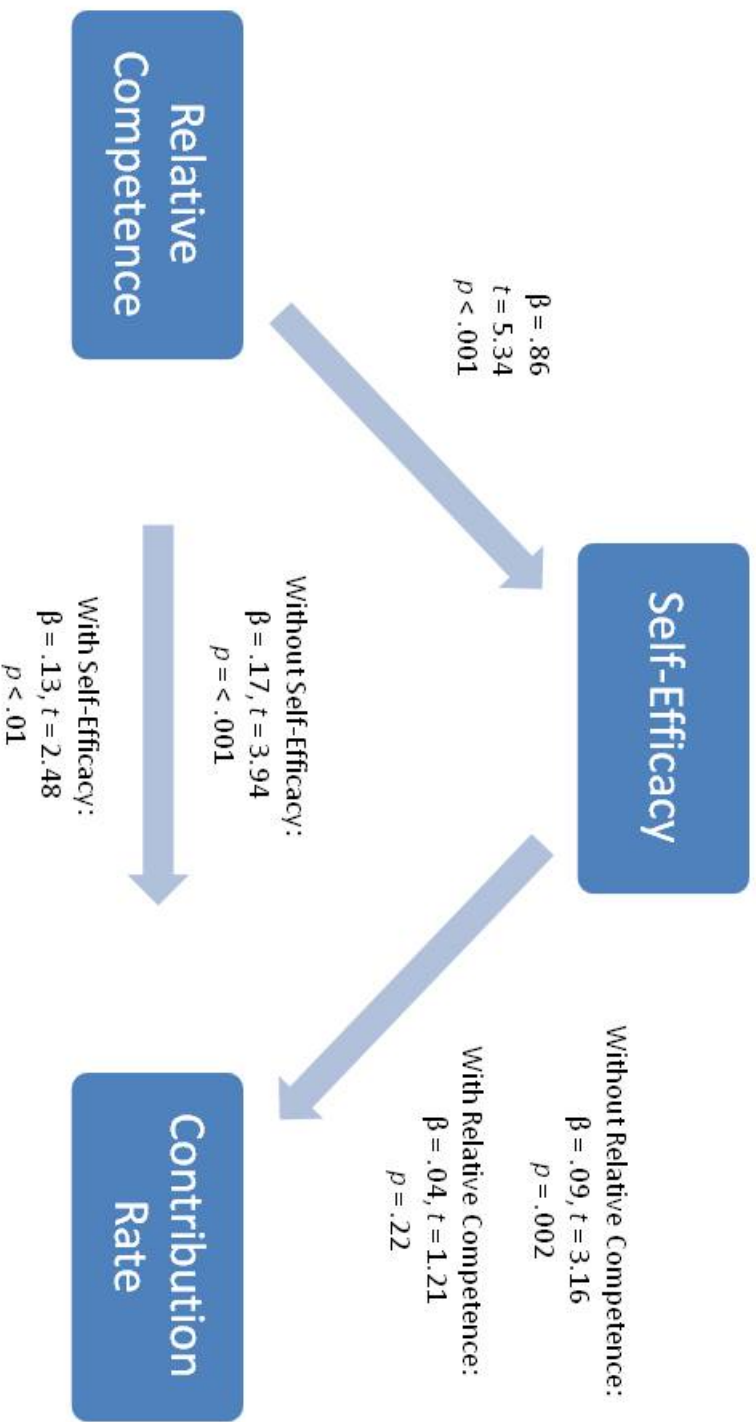


Figure 4.8: Mediation Analysis for Overall Self-Efficacy on the Competence-Contribution Relationship

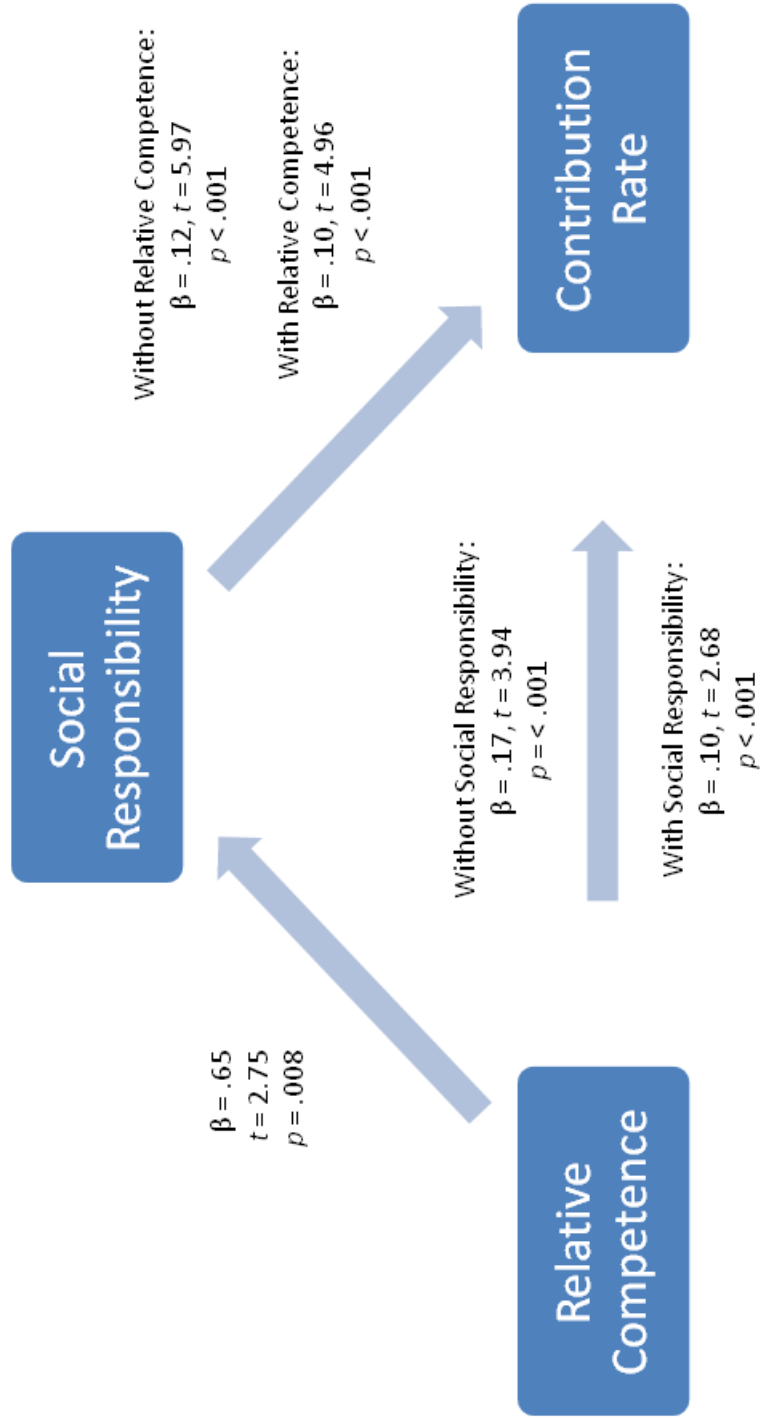


Figure 4.9: Mediation Analysis for Social Responsibility on the Competence-Contribution Relationship

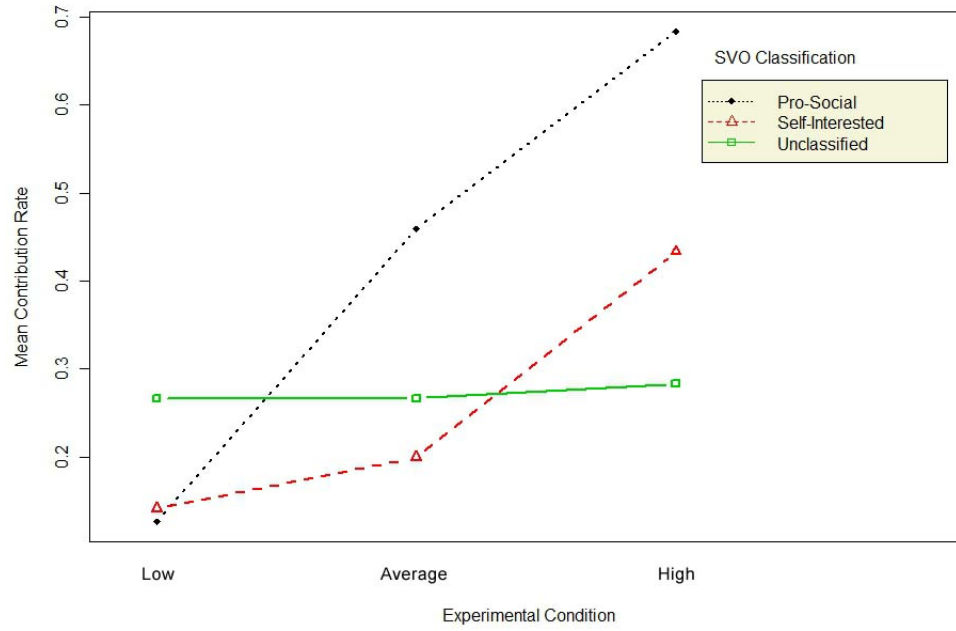


Figure 4.10: Interaction Plot of Contribution Rates by Condition and Social Value Orientation (SVO)

Dependent Variable		Sum of Square	df	Mean Square	<i>F</i>
	Intercept	661.16	1	661.16	606.81***
Overall Self-Efficacy	Condition	21.45	1	21.45	19.68***
	Error	58.84	54		

N = 56, *** p ≤ .001, ** p ≤ .01, * p ≤ .05, † p ≤ .1

Table 4.1: One-way ANOVA for Overall Self-Efficacy Between Conditions

	Average	High
Mean	5.11	5.35
Variance	.81	.50
N	19	17
<i>df</i>	33.45	
<i>t</i>	-.87	
<i>p</i>	1.00	

	Average	Low
Mean	5.11	3.65
Variance	.81	1.31
N	19	20
<i>df</i>	35.71	
<i>t</i>	4.45	
<i>p</i>	<.001	

	High	Low
Mean	5.35	3.65
Variance	.50	1.31
N	17	20
<i>df</i>	32.14	
<i>t</i>	5.51	
<i>p</i>	<.001	

Note: All *p* values are Bonferroni adjusted.

Table 4.2: Post-Hoc *t*-Tests for Overall Self-Efficacy by Condition

Dependent Variable		Sum of Square	df	Mean Square	<i>F</i>
Average Overall Contribution Rate	Intercept	3.85	1	3.85	44.69***
	Condition	.31	1	.31	3.68†
	Error	4.66	54		

N = 56, *** p ≤ .001, ** p ≤ .01, * p ≤ .05, † p ≤ .1

Table 4.3: One-way ANOVA for Contribution Rates Between Conditions

Tests of Within-Subjects Effects					
Variable	Type III Sum of Squares	df	Mean Square	<i>F</i>	
Trial Block	.99	5	.19	9.07***	
Trial Block * Ordered Condition	.21	10	.02	.97	
Error (Trial Block)	5.81	265	.02		
Tests of Between-Subjects Effects					
Intercept	36.71	1	36.71	83.86***	
Ordered Condition	6.67	2	3.33	7.62***	
Error	23.20	53	.43		

N = 56, *** p ≤ .001, ** p ≤ .01, * p ≤ .05, † p ≤ .1

Table 4.4: RMANOVA for Contribution Rates Between All Conditions Over Time

Tests of Within-Subjects Effects					
Variable	Type III Sum of Squares	df	Mean Square	<i>F</i>	
Trial Block	.84	5	.16	6.66***	
Trial Block * Ordered Condition	.08	5	.01	.69	
Error (Trial Block)	4.29	170	.02		
Tests of Between-Subjects Effects					
Intercept	37.73	1	37.73	69.68***	
Ordered Condition	1.56	1	1.56	2.89†	
Error	18.41	34	.54		

N = 36, *** p ≤ .001, ** p ≤ .01, * p ≤ .05, † p ≤ .1

Table 4.5: RMANOVA for Contribution Rates Between High & Average Conditions Over Time

	Average	High
Mean	.33	.50
Variance	.08	.09
N	19	17
<i>df</i>	33.37	
<i>t</i>	-1.69	
<i>p</i>	.27	

	Average	Low
Mean	.33	.15
Variance	.08	.04
N	19	20
<i>df</i>	31.78	
<i>t</i>	2.14	
<i>p</i>	.09	

	High	Low
Mean	.50	.15
Variance	.09	.04
N	17	20
<i>df</i>	27.32	
<i>t</i>	4.00	
<i>p</i>	.001	

Note: All *p* values are Bonferroni adjusted.

Table 4.6: Post-Hoc *t*-Tests for Contribution Rate by Condition

Tests of Within-Subjects Effects					
Variable	Type III Sum of Squares	df	Mean Square	<i>F</i>	
Trial Block	.56	5	.11	6.92***	
Trial Block * Ordered Condition	.07	5	.01	.96	
Error (Trial Block)	3.01	185	.01		
Tests of Between-Subjects Effects					
Intercept	14.03	1	14.03	36.23***	
Ordered Condition	1.82	1	1.82	4.71**	
Error	14.33	37	.38		

N = 39, *** p ≤ .001, ** p ≤ .01, * p ≤ .05, † p ≤ .1

Table 4.7: RMANOVA for Contribution Rates Between Low & Average Conditions Over Time

	Estimate	Std. Error	<i>t</i> value
(Intercept)	4.91	.26	18.27***
Contribution Rate	.60	.48	1.25
High Competence Condition	.13	.32	.41
Low Competence Condition	-1.36	.31	-4.34***

Model $r^2 = .42^{***}$
N = 56, *** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$, † $p \leq .1$

Table 4.8: OLS Regression for Contribution Rate and Experimental Condition on Self-Efficacy

Dependent Variable		Sum of Square	df	Mean Square	<i>F</i>
	Intercept	545.92	1	545.92	249.92***
Social Responsibility	Condition	12.53	1	12.53	5.73**
	Error	117.93	54		

N = 56, *** p ≤ .001, ** p ≤ .01, * p ≤ .05, † p ≤ .1

Table 4.9: One-way ANOVA for Social Responsibility Between Conditions

	Average	High
Mean	4.69	4.86
Variance	2.03	1.75
N	19	17
<i>df</i>	33.94	
<i>t</i>	-.37	
<i>p</i>	1.00	

	Average	Low
Mean	4.69	3.57
Variance	2.03	2.46
N	19	20
<i>df</i>	36.93	
<i>t</i>	2.33	
<i>p</i>	.07	

	High	Low
Mean	4.86	3.57
Variance	1.75	2.46
N	17	20
<i>df</i>	35	
<i>t</i>	2.71	
<i>p</i>	.03	

Note: All *p* values are Bonferroni adjusted.

Table 4.10: Post-Hoc *t*-Tests for Social Responsibility by Condition

	Estimate	Std. Error	<i>t</i> value
(Intercept)	3.67	.34	10.70***
Contribution Rate	3.06	.61	4.99***
High Competence Condition	-.35	.41	-.84
Low Competence Condition	-.58	.40	-1.45

Model $r^2 = .42^{***}$
N = 56, *** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$, † $p \leq .1$

Table 4.11: OLS Regression for Contribution Rate and Experimental Condition on Social Responsibility

	Model 1	Model 2	Model 3	Model 4
Dependent Variable	Social Responsibility	Contribution Rate	Contribution Rate	Contribution Rate
(Intercept)	3.06(.50)***	-.01(.09)	-.21(.09)*	-.33(.10)***
Condition	.65(.23)**	.17(.04)***		.10(.03)**
Social Responsibility			.12(.02)***	.10(.02)***
Model R^2	.12***	.22**	.23***	.46***

Note: Coefficients are unstandardized, standard errors in parentheses.

Sobel Test for mediation = 2.14, $p = .03$

N = 56, *** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$, † $p \leq .1$

Table 4.12: OLS Results for Mediation Analysis of Social Responsibility on the Competence-Contribution Relationship

Dependent Variable		Sum of Square	df	Mean Square	<i>F</i>
Average Overall	Intercept	1.75	1	1.75	20.52***
Contribution Rate	SVO	.46	2	.23	2.70†
	Error	11.95	54		

N = 56, *** p ≤ .001, ** p ≤ .01, * p ≤ .05, † p ≤ .1

Table 4.13: One-way ANOVA for Contribution Rate Between SVO Classifications

Tests of Within-Subjects Effects					
Variable	Type III Sum of Squares	df	Mean Square	<i>F</i>	
Trial Block	.75	5	.15	7.04***	
Trial Block * Ordered Condition	.29	10	.03	.1.37	
Trial Block * SVO	.25	10	.02	1.19	
Trial Block * Ordered Condition * SVO	.53	20	.02	1.24	
Error (Trial Block)	5.03	235	.02		
Tests of Between-Subjects Effects					
Intercept	24.78	1	24.78	60.52***	
Ordered Condition	3.22	2	1.61	3.93**	
SVO	1.91	2	.95	2.33†	
Ordered Condition * SVO	1.87	4	.46	1.14	
Error	19.24	47	.40		

N = 56, *** p ≤ .001, ** p ≤ .01, * p ≤ .05, † p ≤ .1

Table 4.14: RMANOVA for the Influence of Social Value Orientation (SVO) on Contribution Rate Over Time

	Pro-Social	Not Pro-Social
Mean	.44	.25
Variance	.10	.06
N	36	20
<i>df</i>	32.68	
<i>t</i>	-2.19	
<i>p</i>	.06	

	Self-Interested	Not Self-Interested
Mean	.25	.39
Variance	2.05	2.10
N	28	28
<i>df</i>	53.54	
<i>t</i>	-1.82	
<i>p</i>	.14	

Note: All *p* values are Bonferroni adjusted.

Table 4.15: Post-Hoc *t*-Tests for Contribution Rate by Social Value Orientation

Condition	Social Value Orientation			Row Mean
	Self-Interested	Pro-Social	Unclassified	Total N
Average	.20 $N=7$.45 $N=9$.26 $N=3$.30 $N=19$
High	.43(.23) $N=9$.68(.23) $N=6$.28(.02) $N=2$.46 $N=17$
Low	.14(-.06) $N=12$.12(-.33) $N=5$.26(.00) $N=3$.17 $N=20$
Column Mean	.25(.14)	.41(.28)	.26(.01)	
Total N	28	20	8	56

Note: Rates of change are listed in parentheses, and calculated within each SVO classification using the Average(Control) condition as a baseline.

Table 4.16: Average Contribution Rates and Rates of Change by Condition and SVO Classification

	Estimate	Std. Error	<i>t</i> value
(Intercept)	.03	.10	.33
Ordered Condition	.11	.05	2.33**
Pro-Social SVO	-.15	.19	-.80
Ordered Condition * Pro-Social SVO	.15	.09	1.74†

Model $r^2 = .32^{***}$
N = 56, *** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$, † $p \leq .1$

Table 4.17: OLS Regression Including the Interaction of Experimental Condition and Pro-Social SVO on Contribution Rate

	Estimate	Std. Error	<i>t</i> value
(Intercept)	-.01	.14	-.07
Ordered Condition	.20	.06	3.07**
Self-Interested SVO	-.00	.18	-.05
Ordered Condition * Self-Interested SVO	-.05	.08	-.68

Model $r^2 = .27^{***}$

N = 56, *** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$, † $p \leq .1$

Table 4.18: OLS Regression Including the Interaction of Experimental Condition and Self-Interested SVO on Contribution Rate

	Estimate	Std. Error	t value
(Intercept)	.34	.07	4.56***
High Competence Condition	.18	.10	1.72†
Unclassified SVO	-.07	.19	-.41
High Competence Condition * Unclassified SVO	-.17	.29	-.57

Model $r^2 = .11$

N = 56, *** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$, † $p \leq .1$

Table 4.19: OLS Regression Including the Interaction of High Relative Competence Feedback and Unclassified SVO on Contribution Rate

	Estimate	Std. Error	t value
(Intercept)	.34	.06	5.36***
Low Competence Condition	-.10	.04	-2.32*
Unclassified SVO	-.07	.16	-.49
Low Competence Condition * Unclassified SVO	.10	.11	.91

Model $r^2 = .13$

N = 56, *** p ≤ .001, ** p ≤ .01, * p ≤ .05, † p ≤ .1

Table 4.20: OLS Regression Including the Interaction of Low Relative Competence Feedback and Unclassified SVO on Contribution Rate

Dependent Variable		Sum of Square	df	Mean Square	<i>F</i>
	Intercept	398.50	1	398.50	473.76***
Self-Esteem	Condition	.12	1	.12	.14
	Error	45.42	54		

N = 56, *** p ≤ .001, ** p ≤ .01, * p ≤ .05, † p ≤ .1

Table 4.21: One-way ANOVA for Self-Esteem Between Experimental Conditions

Dependent Variable		Sum of Square	df	Mean Square	<i>F</i>
	Intercept	291.38	1	291.38	109.32***
Task Enjoyment	Condition	11.02	1	11.02	4.13*
	Error	63.96	24		

N = 26, *** p ≤ .001, ** p ≤ .01, * p ≤ .05, † p ≤ .1

Table 4.22: One-way ANOVA for Task Enjoyment Between Experimental Conditions

	Average	High
Mean	4.38	4.44
Variance	3.30	1.44
N	12	9
<i>df</i>	18.78	
<i>t</i>	-.08	
<i>p</i>	1.00	

	Average	Low
Mean	4.38	2.33
Variance	3.30	2.38
N	12	5
<i>df</i>	8.87	
<i>t</i>	2.36	
<i>p</i>	.12	

	High	Low
Mean	4.44	2.33
Variance	1.44	2.38
N	9	20
<i>df</i>	6.75	
<i>t</i>	2.64	
<i>p</i>	.10	

Note: All *p* values are Bonferroni adjusted.

Table 4.23: Post-Hoc *t*-Tests for Task Enjoyment by Condition

	Estimate	Std. Error	<i>t</i> value
(Intercept)	.24	.13	1.80†
Egalitarianism	.03	.04	.75
High Competence	.16	.09	1.84†
Low Competence	-.17	.08	-2.02*

Model $r^2 = .23^{**}$
N = 56, *** p ≤ .001, ** p ≤ .01, * p ≤ .05, † p ≤ .1

Table 4.24: OLS Regression of Egalitarianism on Contribution Rate

Hypothesis	Result
1a Individuals who receive feedback indicating that they are of <i>high</i> relative competence will express higher self-efficacy beliefs compared to those who receive feedback indicating that they are of <i>average</i> relative competence.	Not Supported
1b Individuals who receive feedback indicating that they are of <i>low</i> relative competence will express lower self-efficacy beliefs compared to those who receive feedback indicating that they are of <i>average</i> relative competence.	Supported
2a Individuals who receive feedback indicating that they are of <i>high</i> relative competence will contribute more over time than those who receive feedback indicating that they are of <i>average</i> relative competence.	Mixed Support
2b Individuals who receive feedback indicating that they are of <i>low</i> relative competence will contribute less over time than those who receive feedback indicating that they are of <i>average</i> relative competence.	Supported
3 An individual's self-efficacy beliefs will partially mediate the relationship between relative competence feedback and contribution rate.	Supported
4a Individuals who receive <i>high</i> relative competence feedback will perceive greater social responsibility to help the group compared to individuals who receive <i>average</i> relative competence feedback.	Not Supported
4b Individuals who receive <i>low</i> relative competence feedback will perceive less social responsibility to help the group compared to individuals who receive <i>average</i> relative competence feedback.	Supported
5 An individual's perception of social responsibility will partially mediate the relationship between relative competence feedback and contribution rate.	Supported
6a Compared to those who receive average relative competence feedback, the positive influence of high relative competence feedback on contribution rate will be greater for pro-social individuals than for self-interested or unclassified individuals.	Supported
6b Compared to those who receive the negative influence of low relative competence feedback on contribution rate will be greater for self-interested individuals than for pro-social or unclassified individuals.	Not Supported
7a The positive influence of high relative competence feedback will be less strong for individuals who do not have a stable social value orientation compared to those who are pro-social or self-interested.	Not Supported
7b The negative influence of low relative competence feedback will be less strong for individuals who do not have a stable social value orientation compared to those who are pro-social or self-interested.	Not Supported

Table 4.25: Summary of Outcomes for Each Hypothesis in This Study

QUALITATIVE METHODS

5.1 Introduction

In this chapter I describe methods used in the qualitative portion of this study, which uses Wikipedia as a case study for the exploration of social operational information. I begin by presenting a justification for studying Wikipedia, as well as for choosing to study infrequent contributors to Wikipedia (compared to more active or frequent contributors). I then summarize the qualitative process which I employed, and lay out four distinct conceptual categories that informed the development of this qualitative study as well as the construction of the interview guide. Finally, I explain procedures for recruitment and participant selection, as well as for qualitative data analysis.

5.2 Why Study Wikipedia?

The broader goals of this study concern the roles of operational information in online information pools. In pursuit of that goal, the interview portion of this study could have focused on any number of systems. There were three primary motivations for choosing Wikipedia as the focal case study. First and foremost, Wikipedia is a large and popular system which has achieved mainstream popularity and widespread use well beyond the young and technologically-savvy demographic. As early as 2007 a Pew Internet and American Life Project survey found that Wikipedia use was common across age, gender, ethnic, educational, and income categories (Ranie and Tancer, 2007). Choosing a system with a large and diverse user-base allowed me to gather a wide range of perspectives on the research questions at hand. Secondly, I sought out a system which could be personally important to many users. While individuals are likely to use Wikipedia for fun and entertainment at least some of the time, for many it is a primary source of knowledge for educational and professional purposes (Ranie and Tancer, 2007). Furthermore, Wikipedia's ascendancy combined with media coverage has, perhaps, perpetuated the belief that Wikipedia is important to society

as a repository for human knowledge. The relationships between operational information, attitudes, and behaviors are likely to be more salient when those attitudes and behaviors really matter, a fact which suggests that Wikipedia is an excellent case study. Finally, with a focus on operational information, I required a system about which there was a lot to be known. In an overly simplistic information pool, arguably, the influences of operational information could be reduced because there are fewer relevant details about processes, products, or people. Wikipedia, on the other hand, is a complex ecosystem in which there are a wide variety of technical and social rules, and a variety of roles occupied by contributors.

5.3 Why Study Infrequent Contributors?

Having established a rationale for choosing Wikipedia as a case study for the interview portion of this research, the next key question concerns the rationale for studying infrequent contributors. There are several key issues here. First, while researchers have increasingly turned their attention to the attitudes and behaviors of Wikipedia's users, they have almost exclusively studied heavy editors and administrators (See e.g., Bryant et al., 2005, Viegas et al., 2007, Kriplean et al., 2008, Burke and Kraut, 2008). As a result, the attitudes and behaviors of readers and infrequent editors are severely under-studied. The focus on what amounts to a small fraction of Wikipedia's users has yielded important and interesting findings. However, without studies focused on Wikipedia's readers and infrequent editors, it is impossible to understand the similarities and differences between users at different levels of engagement. Furthermore, focusing on readers and infrequent editors is a key element of understanding the evolution of users over time. After all, many heavy editors and administrators likely begin as readers. Those who never invest in Wikipedia at so deep a level may nonetheless become relatively more active over time. Reading constitutes an important gateway activity through which many individuals gain *entr e*, learn about how the system works, and move towards deeper and more frequent forms of participation (Antin and Cheshire, 2010). By understanding the attitudes and behaviors of readers and infrequent editors, we gain insight into the formative experiences of users who may go on to become more engaged participants. Finally, readers and infrequent editors exert a potentially large influence over the operation of Wikipedia as a social and technical system. By acting as an audience for heavier contributors and also as an often opinionated and discerning user base, the behaviors and attitudes of readers and infrequent editors directly and indirectly influence the evolution of Wikipedia over time. Together, these factors suggest that more research should be focused on more casual participants not only on Wikipedia but in the context of many information pools.

5.4 Emic & Etic in Qualitative Research

The primary goal of the qualitative, interview-based portion of this study was to allow for a deeper exploration of perceptions and assumptions about social operational information as they are grounded in real-world experience. Specifically, the interviews focused on beliefs and perceptions about information pools — including competence beliefs, perceptions of other participants and their motivations, and perceptions of the social dilemma — and the potential relationships between these beliefs and participation decisions. In addition, interviews sought to enrich and extend knowledge gained through the experimental portion of this research, specifically by providing additional information about the fit between experimental results and individual experience in naturalistic settings and uncovering avenues for exploration in later experimental studies (Waszak et al., 2003).

In contrast to the experimental portion of this research, the qualitative portion is focused on inductive inquiry and gaining an understanding of the research questions as they are viewed by the participants themselves. This focus on accounts that are meaningful to participants, in the language that they themselves use, has been called an emic perspective (Lett, 1997). An etic perspective, on the other hand, is an external accounting of attitudes, perceptions, and behaviors that structures itself around ideas and language generated by the researcher. In the practice of qualitative research it is impossible to adopt an entirely emic point of view — a researcher’s own ideas and language are unavoidably entangled with those of the research participants. As anthropologist Ward Goodenough put it, “emic description requires etics” (Goodenough, 1970, p. 112). Using word play to emphasize the point, Kvale (1996) emphasizes that an interview is unavoidably a setting for the negotiated construction of meaning which is “inter the views of the interviewer and the interviewee” (Kvale, 1996, p. 15). While Kvale’s view stretches well into the domain of post-modern epistemology, his emphasis on an interview as producing an inter-subjective product is key. While it is tempting to view any data collection instrument simply as a vehicle for capturing information provided by participants, in reality the process of capturing is almost always collaborative, involving both emic and etic points of view. Furthermore, a balance between emic and etic is arguably the best approach if our goal is to conduct inductive qualitative research which is nonetheless theoretically grounded. In this research my goal was to explore a set of theoretically grounded issues, each informed by extant literature, but also to capture the expressions of those ideas using my participants’ own words and ideas.

5.4.1 Conceptual Categories

Schensul and colleagues argue that “creating an initial focus calls for selecting one or more paradigms to organize the inquiry” (Schensul et al., 1999, p. 9). One way of beginning the organizing process is for the researcher to be explicit and transparent about the questions,

ideas, assumptions, and theories which he unavoidably brings to the research process. In search of this transparency, I began planning for qualitative interviews by describing (for my own benefit) four inter-related and overlapping conceptual categories which aimed to capture the important elements of the research topic. In this section I present each of the four categories which served as a foundation for both interview protocol development and analysis, and briefly discuss the extant literature that bears on each.

Each category focuses both on a theoretically grounded topic area and an aspect of operational information (Antin, 2009) — a piece of the products, processes, and people that make up Wikipedia. A qualitative study can add to our understanding of operational information and its role in participation and interaction with Wikipedia in a number of important ways. First, the foundation of a study of operational information must begin with questions such as “What do people know?” and “What types of information are salient or important as individuals interact with Wikipedia?”. Qualitative interviews are well suited to an inductive and exploratory investigation of these questions. However, a thorough understanding of operational information requires more than a simple enumeration of information that is widely known and information that is not. Rather, this qualitative study seeks to understand what ethnographer Peter Lyman called “the rules”¹ — the social and technical processes and patterns through which operational information figures into daily activity and interactions with Wikipedia. Importantly, these socio-cultural and socio-technical patterns will not always be explicit. Indeed, people are not always very adept at enumerating what they know and how it is important (Nisbett and Wilson, 1977). Qualitative analysis allows for these factors to emerge through inductive analysis. By paying attention to the rich detail and contextualized narratives that participants provide, it is possible to find patterns of discourse — ways of talking — that reveal the importance (or unimportance) of operational information.

These conceptual categories served to ground interviews in existing research and theory. It is important to note, however, that I did not explicitly lead participants down these paths of discussion during interviews. While the themes drove the general development of interview questions, those questions were always open-ended explorations of a general topic, and were intended to get participants’ talking about their own ideas, opinions, and experiences. During interviews I made every effort to follow participants’ as they decided for themselves which topics were salient, and never to ask direct or leading questions.

Barriers & Enablers to Participation

One of the applied goals of this research is to learn how to encourage participation in information pools - to get more people involved in a variety of mutually beneficial tasks. A key first step in learning to encourage participation is to understand the barriers and enablers to

¹Personal Communication, 2005

participation that already exist. As I have already discussed, operational information itself can act as a barrier or enabler to participation. Certainly individual operational details can themselves act as barriers or enablers — an individual who does not know that he can edit a Wikipedia page has a formidable barrier to participation. Just as importantly, in aggregate an individual’s level of operational knowledge can act as a barrier or enabler through varying levels of uncertainty about the system and its surrounding environment.

While some existing studies of Wikipedia have examined the issues of barriers and enablers to participation, they have largely collected data through surveys which ask individuals to choose from among lists of items (e.g., Nov, 2007). These surveys provide a valuable baseline of information about potential barriers and enablers, but they are often biased towards the lists of barriers and enablers which have been included in the survey. Inductive, qualitative analysis of interview data has the potential to reveal evidence of barriers and enablers which participants may not be able or willing to report on a survey. Importantly, whether a factor presents a real or merely a perceived barrier or enabler is unimportant — the key issue is what individuals *believe*. Wikipedia’s designers may note, for example, that the “Edit” button is prominently displayed at the top of each and every Wikipedia article. However, if many potential contributors perceive technical barriers to editing, the most well-reasoned user interface loses much of its potency.

Perceptions of Contributors

Are readers and infrequent contributors aware of the others who contribute? What do they think about them? In particular, what do they think motivates others to contribute? These are key questions for two primary reasons. First, many individuals who are considering whether to contribute are likely to make implicit or explicit comparisons between their own attributes, attitudes, and motivations and those of others who they believe are already contributing. By contributing an individual may perceive that he becomes a part of a group labeled “contributors,” and by doing so become associated with the characteristics of that group. Given the potential comparison, negative attitudes about the characteristics or motivations of other contributors could be a barrier — many individuals will be deterred from joining a group which they believe has negative qualities. Positive attitudes and assumptions, on the other hand, may have the opposite influence and encourage individuals to join. Perceptions of other contributors, in particular of their motives, can also influence attitudes about information quality, the nature of user-generated content, and Wikipedia’s open collaborative process. If individuals believe that many contributors are motivated by personal profit or ego, for example, they may be less likely to find Wikipedia articles credible, or they may come to doubt the efficacy of open collaboration and favor more oversight and bureaucracy.

The Social Dilemma

The notion of the social dilemma has long been of theoretical importance in economics and social psychology. Wikipedia is certainly a social dilemma in theoretic terms — because Wikipedia is non-excludable and non-rival, an individual’s most “rational” option is to free-ride on the efforts of others. Too much free-riding could lead to under-provision or non-provision of the good. Despite this accurate theoretical description, however, we cannot argue that the notion of a social dilemma, or of related notions like free riding, are salient, or make descriptive (rather than normative) arguments about how they work in real-world situations unless we know more about how individuals actually perceive the dilemma in practice.

The notion that individual perceptions are essential is not new to collective action research. Some researchers, for example, have explained the prevalence of cooperation in social dilemmas by using the concept of “matrix transformation.” Matrix transformation is a game theoretic concept which suggests that individuals resolve the deficient equilibrium in some games by essentially playing a different game — by subjectively transforming the matrix of payoffs (Thibaut and Kelley, 1978). Based on an individual’s preferences about the distribution of rewards between self and other, for example, some individuals may subjectively transform the outcome values of a particular situation by over-weighting their own or others’ potential rewards (Kollock, 1998).

Despite the fact that game theoreticians and others have noted that individual perceptions can have a powerful effect on collaborative behavior, to my knowledge there is no qualitative research on attitudes and perceptions of the social dilemma in any context. As a result, the most basic questions about real-world decisions as they relate to the social dilemma on Wikipedia remain un-addressed. Do individuals even perceive the site as involving a social dilemma? If so, what do they believe is the nature of the dilemma? How do individuals talk about the dilemma and how it is important? An even more basic question which has important implications for social exchange theory, which I used as a theoretical grounding for this study, concerns whether individuals perceive their contribution to the site as an exchange. Qualitative interviews are an ideal method for addressing this and related questions. Most Wikipedia users will likely be unaware of technical terms such as *social dilemma* and *free-rider* but the basic contradictions, challenges, and decisions that those notions embody can be expressed in the ways that participants respond to a variety of questions regarding decisions about participation, how Wikipedia is produced, and the potential consequences of non-contribution.

Responsibility & Guilt

Wikipedia is, arguably, not simply a public good, but also a social good. For many, Wikipedia furthers important societal goals such as education, information sharing, historical archiv-

ing, and personal development. Given the evolving perception of Wikipedia as a social good, do individuals perceive a responsibility to contribute, or feel a sense of guilt if they choose not to? Attitudes about personal responsibility to contribute and/or feelings of guilt about non-contribution or under-contribution can be an important part of participation decisions. Negative social psychological effects such as guilt, coercion, and social pressure could be strong barriers to participation. On the other hand, a sense of personal or societal responsibility encourages individuals could encourage individuals to overcome other barriers to participation. As such, understanding whether feelings of personal responsibility and guilt are a factor in participation decisions, as well as how and in what contexts they may operate is key. Importantly, an individual's perceptions about responsibility and guilt are likely to be influenced by their attitudes about how the collaborative process works and about the other people in the collaborative system. For example, if an individual perceives the collaborative process as fundamentally biased, inefficient, and unfair, his sense of responsibility to contribute may be diminished. On the other hand, if he believes that other contributors tend to be domain experts who volunteer their time and effort because of a true desire to help others, it may produce an increased sense of guilt over non-contribution.

5.5 Semi-Structured Interviews & The Interview Protocol

This study collected data through a series of semi-structured interviews. Semi-structured interviews are ideal for providing a limited structure to direct interviews towards desired questions, but employs a flexible structure and open-ended questions so that participants can direct the conversation as they see fit (Weiss, 1994, Schensul et al., 1999). The interviewer's role is to avoid asking leading questions, and to be ready with appropriate follow-up questions as discussion topics shift. Semi-structured interviews are a middle ground between completely open-ended interviews, which often take the form of unstructured conversations in informal settings, and highly structured interviews, which may resemble a verbally-delivered survey.

Semi-structured interviews rely on interview protocols to set out the basic structure of topics. The interview protocol development process began with the generation of the four conceptual categories listed above. These categories did not serve as rigid boundaries or as a strict organizational scheme for interview protocol development. Rather, the general concepts embodied in the categories helped to guide the open-ended questions which were ultimately included in the interview protocol. In other words, the goal was not to develop a protocol which mapped directly onto the conceptual categories, but rather to design a protocol which could allow for participants to explore the subject matter on their own terms. Based on the

four categories, I generated an exhaustive list of open-ended interview questions. After iterating the protocol by altering the order and phrasing of questions, removing poor questions and adding others, the protocol was tested during two pilot interviews.

It is important to note that the protocol continued to evolve over the course of interviews. The final interview protocol, developed and refined over the course of the interviews is included in Appendix C.

5.6 Recruitment

Potential interviewees were recruited through an advertisement placed on the classified ad web site Craigslist². Craigslist runs a variety of localized sites for cities across the nation. Advertisements were posted on both the San Francisco-area site and the East Bay site, which covers Berkeley, Oakland, and a variety of communities to the North and South. The solicitation read as follows:

Hello,

If you are someone who has used Wikipedia — even a little — I am interested in interviewing you about your experiences. My name is Judd Antin. I am a doctoral student in the School of Information. My research is about understanding how you use user-generated content web sites and, more generally, how you perceive them, what you think about them, and what you know about them.

If you participate in the approximately 60-90 minute interview you will receive \$50 cash in compensation. We will arrange to meet for the interview at a quiet place that's convenient for you.

If you are interested, the first step is to fill out a short screening survey. The survey should take only 2-3 minutes to complete. Thanks very much.

Individuals who were interested in an interview clicked on a link embedded in the advertisement and were directed to a web-based survey. The survey began with a consent form, and then asked participants a series of questions about their interest in and knowledge about Wikipedia, as well as their patterns of use.³ The survey took no more than a few minutes to complete. Potential participants were required to enter an email address so that I could contact them for an interview.

²See <http://craigslist.org>.

³The full text of the screener survey is available in Appendix D.

5.6.1 Participant Selection and Interview Location

Potential participants were chosen from those who had filled out the screening survey in order to balance three factors: (1) gender; (2) age, and; (3) experience level. Experience level was a particularly important factor. The interview study focused on individuals at the lower end of the participation spectrum: non-editors, casual or infrequent editors, and occasional editors. Based on both self-reported knowledge and experience with Wikipedia and frequency of use data, potential participants who fit each category were contacted via email. While some who were contacted never responded, the majority of those who were contacted responded, and interviews were scheduled at mutually convenient times and places. Many participants were able to travel to the UC Berkeley campus, and interviews were conducted in a quiet conference room. In approximately 25% of cases, interviews were conducted at other convenient locations in Oakland, San Francisco, San Jose, Redwood City, and several other nearby cities.

5.6.2 Interview Procedures

Interviews were scheduled at mutually convenient locations either on the Berkeley campus or elsewhere. Upon meeting, I greeted participants and engaged in casual conversation in order to establish rapport. Participants then filled out consent forms, and asked any questions about the project (though few participants had questions in advance). I informed participants that the interview would take about an hour, that I was interested in what they think and do with respect to Wikipedia, and that there were no right or wrong answers to questions. Finally, I reminded participants that, in the unlikely event that I asked a question they were uncomfortable answering, they should ask to move on to the next topic.

5.7 Qualitative Coding and Analysis

While interview protocol development, informed sampling, and proper interview technique are all key elements of any interview-based project, the qualitative analysis phase is, arguably, “where the action is” (Agar, 1980). Researchers have produced a variety of mechanisms for conducting qualitative analysis. One method, for example, advocates a focus either on “issues”, which are substantive areas of thought, perception, or behavior, or on “cases”, which are concrete narratives about real-life situations (Weiss, 1994). Another asks the researcher to move from a “taxonomic analysis,” which places the variety of topics and domains into bounded categories, to a “componential analysis” which constitutes a “search for the attributes (components of meaning) associated with cultural symbols” (Spradley,

1979, p. 274). In these and many other cases, the over-arching purpose is to extract shared ideas, meanings, and symbols from the words of participants, and to “categorize the different segments of talk” (Agar, 1980, p. 153).

In practice, each of these methods also adopts a similar set of analytic practices. With interview transcriptions as the basis of analysis, they first undertake a thorough coding process. Codes are words or short phrases that signify segments of text in a particular theme or domain. As analysis progresses, a codebook is developed and refined. Often, codes overlap and are iteratively combined or grouped under higher-level codes. Once a dataset has been thoroughly coded, the next step in analysis is often to examine codes and the portions of text that are within them. By grouping related codes, the analyst can identify themes that represent broader conceptual categories. Finally, themes may be further combined into more abstract theoretical notions that represent broader classifications of ideas that are present in the data. At each step, the goal is to identify common themes across interviews, and examine the subtle variations in meaning across participants.

Qualitative analysis practices that generally follow the model presented above have been used by anthropologists, sociologists, and qualitative researchers and ethnographers in other fields for many years. More recently, similar steps have been codified into a specific set of practices known as grounded theory (See, e.g. Charmaz, 2006). While I am inspired by many of the core principles of grounded theory, I did not follow the specific methods illustrated by its many proponents.

5.8 Conclusion

In this chapter I described the methods used during the qualitative portion of this study. I first addressed several key issues around the motivation and justification for this study. I explained why Wikipedia is an important case-study and infrequent contributors in particular are an overlooked and essential group of users. I then described four conceptual categories which formed the underlying framework for initial interview protocol development. Finally, I described procedures for interview protocol development, recruitment, interviewing, and qualitative data analysis.

A QUALITATIVE STUDY OF WIKIPEDIA

6.1 Introduction

In this chapter I present the results of a qualitative interview study of twenty Wikipedia users. I begin by introducing some basic information about interview participants, and then present the results of iterative qualitative coding and analysis. I finish with a general discussion of qualitative findings.

6.2 Sample Description

Qualitative interview participants were recruited from various locations in the San Francisco Bay Area by posting an advertisement on the online classified ad web site craigslist.com. 311 individuals filled out the recruiting survey, 32 were contacted via email, and 20 individuals agreed to participate.¹ Several guidelines drove participant selection from the pool of survey respondents:

1. **Experience with Wikipedia** - I intentionally focused on participants who reported infrequently editing Wikipedia. I will discuss this issue in greater detail later on in this chapter.
2. **Interest in Wikipedia** - As a crude means of identifying individuals who were likely to be more engaged in an hour-long conversation about Wikipedia, I sought participants who self-reported a high degree of interest in Wikipedia.
3. **Age, Gender, and Education** - In order to avoid the potential biases that could come from interviewing participants in a narrow demographic range, I sought out participants of all ages, genders, and educational levels.

¹Of the 12 individuals who were contacted but not interviewed, 11 failed to respond to an email query about the interview, and one individual was unable to schedule a convenient time.

Ultimately, interview participants came from all walks of life and brought a variety of different backgrounds and narratives to their use of Wikipedia. Recruitment yielded several technologically adept college students, and recent college graduates in high-paying techno-centric jobs. However, I also talked with individuals like Russell, a 47 year-old probation officer on disability leave, Roger, a rock photographer who works at a San Francisco public health non-profit when he is not touring with major musical groups, and Candace, a San Leandro, CA-based stay-at-home mother in her 40s who manages her childrens' home schooling. A limitation of this research is that it reflects the views of people who live in a technologically saturated geographical area. Residents within the so-called "Bay-Area Bubble" are exposed to information and information technologies through media and sheer proximity to the giants of technology and the web. As a result, the attitudes of people in the San Francisco Bay may be different from those in less techno-centric cities. However, I believe that the diverse profile of interview participants helped to mitigate this limitation.

The average age of participants was 34 — 30% were younger than 25, 30% were between 25 and 35, and 40% were older than 35. 60% of participants were male. Table 6.2 illustrates the self-reported educational level of participants. Figure 6.1 displays the distribution of participants around the Bay Area by zip code.

The screening survey which was used to recruit participants included a variety of questions to assess attitudes and behaviors related to Wikipedia. Table 6.3 illustrates participants' responses to a series of agreement statements about Wikipedia attitudes. Table 6.4 describes the self-reported frequency with which participants engaged in a reading and editing behaviors.

While these data provided an excellent basis for recruitment, they are unlikely to represent accurate reports of behavior. During the interviews, several participants whose survey responses indicated that they edit Wikipedia several times per week said they had actually never (or only very rarely) done so.² Similarly, although 50% of participants reported having edited a Talk page at least once, most participants were not aware that Wikipedia's discussion pages go by that name, a fact which brings the reliability of survey responses into question. So, while the limitations of these data must be considered, they do paint the picture of an interested and confident group of Wikipedia users who frequently read the site but edit much less frequently or not at all.

6.3 Data & Analysis

In addition to the five conceptual categories, several additional codes were used to categorize more general descriptions, attitudes, and behaviors around Wikipedia. Coded text segments

²I did not specifically ask participants about or refer to their survey responses during interviews. I did, however, familiarize myself with each participant's screening survey results prior to beginning each interview.

ranged in length from a single sentence to an extended back-and-forth with a participant. Wherever appropriate, the quotation included all surrounding discussion that would be necessary for the quotation to retain contextual details. Table 6.1 shows the complete list of codes used during this stage of the analysis, as well as the total number of quotations associated with each code.³

Elements of all five conceptual categories can be found woven throughout the data I present below. However, I have chosen to structure the presentation and discussion of data around three themes which emerged organically from my participants' own words. The three themes are fluid and overlapping, but provide a useful framework for discussion which is structured around the issues and themes that my participants talked about more often and with particular detail and excitement.

6.3.1 What is Wikipedia?

Interviewer: “So, how would you describe Wikipedia to someone who had never heard of it before?”

Roger: “I’d probably describe it as a popular song that you could write lyrics to. You know, I would tell him that if you like the Michael Jackson song, you like it so much that you thought you had some good lyrics to add to it, you can go to Wikipedia and actually go to that subject of that song and add some lyrics to it and it would stay on there and people can get your lyrics. So, simple.”

How we choose to define the actors and objects in our lives is far more than a simple matter of taxonomic description. Rather, the ways we define things — the metaphors and words we use, the things we devote more or less time to explaining, and the aspects we include or leave out — can be powerful signals of attitudes and perceptions that are beneath the surface. Wikipedia is no exception. The answer to the question “What is Wikipedia?” is really a question about the mental models that individual use to think about Wikipedia. Furthermore, Wikipedia’s definition is largely about the three categories of operational information which I defined in Chapter 2 — information about the *products* that are produced by collective effect, about the *processes* through which those products emerge, and about the *people* who work to make it all happen.

³It is important to note that the length of individual quotations varies, so a topic with a relatively smaller number of quotations may nonetheless contain richer data than a code with a greater number of short quotations. Furthermore, these data tell us nothing about the distribution of codes between participants. I perceive the primary value of this type of code counting as: (1) providing a procedural accounting of the coding process and how it was conducted, and (2) emphasizing in particular which codes were rarely used.

At the start of each interview, I asked participants to imagine a hypothetical conversation with someone who had never before heard of Wikipedia. Roger's above description artfully captures a number of prevalent themes. The choice of the lyrics to a popular song as a guiding metaphor is indicative of a common description of Wikipedia as a "database for basically anything and everything." Participants saw Wikipedia as a basic repository for human knowledge of all kinds, be it chemistry, biography, or popular music. Wikipedia was often described as approachable and universal, and participants frequently used superlatives such as "everyone," "anyone", and "everything" to describe the site. More than a mechanistic description, these words seemed to signal feelings of accessibility and ownership that were echoed throughout many interviews. The notion of Wikipedia as a living and social entity was also common:

Jeff: "I think it's like a social encyclopedia. . . so it's sort of a community of people, who sort of built this encyclopedia from the ground up and this information is up-to-date and there's this community of people who sort of go in and update it and it's like — it's a huge kind of web of information."

Jeff's description is emblematic of many who focused on the community of people who use and create Wikipedia. Bryant et al. (2005) found that one aspect of the transition from casual to heavy contributor is a shift in focus from information to community. My results, however, suggest that community and the people who are behind Wikipedia are very much on the minds of infrequent contributors — so much so that they often figure prominently in their definitions of the site. Many, however, were conflicted about Wikipedia's accessible and social nature. Most participants' definitions moved quickly from matter-of-fact descriptions of what is on the site to concerns about information quality borne from the free-for-all model through which Wikipedia is produced. Almost without taking a breath, and completely unprompted, many definitions of Wikipedia followed patterns similar to this one:

Russell: "I would say it's an online encyclopedia written by people who use it. You need to take some of the information with a grain of salt especially when it comes to autobiographies or biographies, some of them, I wonder if they're autobiographies. But it's a great resource for finding out information you're curious about. Most of the information is not so in-depth although some of them are."

Russell's description not only illustrates how quickly information quality concerns came to the forefront, but also some of the internal conflict that appeared to be associated with those concerns. Descriptions often followed a pattern of enthusiasm followed by hedging and

caveats. Wikipedia is a vast resource, but it's not always in-depth. It's accurate, except when it's not. Many participants expressed context specific attitudes about information quality, for example noting that biographies can be problematic while basic information such as chemical boiling points or historical dates tend to be accurate. As Allie, a mid 40's PR specialist put it, "...so you know while most of it is accurate you might want to verify some things if it seems completely ridiculous."

The debate over information quality on Wikipedia and other user-generated sites is hardly new (See, e.g., Voss, 2005, Stvilia et al., 2005). Discussions of information quality among my participants add to this debate by highlighting the tension between abstract concerns about information quality and personal experience. On one hand, many participants discussed their general concerns about information quality — the notion of the so-called "grain of salt" was firmly lodged in the consciousness of many. Selene, a 21 year-old college student, described it this way:

Selene: "...it's kind of like an encyclopedia but the users fill in the information and it's really useful if you need to answer a random question...but it's not always reliable, it's not necessarily a good resource to use in a research paper."

Interviewer: "So what do you mean? Why do you say it's not always reliable?"

Selene: "Well because anyone can make a page. And some people have biases, right? And if you're not a hired writer or a journalist or whatever...and they have biases too but anyone could be like you know I hate, I don't know, environmentalism."

For Selene, a part of the problem is being unsure about the author of information she reads on Wikipedia, although she is also conscious that all writers can have biases. Karen, a public health practitioner in her 40s expressed a similar sentiment:

Karen: "But I also know that it may not be entirely correct and it's not going to be as detailed as I probably would like but it's a good starting point in terms of generally, 'what is this topic about?' or... 'where else might I may be able to go for more information?'"

Both uncertainty about authorship and the belief that Wikipedia's proper role is as a starting point for inquiry were widely echoed by participants. Despite these abstract concerns,

however, participants overwhelmingly said their personal experiences with information on Wikipedia were positive. Participants rarely mentioned encountering obviously flawed information, and few could relate examples when asked directly. What is interesting here is the contradiction between positive personal histories and the negative prevailing attitudes that participants may feel are more prudent and wise. These contradictions were often expressed in discussions of information quality. Selene (also quoted above), said that in her experience Wikipedia’s information has been highly accurate, but she also said she felt “naive” for making such a statement. Sean, an office worker in his early 20s, also captured the contradiction:

Sean: “. . . usually for me, it’s kind of like a starting point and then when I look into something — because I don’t take everything that I see on Wikipedia as set in stone, even though it’s probably fairly accurate most of the time.”

These statements seem to reflect a degree of internal conflict about Wikipedia and about the process by which it is created. They suggest that attitudes towards Wikipedia are very much “under construction.” Highly publicized discussions of Wikipedia’s information quality, as well as biases introduced by individual editors have raised generalized concerns for many. In 2005, an erroneous and malicious entry about political journalist John Seigenthaler remained on the site for more than four months. When it was discovered, Seigenthaler’s outrage helped to raise serious popular concerns about Wikipedia (Wikipedia, 2010, Seigenthaler, 2005). Just a few months later, staff members in the offices of several congressmen were found to have entered false information or removed Wikipedia content that painted congressmen in a negative light (Noguchi, 2006).⁴

These incidents helped to cast popular doubt not only on the quality of Wikipedia as an encyclopedic product, but on the process through which it is produced. As a result, it may be unsurprising that many participants expressed a degree of general suspicion about the quality of user-generated content. Again, the internal tension between what may be perceived as a prudently skeptical attitude and attitudes drawn from participants’ own experiences was evident in our discussions. Many participants went out of their way to explicitly extol the virtues of a user-generated process. One participant explained that he appreciates the typos and other small errors that are often introduced by the user-generated process. They remind him that it was the community, and not a potentially biased corporate or commercial interest that was responsible for the information — in his words, it gives the entry a “home cooked” feeling. Another participant joked that it could be 12 year-old kids who are writing Wikipedia, but also noted that the beauty of Wikipedia’s system, in her eyes, is that even

⁴Research has shown that such blatant acts of vandalism tend to be corrected quickly (Viegas et al., 2004). However, incidents such as the Seigenthaler controversy nonetheless helped to inflame public opinion about the potential dangers of allowing anyone to edit.

a 12 year-old can chip in if he or she has something to offer. Indeed, the democratic and egalitarian nature of Wikipedia's user-generated process was a common topic of discussion:

Jimmy: "So it's... kind of a grassroots user-based encyclopedia I think is the term he used where it's not funded or fueled by a corporation. So you know it's more honest, if it's grassroots that's everyone being able to kind of communally put information in there versus... it's done by Microsoft, it's done by Apple."

Donald: I'm thinking there's more people working on [Wikipedia]. That's really important to me because the more people working on it the more people kind of get the same conclusion you know if you like you're sending me over here to East Oakland to do some research and then you send a friend of yours over to East Oakland to do research and we talked to the same people but some of the people tell a different story or something like that. So we kind of all get together and see where the lie ended or where it started.

Wikipedia's user-generated nature was also an asset to some who felt that it can be both empowering and socially beneficial to allow anyone who has knowledge to share it.

Nicole: "Well, like that's one thing that I like about everyone, anyone being able to contribute is because there's a lot of people out there that didn't necessarily go through the school systems... but can have like something to offer, you know maybe they're self educated or something like that and that they are not totally alienated from society."

The tensions and contradictions I've laid out in the preceding sections are important because they suggest that attitudes about the user-generated process and the perception of Wikipedia as a fundamentally social system are salient for many users. In their paper "Becoming Wikipedian," Bryant et al. (2005) argue that many new contributors see Wikipedia primarily as a collection of information. This was certainly the case for some people that I talked to. But for many, the fundamentally social processes that generate Wikipedia were never out of view. Rather, the contested grounds of information quality and user-generated content were important elements of attitudes about Wikipedia. Questions about who writes Wikipedia and who oversees the editing process were seen as relevant and important. Furthermore, those attitudes helped to structure usage practices. Many participants described their use of Wikipedia for gathering a quick overview of a topic and (as previously mentioned) as a starting point for future research. These are not likely to be automatic or un-reasoned practices. Rather, my analysis suggests that for at least some people implicit attitudes about the user-generated process drive them to both question the information they see on Wikipedia and to seek out alternative sources of information.

6.3.2 Who Writes Wikipedia?

In 2006, when Aaron Swartz wrote his now-famous analysis of the question “Who writes Wikipedia?”, he did so primarily to bolster his case for becoming one of Wikipedia’s administrators (Swartz, 2006). Perhaps because no one had, up to that point, so closely examined the question of where Wikipedia’s content comes from, Swartz’s blog post became required reading for anyone interested in online collaboration. Swartz used a detailed analysis of Wikipedia’s edit histories to make what was then a surprising argument: the largest quantity of Wikipedia’s article edits come from a small group of active core contributors, but most of Wikipedia’s raw content comes from outside that close-knit group.

Swartz only scratched the surface with his analysis, and researchers have since devoted attention to variations on the question of who writes Wikipedia (See, e.g., Kittur et al., 2007, Ortega et al., 2008). In this section I will address another important and overlooked variation: the question of who readers and casual contributors *believe* writes Wikipedia. As I have already discussed, prevailing attitudes about the characteristics, attitudes, and motivations of Wikipedia’s contributors are essential for at least two reasons:

1. Some individuals may be dissuaded from contributing because of negative perceptions of contributors as a group, or they may be encouraged to contribute by positive perceptions.
2. Perceptions of the attitudes and motivations of contributors can influence beliefs about essential factors such as information quality.

In this section I organize my analysis of participants’ perceptions about other contributors around two sub-questions: (1) Who are contributors and what are their characteristics? and (2) Why do those individuals contribute?

Who are Contributors?

Throughout their narratives, participants used three primary metaphors to describe their attitudes about who writes Wikipedia.

Everyday Folks. First, participants described Wikipedia’s contributors as “average people” or “regular folks.” Statements like “it could be anyone” were indicative of many participants’ attitudes. These did not appear to be dismissive responses driven by a lack of thought or a lack of interest. Rather, the notion of Wikipedia as an open, democratic, and egalitarian institution encouraged the perception of Wikipedia’s contributors as anyone and everyone. Many conceived of Wikipedia as an open venue for anyone with knowledge to share:

Donald: "...just everyday people... we've got our geniuses, or lawyers, or scientists, or you, or journalists, or me. I'm just an old man who don't know much but I know a little bit. You know it's just people asking people. People just working with people that know... or know somebody that might know."

For Donald, Wikipedia's contributors are active in their pursuit of questions and answers, and they are a fundamentally diverse group. Donald's description also emphasizes the common belief that, as long as a contributor has something to offer Wikipedia, who he or she is doesn't matter. One participant mentioned, for example, that when she reads Wikipedia she is aware that the author of a particular article could very well be in grammar school, but she also noted that "...as long as he was accurate, I couldn't care less."

What is also evident in these descriptions is the conviction that Wikipedia has a place for everybody. The notion that everybody knows something was repeated several times. One participant, for example, described his belief that contributors come from many different backgrounds and draw from many different experiences:

Russell: "...so for every little thing on the internet, there's somebody out there. There's somebody sitting out there, in Birmingham, or Belize, wherever, [or fixing] punctuation is what they were born to give. And by God, I'm going to let them have it. Why do I need to eat off their plate? I've got a thing about rivers in Iowa."

Russell was particularly aware of the scale and reach of Wikipedia and the internet more generally. One of the more active editors in my sample, Russell's awareness also seemed to encourage him to be particular about his contributions. While he could very well fix a typographical error, he felt that his time was better spent contributing the specialized information he had to offer. His confidence in the diversity of Wikipedia's contributors allowed him to implicitly delegate the task of writing Wikipedia to unknown others.

Wikipedia's Intellectual Class. Secondly, many participants described Wikipedia's writers and editors as a well educated group. Selene, a 21 year-old recent college graduate described them as "intellectual internet junky types." Some seemed to draw their inferences directly from the quality of Wikipedia's writing and organization. Allie, a bio-technology worker in her 40's, for example, said "...yeah, it's well written, respectable, and then you know a lot of people that do post were extremely well educated." For others, the in-depth nature of many Wikipedia articles encouraged them to think of it as the product of dedicated research for another purpose:

Gigi: “I *have* thought about this, they must be like, you know. . . PhD students who - or somebody who’s just done a bunch of research. Sometimes it reads like somebody just wrote a paper on these. They decided to put it on Wikipedia. So a lot of time it does seem like it’s coming from you know college graduates, people who are interested in research.”

In the eyes of these participants, doing research for other purposes and then posting it to Wikipedia seemed to add to the legitimacy of that information. In other words, some participants drew confidence from the notion that information reproduced on Wikipedia might have been checked or vetted by some other institution. Several college age participants also mentioned knowing professors who talked about contributing. Other perceptions of Wikipedia’s intellectual class were much more elaborate:

Maria: “I guess I kind of always imagined like people with a bunch of books in their house and they’re old men with tweed jackets with circles on their elbows.”

In addition to the recurring theme of a college education, others described Wikipedia contributors as older, wise, or “seasoned travelers.” Many descriptions were like Maria’s in that they implied a mental model of the Wikipedia contributor as a man. One participant, a recent college graduate, openly admitted her assumption that contributors were mostly men.

Wikipedia’s Geek Stereotype. By far the most common image that participants invoked to describe Wikipedia’s contributors was that of the solitary techno-geek. The consistent repetition of a number of stereotypes was remarkable.

Lee: “I’m sure they’re locked up in a room. . . and Wikipedia is the ultimate thing for them. . . people in their room alone, playing World of Warcraft and things like that.”

Roger: “Maybe they’re homebound people, or people who have no life. . .”

Neil: “. . . a bunch of nerds sitting around updating things every second. I think we still have most of these ideas of the nerdy technical guy sitting around in his mother’s basement. . .”

Jeff: “Someone who sits at their computer. . . all day who has nothing better to do.”

Russell: “I mean, there are people that live for [Wikipedia]... I imagine them sitting on a chair in their boxer shorts with a catheter and a feeding tube.”

These quotations paint a particularly unflattering picture of Wikipedia’s contributors. In the imaginations of many participants they are “geeky” or “nerdy”, technologically adept, unkempt, and absorbed with online life. Furthermore, in this view contributors are shut-ins — homebound, sequestered in dark places, devoid of face-to-face social contact of any kind. These quotes also envision contributors as unhealthily obsessive, so much so that they spend all their time in front of a computer. These expressions of obsession share much in common with Sherry Turkle’s description of a computer’s “holding power” in her seminal book about online identity, *Life on the Screen* (Turkle, 1995). But while Turkle ultimately concludes that “seduction” is a more appropriate term for the manner in which a computer can capture you, the obsession that my participants described did not carry that positive connotation. Rather, their descriptions were almost universally tinged with negative connotations or outright distasteful imagery, as in the case of Russell, who vividly described the medical equipment he imagined kept some Wikipedia contributors at their posts.

Certainly some of these descriptions were made in jest. Many were accompanied by wry smiles and laughter. Yet behind them is a very real stereotype which has its roots in media and popular culture (Herz, 1997). The image of the geek, nerd, or hacker has been socially constructed to incorporate nearly all of the qualities my participants ascribed to Wikipedia’s contributors: predominantly male, anti-social, unkempt, and essentially autistic (Levy, 1984, Kendall, 1999, Thomas, 2002). Some research on the actual qualities of heavy computer and internet users, much of it conducted in schools, has found that these stereotypes are largely inaccurate (See, e.g. Schott and Selwyn, 2000). And yet despite evidence that computer users are “socially effective” (Lutz et al., 1988) and that individuals who interact with others online are also likely to have more offline social ties (Kraut et al., 2002), the stereotype may still be common (Schott and Selwyn, 2000).

That participants so readily called upon the geek stereotype to describe Wikipedia contributors presents a number of interesting issues. First, the prevalence of the stereotype confirms the importance of understanding attitudes about contributors as they relate to potential participation. Research has shown that the stigma associated with the geek stereotype can be a barrier to computer use for some (Selwyn, 1998). It is notable that the majority of research on the geek stereotype and its potentially negative influences is now more than ten years old. The lack of more contemporary research on the topic may indicate that, as computer and internet technologies have become tightly woven into the fabric of daily life, researchers believe the geek stigma has diminished and is no longer worthy of study. This research provides no guidance on whether this may be the case in a general sense. However, my participants’ descriptions do suggest that the image of the geek and the stigma that surrounds it may still be relevant, albeit in the more circumscribed context of Wikipedia.⁵

⁵The prevalence of this stereotype in my participants’ descriptions is arguably even more surprising given

One interesting open question relates to the type of contributor that participants’ envisioned when invoking the geek stereotype. Participants were always asked a general question about their perceptions of the people who contribute to Wikipedia,⁶ and none of my participants specifically placed their imagined contributor on the continuum from infrequent to frequent contributor. Simply by virtue of the obsessive characteristics many ascribed to these imagined contributors, however, we may infer that for many the stereotype characterizes the most frequent and engaged contributors. And yet the lack of specificity about that issue suggests that the negative connotations of the geek stereotype may tinge other categories of contributors.

The stereotype of Wikipedia’s geek stereotype throws yet another contradiction into stark relief. As I have already described, perceptions of Wikipedia’s importance, benefits, and utility were almost universally positive. And yet many also expressed these negative assumptions about the group of people that they believe is largely responsible for writing Wikipedia as well as coordinating and overseeing the larger collaborative process. Furthermore, many of the same people who invoked geek stereotypes also described Wikipedia contributors as “everyday folks.” This sets up an interesting tension in which many participants appeared to view Wikipedia’s contributors as both normal people and stereotypical geeks — as people who could be just like them but also distinctly “the other.” Interestingly, several of the individuals quoted above reported editing Wikipedia on an occasional basis, but all constructed the prototypical Wikipedia user as someone with foreign and largely undesirable characteristics. The extreme nature of the geek stereotype as it applies to contributors who, by participants’ own admission are a varied bunch, may constitute a form of social distancing. Applying a negative stereotype allows some individuals to reconcile their own lack of participation by arguing to themselves that Wikipedia’s real contributors are people that they could not and would not want to be.

What Motivates Contribution?

In the previous section I discussed participants’ perceptions about the characteristics of Wikipedia’s contributors. In this section I address the related question of what participants believe motivates those individuals to contribute. The question of motivation is essential because it can color individual attitudes about the credibility or reliability of the information Wikipedia provides. Furthermore, perceptions of the positive or negative characteristics of others’ motivations — for example whether others are motivated by a desire to share knowledge or to seek attention and fame — can encourage or discourage individual participation.

the manner in which information technology and the people who design it are woven into the fabric of the San Francisco Bay Area. One might assume that the geek stereotype would be particularly rare in this area, or that it might carry more positive connotations.

⁶The interview guide, for example, lists the general question as “In your mind, who are the people who contribute to Wikipedia?”

The distinction between pro-social and self-interested motivations has been key to many studies of cooperation and contribution in social dilemmas. Pro-social motivations are based on rewards that are provided for others, whereas self-interested motivations are based on rewards provided to the contributor. I paid special attention to my participants' beliefs about whether contributors care primarily about their own rewards or the rewards of others. An analysis of both the kinds of rewards my participants pointed to and the manner in which they discussed them quickly revealed a severe bias towards pro-social motivations. Most of my participants assumed that others were motivated to contribute primarily by the benefits that could be gained for others.

Many individuals emphasized their belief in the desire to “give back” and to make a difference in the lives of others. Jeff, a graduate student in his early 20's, went further and suggested that the relative rarity of contributors versus readers could make giving back an even more powerful motivator:

Jeff: “It’s actually an incentive for the 1 or 2% who want to edit. Because, you know, there are millions of people who are reading your page, right? And if you’re that 1 or 2% wanting to give back, that can really make big difference there, right? . . . if no one’s going to read it, who cares what I write? Why would I even think about giving back?”

Jeff portrays Wikipedia as a particularly fertile ground for altruistic endeavors because an individual’s effort can be shared with a wide audience. Rather than describing the desire to give back as a rare and special trait, as Jeff did, many portrayed it as a natural phenomenon, “just the good nature of people,” or “the nature of humankind.” One participant described Wikipedia as a “goodwill project,” and others characterized contributing to Wikipedia as similar to volunteering for community service. Donald, a 62 year-old retired truck-driver, summed up the perceptions of many by saying “I think most are doing it because they just actually love doing it.”

The use of the words such as love, care, and especially *passion* to describe others’ motivations for contributing was extremely common. Many said they believe that contributing comes from genuine passion about a particular topic:

Jimmy: “. . . it comes down to if you’re passionate about it — if you enjoy the topic. Like, I’m not going to contribute to burritos, because I like eating burritos but I’m not passionate about it. . . . it really comes down to kind of personal preference of what you really feel as if it’s important enough for you to actually do something about.”

Allie, a bio-tech worker in her mid 40's, also suggested that the passion that can drive contribution is contagious and can promote a kind of "virtuous cycle" (Putnam, 2000):

Allie: "Yeah. I think there's something about people contributing for free that appeals to other people. I think it's people [getting] involved. I mean you know I do believe that the more people that you get involved they feel like an ownership of it. Being active and passionate about it, there's something to be said for that."

Maria, a public health worker in her 20's, described how Wikipedia provided a vehicle for a neighbor to take a topic she was passionate about and "get it out to the world":

Maria: "There are some people who write about really local things or things that they're passionate about. Like my neighbor... she was really into how Northern California tried to become its own state and that was her passion and hobby. It's an arcane, like five-day history after World War II happened. And she knew it all. You know she had really no forum to share this with the world... and then we told her about Wikipedia. [She] took a lot of time and wrote drafted it out... she was really passionate about wanting to share this little bit of history."

Other participants discussed the intrinsic rewards that come from sharing knowledge and passing it along to others. Roger, a rock photographer in his early 50's exemplified this point of view while describing a friend who is an active Wikipedia contributor:

Roger: "A lot of people are highly invested in history or historical things, you know. Like my friend who writes his software. His whole idea is 'save something for the next generation.'...he's actually interested in helping other people so through what he does he wants to share with other people. I think a lot people are like that. I think a lot of people deep down inside, I actually think most people are good..."

Though each of the motivations described above was framed as primarily pro-social, the manner in which participants discussed some motivations revealed their perception that self-interest and pro-sociality were not always mutually exclusive. The individuals I talked to were particularly conflicted over the motivation to "be heard," which meant both sharing what one has to say for others' benefit and speaking up in order to gain attention. At least

one participant noted the tension between sharing information to benefit everyone, and the “catharsis” that can come from that same act.

Participants also discussed what they felt were purely self-interested motivations, albeit much less frequently. Several participants suggested that seeking attention is important for some Wikipedia contributors. Russell captured the reactions of several others by saying: “maybe [contributors are] doing that out of the sense of wanting to have a little fame, maybe it’s out of sense of wanting to prove having control, maybe they even feel a little power from it.” In the minds of several participants, recognition drawn from “seeing their name out there” was also key to contributors’ “feeling good about themselves.” One participant labeled this brand of contributor a “busybody” — someone who needs to be heard, to put his “two-cents out there whether people want to hear it or not.”

Monetary and Non-Monetary Incentives. The distinction between monetary and non-monetary incentives has also been of particular interest to researchers of social dilemmas and collective action. One reason that the distinction has been essential is because of conditions in which the presence of monetary incentives can actually deter participation (See, e.g. Deci, 1971, Frey, 1997). In this study I did not look for specific evidence of “crowding out” (Frey, 1997) or of the “corruption effect of extrinsic incentives” (Deci, 1971). Rather, I aimed to address the question of how individuals perceive the influences of monetary and non-monetary incentives in the context of Wikipedia. As a window into attitudes about monetary and non-monetary rewards on Wikipedia, I asked participants about their reactions to the fact that no one gets paid to write Wikipedia. I also posed the hypothetical question of what might happen if Wikipedia started to pay contributors, and investigated how my participants would feel about such a change.

Once again, there was remarkable consistency in participants’ responses: there was a near universal belief that the lack of monetary incentives for writing Wikipedia is desirable, admirable, and beneficial for Wikipedia, while a system of cash payments would be detrimental and undesirable. Many participants expressed the explicit or implicit notion that “Wikipedia wouldn’t be Wikipedia if people were being paid for it,” expressing their belief that adding money to the mix would fundamentally and irrevocably change Wikipedia. One participant envisioned the new ecosystem that he thought would emerge with the introduction of cash:

Roger: “. . . you never know, but I think that generally they would have to start regulating information because if you’re paying people to write, then quite clearly sooner or later you’re going to have to use pop ups and/or commercials to pay those people. . . . if you’re going to pay the people to [enter] the information then there’s going to have to be some type of regulated and/or confirmed information. Which would cut out a good half of their writers. . .

Some worried that the introduction of cash into the Wikipedia ecosystem would attract a different and undesirable group of contributors who would provide lower quality information in the pursuit of a quick buck:

Interviewer: “Do you think Wikipedia would be different if people got paid?”

Donald: “Oh yeah, I think there’d be a lot of bullshit in there, for real. I think people would just throw a lot of stuff in there thinking, ‘I’m getting paid so it really doesn’t matter what I’m putting down!’ You know, and that’s the truth. I think people really put their heart and soul into it, because they like doing it.”

If people were drawn to Wikipedia for the money, another participant worried that the strong sense of Wikipedia community might be lost. Indeed, intrinsic motivations for participation were widely viewed as an integral element of Wikipedia’s identity. Many participants were overtly appreciative that Wikipedia’s contributors are unpaid and drew confidence from the belief that passion and a desire to share are the principal drivers of participation.

Interviewer: “How do you feel about the fact that Wikipedia thrives even though no one gets paid to contribute to it?”

Gigi: “That’s awesome. I love that. Because I like doing things not for money. I like the idea of doing things because people want to do them and have some other motivations besides like I need to pay more rent, which is a fine motivation — I mean it’s necessary. But it’s so nice and fulfilling that it makes me so happy to do things because I want to and to find out about things because I want to and that information changes are happening just because people want it.”

A large part of the appreciation that many expressed seemed to come from the belief that intrinsic motivations lead to higher quality, more trustworthy information. The notion of *purity* was often invoked by participants who extolled the virtues of writing Wikipedia “from the heart.” Some also believed that the introduction of money would professionalize writing Wikipedia in a way that would detract from the freedom and openness of an encyclopedia that truly anyone can edit.

Mike: “You know if it went to the professional community then it’d just change it... I think that it would change the dynamic of it. It will be totally different.

It would be written professionals, but what will happen to the freedom of adding and taking away it all? That's the best thing. That's what makes it so beautiful. . . the freedom to do that and knowing up front this is written by Joe from Idaho.”

While the majority of comments portrayed the introduction of money as a bad thing for Wikipedia, there was some discussion of potential benefits. Several participants believed that adding monetary incentives would likely draw in a larger number of contributors, which could have a net-positive effect on Wikipedia. In contrast to the attitudes of many, one participant suggested that paying contributors could actually improve the quality and reliability of Wikipedia content because there would be “more incentive to actually have the right sources and have the right information.” Two participants also expressed some internal conflict about whether Wikipedians should be paid because of the belief that people should be paid for doing useful work. One went so far as to invoke the work of Karl Marx, saying “I think that it shows that capitalism has really reached a new level. . . that capital is extracting labor value from us when we don't even know that we're working anymore.” Again, however, these attitudes were not indicative of most of my participants.

In sum, my participants largely viewed the absence of monetary incentives on Wikipedia as a virtue and as a key factor in maintaining its genuine and pure nature. Cash, on the other hand, was portrayed as a kind of pollutant which could sour and soil the passionate, caring, community-oriented motivations which drive contribute and constitute a significant part of Wikipedia's identity.

6.3.3 The Social Dilemma

I asked a variety of questions in search of attitudes and beliefs about the social dilemma on Wikipedia. I asked my participants to reflect on whether there could be too many Wikipedia readers and not enough contributors and whether they perceive consequences if they or others choose not to contribute. In most cases, I also explicitly described the social dilemma in layman's terms and asked participants whether it was an idea that resonated with them. Many participants noted that they rarely consider these issues in the course of their daily interactions with Wikipedia, so my data provides no basis for claiming that the social dilemma is a conscious factor in decisions about behavior on Wikipedia. But nearly everyone was thoughtful and reflective about the questions, largely invoking attitudes that had been expressed at other points in the interview. The balance or tension between one's own rewards and needs and those of the group was a notion that appeared to intuitively make sense to my participants. The coherence and consistency of discussions around the social dilemma suggests that related attitudes and beliefs can play at least an implicit role in shaping perceptions and behaviors around Wikipedia.

Nearly all of my participants intuitively understood the notion of the social dilemma and easily saw that it could be used to describe a system such as Wikipedia. None, however, believed that the social dilemma is a practical problem or challenge for Wikipedia. This did not appear to be a dismissal of the idea, however. Instead, my participants expressed a number of thoughtful and coherent justifications for their lack of concern. Many pointed to the perceived size and diversity of Wikipedia as an assurance that there would always be plenty of contributors. As long as Wikipedia is large and growing, they reasoned, there was no reason to worry that there would not be enough contributors. Many also expressed remarkable confidence that other people would always contribute, that “there will always be people to give back.” A great deal of this confidence seemed to come from beliefs about the fundamentally good, sharing, and generous nature of human beings. Participants described themselves as “trusting in mankind” and in the good characteristics of most human beings. Interestingly, some took Wikipedia’s existence and prosperity as proof that people are basically good natured and inclined to share with others:

Allie: I have faith in America. I’m serious! ...overall its been proven, you know...people are basically good. So people prove me wrong on occasion but overall people are good...the fact that Wikipedia does exist is evidence of that.”

Like Allie, many participants used evocative and emotional words such as “faith” to describe their confidence that there will always be someone to write Wikipedia. One participant was particularly mystical in his description:

Interviewer: “Do you ever worry that there would be too many readers and not enough contributors?”

Neil: “No... I think that’s funny. I really just delegate that task towards whoever it is that does that... ‘to the wind’... I dont know.”

Several participants took a much more practical point of view, explaining that the history of Wikipedia and other user-generated sites has proven that the social dilemma is no barrier.

Maria: “It’s true. In theory like if that was set out from the beginning, if someone said, ‘I have this great idea for this user-generated encyclopedia-type thing’... But we see clearly now that theres no real problem with that, you know... there’s everything up there.”

Gigi: “Somebody has to contribute and I suppose yeah, I would start to worry more if it seems that was happening but it doesn’t. . . it’s growing — there’s more and more submissions, there’s more and more information. People seem to be more and more active in doing everything that it needs.

Many were particularly thoughtful about the question of whether there are potential consequences when individuals choose not to contribute. A few explicitly highlighted the non-rival nature of digital information goods, explaining that choosing not to contribute doesn’t “take away” anything from others. Karen, for example, said “I don’t have that sense of. . . oh, people are taking and somehow that’s decreasing the amount of resources that are available for the people.” A surprising number of people also explained non-contribution not in terms of Wikipedia’s viability as a collaborative system but in terms of the knowledge that could go un-shared.

Nicole: So I don’t know if there is a consequence [to non-contribution]. . . if they didn’t have something to contribute then there is no consequence, but if they did and they are holding out, then yes, someone is missing out on something that they could contribute.

Several individuals suggested there could be positive consequences for non-contribution: if everyone contributed there could be “too many hands in the pie.” The notion of a balance between contributors and non-contributors was also common. Many suggested that Wikipedia needs contributors and readers in their proper proportions, but also that each has an important role.

Nothing in my participants’ discussions about the social dilemma or the potential consequences of non-contribution revealed a negative attitude about those who choose to use Wikipedia for research or reading but not to write or edit content.⁷ Quite the contrary, most participants believed that readers themselves make contributions in a variety of ways. Many individuals pointed out that without readers, there would be little incentive for editors to devote significant time and effort to their contributions:

Donald: Well, I mean, all the hard work those guys are putting in and doing, if nobody is reading then what’s the use, what’s the point? You know I mean? I wouldn’t want to do something that I really struggled on, I put in a lot of man hours and everything and I post it out there on a bulletin board and everybody just walks by and nobody looks at it. I mean, it’s like, I did all this work and nobody gives a damn. I did all this work and nobody cares.

⁷This may be unremarkable since my participants were overwhelmingly people who are readers or rare editors themselves.

In the minds of many, then, readers give Wikipedia purpose by providing an audience. Others suggested that reading is a contribution to another of Wikipedia's primary goals: learning and knowledge sharing. Many were adamant that readers make valuable contributions simply by expanding their own horizons and learning new things. Those contributions could be even more valuable if readers chose to share what they had learned, or direct others to Wikipedia as a source of knowledge. In this way, some participants highlighted the larger network that surrounds Wikipedia: not just contributors and readers, but those who are touched by Wikipedia's content in indirect ways. This nuanced view was indicative of many thoughtful distinctions. Several distinguished between "active" and "passive," "indirect" and "direct" forms of contribution, while another suggested that while readers might not be "contributors," they are at least "participants."

6.4 Discussion

6.4.1 Wikipedia & The Hacker Ethic

In his book *The Hacker Ethic and the Spirit of the Information Age*, Himanen (2001) argues that the emerging Network Society (Castells, 1996) of the 21st century is engendering a new attitude towards work and the nature of group enterprise — what he calls *The Hacker Ethic*. As the foil for his description of this new orientation towards work, Himanen uses Weber's notion of The Protestant Ethic (Weber, 2003). Written in 1905, Weber's seminal piece of social theory argues that the notion of work embedded in modern capitalism finds its roots Protestantism, specifically in sects such as Calvinism. Weber suggests that according to the Protestant work ethic, work and dedication towards work are ends in and of themselves rather than the means of achieving a higher purpose. The Protestant doctrines dictate that the higher purpose is work itself. According to the Protestant Ethic, then, it is incumbent upon individuals to work to the best of their abilities, and to consider work as a duty that one must fulfill simply because it must be done. Weber's central thesis is that this attitude towards work was a key influence on the development of capitalism, which he argues is singularly focused on the pursuit of profit as a virtuous end in itself, rather than a means of achieving another primary goal or purpose.

Himanen contrasts this notion of work with the idea of The Hacker Ethic. By tracing the development of "hackerism" and open-source software from its inception in the 1960's, Himanen argues that the Hacker Ethic embodies distinctly different attitudes towards work, time, and profit. Himanen paints the picture of passionate, joyful, and creative workers who tackle intrinsically interesting problems with gusto. These hackers work hard, but not because they believe it is their duty or because there is some inherent purpose to work. Rather, they find the challenge to be fun, interesting, and exciting. They freely distribute

the fruits of their labor because of a genuine passion for their work and the desire to share something valuable with the community. They explicitly eschew profit and monetary rewards, and instead draw motivation from the intrinsic nature of the tasks at hand. Himanen suggests that the traditional model of systematic profit-seeking “is challenged by the open model in which the hacker gives his or her creation freely for others to use, test, and develop further.” (Himanen, 2001, p. 63). Importantly, this attitude towards sharing is driven not by pure ideology, but also by the sincere belief that open sharing and group-based creativity are the most practical way to get things done. In summing up the contrast he aims to draw, Himanen sets the 7 virtues of the Protestant Ethic — money, work, optimality, flexibility, stability, determinacy, and result accountability — against the 7 virtues of the Hacker Ethic — passion, freedom, social worth, openness, activity, caring, and creativity.

Just as Weber argues that The Protestant Ethic was captured in “The Spirit of Capitalism,” Himanen argues that The Hacker Ethic is captured by the “alternative spirit of informationalism” (Himanen, 2001, p. 139) that is invading the Information Age and the Network Society (Castells, 1996). Himanen himself admits that it is difficult to argue that a notion like The Hacker Ethic could “describe the dominant spirit of a time, and it is particularly difficult to do so with the values of the network society, which functions in diverse cultures with diverse values, in an era in which these values are additionally subject to rapid transformation everywhere.” (Himanen, 2001, p. 122) Nonetheless, drawing on Castells arguments about the fundamental societal transitions touched off by the information-technology revolution, Himanen argues that an ethic that began with a small group of computer programmers is expanding to characterize a new societal attitude towards work.

Himanen’s scholarship falls under the broad category of social theory or philosophy. While his argument draws on a variety of documents, as well as the comments of hacker luminaries such as Fred Turner, Eric Raymond, and Linus Torvalds, it does so selectively, and Himanen provides no other empirical support for his arguments. And yet as evidence of the spread of The Hacker Ethic, it is impossible to ignore the striking similarities between Himanen’s notion and the attitudes about motivation and money that I have presented in the previous sections. In short, The Hacker Ethic neatly encapsulates my participants beliefs about the motivations of Wikipedia’s contributors, as well as their attitudes about the appropriate place of monetary incentives in the Wikipedia system.

Each of the 7 virtues of Himanen’s Hacker Ethic can be found in my participants’ own words. My participants believed that the primary motivators for Wikipedia contributors are passion, care, and interest in the topics they write about or oversee. They believe that contributors share a deep desire to share what they know, to express themselves creatively, and to be actively involved with a community of individuals trying to do something good for the world. Like Himanen’s hackers, my participants argued that monetary rewards would be bad for Wikipedia, despite the belief that people should be paid for doing good work. They expressed the notion that the pursuit of profit can pollute a system already based on intrinsic motivations, open discussion and collaboration, and the free exchange of ideas. My

participants believed that individuals are motivated by openness, passion, and creativity, and that they do their best work when they write from the heart. It is particularly notable that The Hacker Ethic appears not in my participants' discussion of their own motivations but in motivations they ascribe to others. A key unanswered question is how these attitudes about Wikipedia contributors are formed — my data provides little insight on this question. And yet the assumption that Wikipedia's editors act on the basis of this new orientation towards work, time, and profit provides support for Himanen and Castells' arguments about the re-organization of work in a networked society.

This finding also sheds light on several key aspects of my participants' relationships with Wikipedia and the people who write it. First, the overriding themes of passion and pro-social motivations may underlie other positive attitudes. For example, perceptions of information quality appear to be more favorable under the assumption that contributors are intrinsically motivated, benevolent sharers. Certainly passionate and interested people can be wrong and biased — several of my participants explicitly added this caveat — but many who believe that intrinsic motivations are the primary driver of participation draw confidence from that fact. They may assume that contributors working in a system of joyous and creative collaboration with others provide more reliable information, especially when they are also motivated by the sincere desire to share what they know and contribute knowledge to the world. My participants were under no illusion that this behavior was motivated by pure altruism. Rather, they explicitly and implicitly referred to the important rewards that they imagine contributors draw from producing and sharing knowledge, participating in a community, or being recognized for their good work.

Many parts of the the internet are (perhaps by necessity) tainted with the faint green tinge of money, a fact which may encourage some to assume self-interested, profit-seeking motives in others. Wikipedia, on the other hand, appears in my participants' minds to be a kind of hallowed ground, an environment whose social and personal rewards are so strong and self-evident that monetary rewards do not even enter the picture. Several participants made mention of the need to “keep the lights on,” so to speak, and recognized the importance of the donation-drives that occasionally appear on Wikipedia. And yet the question of who pays for the servers seemed to be secondary to the question of who creates the knowledge (without which the servers would be unnecessary). As Wikipedia's stock and trade, knowledge appeared to enjoy an unrivaled status of purity and honor. This may partly explain my participants' strong negative reactions to the idea of introducing monetary incentives. Introducing money, they believe, would change everything — it just wouldn't be Wikipedia anymore.

It is notable also that my participants expressed two coherent but potentially conflicting incarnations of the hacker stereotype. They described contributors using the pejorative metaphors of the obsessive, socially isolated computer nerd. And yet they also ascribed to them the unabashedly positive and pro-social characteristics of The Hacker Ethic. Here we have both sides of the hacker coin. The tension between negative and positive imagery here

once again suggests a complicated relationship with Wikipedia and the people who write it — a relationship that is far from established, and is continuing to be negotiated as individuals use Wikipedia and perhaps try their hand at contributing themselves.

6.4.2 The Challenge of Negative Stereotypes

The stereotypes which my participants revealed in their discussion of Wikipedia could have real consequences for the recruitment and development of editors from among the Wikipedia reading population. Just as researchers have argued that negative stereotypes could deter students from engaging in computer education or adopting new technologies (Selwyn, 1998), I argue that the negative stereotypes of Wikipedia contributors may be a deterrent to increased contribution. Many of my participants seemed perfectly willing to participate in small ways, characterizing reading activities which they themselves engaged in as important contributions. However, the negative stereotype of the contributor could introduce a threshold of participation beyond which participation becomes tainted. The detailed and evocative imagery that many used to describe Wikipedia contributors also suggests a clear mental model of who a contributor is. Whether or not these models are based on reality, they may become a self-fulfilling prophecy. Researchers have noted the important role of “vocational stereotypes” (Holland, 1985) or “occupational images” (Gottfredson, 1981) — preconceptions about the nature of specific jobs and the gender, ethnicity, educational background, or other descriptive characteristics of the people who do them. These cultural images are important because they can create a “stereotype bias” that discourages individuals from joining a group or pursuing a vocation.

6.4.3 Conceptualizing Wikipedia’s Social Dilemma

One of the goals of this research has been to explore how the theory of the social dilemma is subjectively perceived by Wikipedia readers and casual editors, I wanted to examine potential differences between how the normative theory conceives of costs, benefits, and decision-making and how individuals conceive of those issues in the context of everyday action. The data presented above adds many nuances to our understanding of how the social dilemma may indeed influence attitudes and behaviors in real-world contexts. My participants simply did not feel that the social dilemma is a problem to be grappled with in the case of Wikipedia. Many are likely to feel that there is no dilemma at all if they are confident that others will pick up the slack. Furthermore, some Wikipedia users are keenly aware that their confidence is not mere speculation, but rather a historical reality borne out by Wikipedia’s continued success over time. In this regard my participants attitudes are similar to those at play in other contexts such as public radio. Listeners may have noticed that even though they never contribute, the occasional funding drives seem to end on time,

and that the broadcast is always available when they turn on the radio. Ultimately, faith in the nameless and faceless crowd of others who contribute led many to feel that there are few consequences for non-contribution. This last point is key for understanding the nature of decision-making in Wikipedia: without the perception of consequences for inaction, one potential reason for acting — the fear of under-provision — is reduced or removed.

Indeed, the faith in others that my participants expressed was one of the most remarkable findings. Many were happy to delegate the job of contributing “to the wind” with full confidence that it would somehow be carried out on everyone’s behalf. This did not appear to be the sign of a lazy attitude or inattention to Wikipedia’s needs, although many participants did mention a lack of time as an important barrier to their own participation. Rather, faith in others’ contribution appears to be part of a deeply held sentiment that was echoed in discussions of many Wikipedia-related topics: that people are basically good, motivated by the rewards of others, and focused on sharing what they know. There was amazing reliance on this unspecified good will. Again, partly this confidence seemed to be justified by Wikipedia’s very existence. How could it exist, after all, if it were not for the good will of the people? This is a key point because my participants did not seem to consider that self-interested motives could be the primary motivating factors for contributors. They did not feel that the personal rewards drawn from status, reputation, attention, narcissism, or catharsis could possibly be enough to explain the volume of contributors on Wikipedia. The only way my participants could make sense of it was to assume that people are motivated by good will, passion for their work, and their fundamentally good natures.

This data also sheds light on the valuable work that readers do. Antin and Cheshire (2010) argue that readers should not all be considered free riders because they may have incomplete information about how Wikipedia works, because they contribute to the system as an audience, and because they use reading as a gateway for future participation. This data provides additional evidence in support of each of these assumptions. First, my participants were open about their lack of knowledge about how Wikipedia works, and several suggested that if they were to learn more about it they might be more likely to contribute. Another participant explained that additional knowledge could have the opposite influence, deterring an expert from participating if she learned how easily her hard work could be un-done. In either case, my participants suggested that what readers know about how the Wikipedia system operates can influence participation. Secondly, many of my participants did not consider reading to be free-riding because of their perception that readers are contributing to the community in other ways. Readers contribute, for example, to the universal quest for knowledge which many believe is Wikipedia’s core mission. They also contribute by expanding Wikipedia’s reach and by sharing information with others who might one day contribute. Though these were largely described as small rewards, in my participants eyes they were significant nonetheless. Finally, several individuals noted that reading can be a first step to contribution:

Karen: “the potential for . . . contribution seems like it would come from somebody who’s reading the Wikipedia entry and who feels that there’s something missing or something that might be inaccurate and then goes in to either change or add additional information.”

This study supports a re-thinking of how social dilemmas work in practice, and highlights that the contextual factors that surround social dilemmas are key. Time and again it was Wikipedia’s character itself that was important to people. My participants cast Wikipedia as a site dedicated to learning, knowledge, and collaboration — important societal goals that we all share (or at least people believe we all share). In another context — one which was not so closely associated with socially rewarding goals — we might see very different dynamics around social dilemma perceptions, assumptions about free-riding, and the potential consequences of inaction. Individuals might also assume more self-interested motives in a domain that is not so closely perceived as a pure, true public good. These contextual factors are an important domain for future study.

6.5 Conclusion

In this qualitative study I have above all focused on documenting *perceptions* and *attitudes* about Wikipedia and the people who write it. These perceptions, I have argued, are often overlooked in analyses of how Wikipedia works and what motivates contribution, and yet they are essential to understanding how people make sense of Wikipedia and how they structure their participation decisions. One of the most important and well-supported findings of this study is that perceptions and decisions about Wikipedia are complex, sometimes contradictory, and very much in flux. Given that Wikipedia has become firmly ensconced in the American cultural, media, and educational landscape, it is tempting to believe that its place is simple and self-evident. We might look at how easily many individuals now turn to Wikipedia as a source of information and assume that they do so un-problematically. This study, however, provides strong evidence of salient tensions about Wikipedia for at least some users.

One way to think about the character of this tension is as a tug of war between abstract and practical notions, or between the theory of Wikipedia and its real life incarnation. Many participants said they liked the idea that anyone could write Wikipedia, and were supportive of Wikipedia’s open model on an abstract level. Those same people, however, turned quickly to the practical challenges of information quality, coordination, and bias which come from that model. Many worried about how individual agendas could shape editing behaviors, and reported that their view towards the information that Wikipedia provides was deeply influenced by their understanding of how Wikipedia is made and maintained. Put differently,

many like the *idea* that Wikipedia could be written by “Joe Schmo” next door, but they were skeptical about Joe himself. The theory of the social dilemma was locked in conflict with what many participants saw as the reality of Wikipedia as it has emerged. Most intuitively understood the notion of the social dilemma, and readily acknowledged that it could be a problem for Wikipedia, while quickly noting that it obviously is not.

Similar tensions were evident in discussions about who, exactly, writes Wikipedia. Again, in the abstract many emphasized their perception that Wikipedia writers and editors could be anyone with information to share or an interest in providing knowledge for the world. In practice, however, the prevailing perception was that although anyone *could* contribute, it is specific types of people who actually *do*. My participants identified intellectuals and geeks as the primary contributors who keep Wikipedia humming, and in doing so illustrated the tension between the theory of open content creation and a reality in which a relatively small number of obsessively invested individuals tend to do and guide most of the work. Tensions between positive ideas about generosity, the human spirit, and the love of knowledge and sharing regularly squared off against descriptions of individuals with negative personal characteristics — closeted obsessives, the real-life hackers who fill their dark and lonely hours with Wiki-work. The strength and constancy of these tensions was one of the most surprising results to come from this study, and much more investigation is needed to uncover how, exactly, these tensions may manifest themselves in behavior on Wikipedia, and influence decisions about participation.

6.6 Figures & Tables

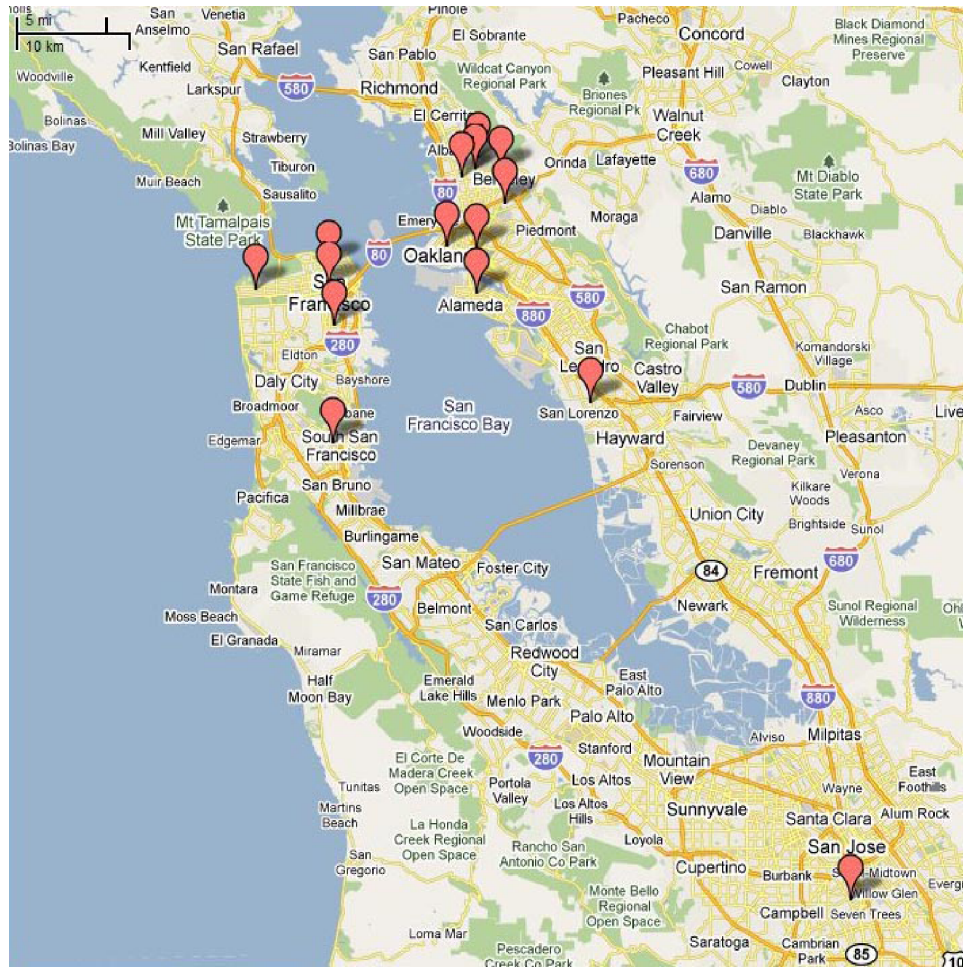


Figure 6.1: The geographical distribution of interview participants in the San Francisco Bay Area.

Complete Qualitative Code List for Stage 2 Analysis	
Code Category	Code
General	Wikipedia Definitions Contribution Behaviors Evolution Information Quality User-Generated
Operational Information	Operational Information Oversight / Administration
Barriers & Enablers	Barriers Enablers Competence
Perceptions of Contributors	Motivations & Incentives Perceptions of Contributors Wikipedia Community
Social Dilemma	Do Readers Contribute? Cash & Contribution Social Dilemma
Responsibility & Guilt	Personal Responsibility Guilt

Table 6.1: A total of 18 codes were associated with 694 quotations. Some quotations were associated with multiple codes.

Educational Levels of Interview Participants	
High School	2
Some College (currently enrolled)	4
Some College (not enrolled)	2
College Graduate	5
Some Postgraduate	3
Postgraduate	4

Table 6.2: Participants had a relatively wide variety of educational backgrounds, ranging from older individuals who had never entered or completed college to others with advanced postgraduate degrees.

Self-reported attitudes about Wikipedia							
	Strongly Disagree	Disagree	Slightly Disagree	Undecided	Slightly Agree	Agree	Strongly Agree
I have a lot of experience with Wikipedia.	0	0	0	5%	15%	40%	40%
I know a lot about Wikipedia.	0	0	5%	10%	25%	35%	25%
I am interested in Wikipedia.	0	0	0	5%	0	40%	55%

Table 6.3: Most participants reported a high level of experience, knowledge, and interest in Wikipedia.

Self-reported Frequency of Use of Wikipedia (per week)					
	Less than 1	1-3 Times	4-6 Times	7-9 Times	10+ Times
Read an Article	0	15%	5%	15%	65%
Edit an Article	20%	40%	20%	10%	10%
Read a Talk Page	25%	15%	25%	5%	30%
Edit a Talk Page	50%	15%	0	10%	25%

Table 6.4: Participants reported reading Wikipedia articles frequently, and editing them infrequently. Many participants also reported reading Wikipedia’s Talk pages on a regular basis, though most reported never or almost never editing Talk pages.

SYNTHESIS, IMPLICATIONS, & CONCLUSION

7.1 Introduction

In this chapter I unify some of the results discussed in previous chapters and provide an overarching discussion of findings. While Chapters 4 and 6 already present results and draw out some of the direct implications of the experimental and qualitative studies (respectively), in this chapter I take a more holistic view. I bring together the qualitative and experimental results and discuss the ways in which they speak to each other. I also reflect on the benefits and challenges of this type of mixed-method study in practice. Next, I present several design implications. In particular I argue that an important design implication of both the experimental and qualitative results is that we should move away from a “one size fits all” model of incentives for online participation, and devote significant attention to developing *adaptive incentive systems* which account for the characteristics of individual users and the contexts in which they interact and collaborate. Finally, I conclude this study by summing up my findings and pointing to directions for future research.

7.2 A Holistic View on Social Operational Information

One of the important benefits of augmenting experimental methods with qualitative work is the potential for improved ecological validity. Qualitative research can help to vet the assumptions which drive experimental design. Furthermore, it can help us understand whether concepts which were central in the lab are also relevant in real-world contexts. In this study *competence* was a foundational concept. So a key issue is what qualitative results have to say about the role of individuals’ perceived competence and their participation in Wikipedia.

Overall, results of the qualitative study suggest that perceptions of competence and comparisons to others with regards to competence are salient in the context of Wikipedia. Implicit

notions of competence and competence comparisons were woven throughout topics of conversation. Social comparisons with respect to skills, knowledge, and legitimacy as experts, contributors, and community members formed a large part of individual perceptions of contributors. The ways in which participants differentiated contributors from themselves — the ways in which they constructed contributors as “the other” — were also largely based on notions of competence. Contributors were intellectuals who had amassed deep academic knowledge on specific topics, or they were “geeks” or “hackers” with high degrees of competence on technical topics related to information technology. In these discussions, participants tended to place themselves at the bottom of a competence hierarchy that was capped off by the caricatured types of contributors that I described in Chapter 6. So, while the explicit language of competence was rarely a part of these discussions, implicit social comparisons based on competence anchored individual perceptions of contributors, and helped many to explain or justify their own reasons for choosing not to participate.

Explicit discussions of competence were less common. Several participants noted forthrightly that feeling incompetent, inexpert, or like they had nothing useful to add was a significant barrier to participation. At least two aspects of competence were mentioned in these direct discussions. First, some participants focused instead on their feelings of incompetence specifically with respect to operational information.

Sean: “. . . at times its like I feel like I dont want to put too much effort into it, and I would be reluctant because I dont know all the nuts and bolts. At first I have to go learn that and then be able to add the information.”

For Sean and several other participants, the most salient barrier was a practical one: a lack of information about how the process of contributing works. Interestingly, however, most participants felt that this kind of barrier could easily be overcome given the time and desire to do so. Secondly, other participants mentioned feeling like they lacked competence related to the content they might add, and so felt that their contribution would not be of sufficient quality to benefit Wikipedia as a whole. Allie, for example, said she did not feel knowledgeable enough on any subject to edit a Wikipedia article. Interestingly, her discussion made explicit comparisons to other contributors who in her imagination could be school-age children. She noted, however, her feeling that even those kids were likely to have more expert knowledge than she felt she had.

There was a division in discussions of competence with respect to content which could shed light on experimental results and point to directions for future study. Some participants expressed their assumption that on any given topic there is likely to be another contributor who is more competent and knowledgeable on the subject. They were content to leave the work of contributing to others, under the assumption that they would do a better job. So,

for these individuals, the social comparison of themselves as having low relative competence, combined with a faith that there were more competent others who would be willing to contribute, encouraged them not to contribute at all. Another group of participants, however, felt that their perception of low competence did not exclude them from being able to help in any way. These individuals typically expressed sentiments such as “every little bit helps.” Donald, for example said “I’m just an old man who don’t know much but I know a little bit.” For these individuals the perception of low relative competence was real, and the implicit deference to more competent others remained. Still, they felt a responsibility to do what little they could to improve Wikipedia on topics of interest.

This duality — between those who use their relatively low competence as a reason not to contribute and those who retain their desire to do their part (however small it may be) despite the perception of low competence — echoes the argument I made regarding the interaction of social value orientation (SVO) and relative competence feedback. Self-interested individuals, I argued, would be more likely to respond to a more personally expensive cost/benefit ratio by deciding that they could not or would not contribute. Pro-social individuals, on the other hand, would be more likely to continue contributing even if it could be more cumbersome (by virtue of low competence) and would be less beneficial to the group. Finding essentially this same dynamic in my participants’ descriptions of Wikipedia lends it additional credibility. It also suggests that the social psychological processes I observed in the laboratory may share much in common with those on Wikipedia, and perhaps on other information pools that share similar characteristics.

Digging even more deeply into my participants’ thoughts about competence also suggests an alternate explanation for the curious and unexpected interaction of SVO and competence feedback on contribution rates. How can we explain the severe drop in contribution rate for pro-social individuals in the low relative competence condition? I discussed this matter at length in Chapter 4, suggesting both that differing reactions to social information in an interdependent, collaborative situation was a key factor and that a “basement effect” made it hard to observe true comparisons between pro-social and self-interested participants. Qualitative findings suggest another possibility. Some participants went beyond saying simply that due to low competence they felt comfortable leaving the job to other contributors; they also worried that their less competent contributions would actually do harm. Could a similar worry explain the drop in contribution for pro-social individuals in the low competence condition? The belief that low competence contributions would actually harm the group should lead to a more drastic drop in contributions for pro-social individuals in the low competence condition compared to self-interested individuals. And this is indeed the pattern I observed. Importantly, this explanation would only hold in situations where participants believe that less competent contributions would actually damage group outcomes. While the experimental task was not technically structured in this way — every contribution, even from a less competent individual, would benefit the group to at least some degree — a review of experimental instructions suggests there was some ambiguity. So, the observed results may be partly a result of a misperception of the experimental situation.

If this is indeed the case, it could reveal an interesting pattern of response to incomplete operational information. The potential ambiguity around whether contributions could actually harm group outcomes is likely to be found in many real-world systems. Importantly, an individual's perception of this will depend on what she knows about how the online system operates. Could a low competence contributor harm to the group? If so, in what ways? What could the possible consequences be? How easy would it be for others to repair damage that could be caused by lower competence individuals? Information that relates to these questions could have a profound influence on patterns of participation. Participants may have exercised a kind of motivated reasoning based on their SVO, ultimately choosing the course of action they deemed least risky given their preference for their own or others rewards. For those less predisposed to consider the rewards of others (self-interested participants), the risk that their contribution would harm the group could be diminished or less salient in the low competence condition. For those more concerned with others' outcomes (pro-social participants), the risk that their own low competence could harm group outcomes encouraged them not to contribute. Future research could examine this issue, altering the experimental situation by deliberately emphasizing whether low competence contributions could harm the group and looking for changes in contribution behavior.

A second key area in which qualitative and experimental findings can speak to each other is on the topic of social responsibility. In the experimental portion of this study I argued that social responsibility — a social norm that those who are more able to help should do so and that those who are less able can rely on others — mediates the competence-contribution relationship. Experimental results provide strong support for this argument. I also discussed the debate over social responsibility, and at what level of generality or specificity it is likely to operate.

Participants in the qualitative study discussed the issue of social responsibility in several ways which reveal a tension between the abstract and the specific. Most participants said they believe there is no explicit expectation or responsibility of individuals to contribute. Few thought that a sense of guilt is appropriate for individuals who choose not to contribute. The notion that Wikipedia is entirely voluntary, and that people should do only what they feel comfortable doing, was repeated many times. At the same time, my participants' believed that the primary consequence of non-contribution is that the group would suffer because of a lack of access to information that goes un-shared. Attention to the danger that important knowledge would not find its way to Wikipedia suggests an underlying belief that it is our responsibility to share what we know. Several other types of comments revealed an underlying idea that those who have knowledge should do their part, that it is their duty to help the group. This belief may have been magnified for individuals who put special emphasis on Wikipedia's importance as a repository for information, knowledge, and history. Many others cast sharing individual knowledge for the benefit of the group as an unequivocally important and pro-social act. Together, these ideas illustrate a tension between specific and abstract responsibility. On one hand, nearly all participants felt that no one should feel an obligation to contribute or guilt for choosing not to. On the other hand, the responsibility of

sharing knowledge for mankind was repeatedly pointed to in more or less subtle ways. Future research should focus on teasing apart abstract and specific notions of social responsibility in online collective action.

7.3 The Marriage of Experimental & Qualitative

Few mixed-methods studies appear to have specifically combined qualitative and experimental methods, if the lack of available literature is any indication. One reason for the dearth of such studies may be the challenge of integrating research methods that rely on distinct epistemologies. In their discussion of combining multiple research paradigms, Greene and Caracelli (2002) focus on the challenges of integrating not just data collection and analysis methods, but multiple philosophies of science and ways of understanding the social and culture world. Greene and Caracelli contend that many theorists of mixed-methods wrongly conclude that quantitative and qualitative methods rely on incompatible epistemologies. Drawing from prior debates on mixed methods, it is reasonable to argue that experimental and qualitative research do generally rely on different epistemologies, or what Creswell and Clark (2007) call “worldview stances.” While experimental research is usually situated in a positivist or post-positivist tradition, qualitative research may be situated in an interpretivist tradition. However, Greene and Caracelli (2002) argue that while these epistemologies are often portrayed as in conflict, a dialectic view allows researchers to “invite the juxtaposition of opposed or contradictory ideas, to interact with the tensions invoked by these contesting arguments” (pp. 96–97) and to acknowledge that “all paradigms are valuable. . . [and] use of multiple paradigms leads to better understandings” (pp. 96).

A key element of a dialectic approach to research methods is to recognize the ways in which different epistemologies and practices of research can be influential and potentially challenging. In the social psychological tradition, experimental studies are focused on tightly controlling experimental conditions in order to make causal claims about the influence of specific interventions. In service of such a high degree of control, experiments make necessary simplifications of real-world systems, and abstract processes such that they can be reproduced in the laboratory. In the lab, then, much relies on the experimenter’s assumptions, theories, and points of view as he develops experimental interactions and operationalizes key concepts.

Qualitative research, on the other hand, proceeds from a point of view that is in many ways the polar opposite. The purpose of qualitative research — at least the ethnographically-informed version of it that I have practiced in this study — is to capture the deep complexity of lived experience, and to understand that experience from the point of view of those whom we study. The object is not control and causality, but rather to capture and categorize ideas and practices as they exist in the real world through “thick description” (Geertz, 1973). This

mode of research puts the emphasis on participants' own points of view, and aims primarily to uncover through rigorous analysis of events and discourse the underlying habits, practices, values, and beliefs that influence daily life.

As a challenge for mixed-method researchers, the juxtaposition of qualitative and experimental methods is similar to the juxtaposition of qualitative methods with any quantitatively-oriented method. The challenge may be even greater, however, because qualitative and experimental stances can live at opposite ends of the inductive–deductive spectrum. As a matter of practical research planning, I underestimated the difficult process of switching between qualitative and experimental stances during both data collection and analysis phases. Especially during the qualitative analysis phase, it was difficult to move away from deductive arguments based on social-psychological theory and focus on my participants' own world-views. Over time I found a balance between inductive and deductive by beginning with a set of conceptual categories, but allowing those categories only to act as a rough guide for research. The set of qualitative findings described in Chapter 5 do not map perfectly (or perhaps even recognizably) to the 4 conceptual categories that informed qualitative data collection. I do not view this as a weakness, however, but rather a necessary compromise borne from the difficult melding of epistemologies in tension with each other.

Any time two or more methods are involved in a study there can also be a festering question of internal power dynamics: does one method “serve” the other? Is there a “primary” and a “secondary” method, or can two forms of inquiry and their related research questions share equal status in a research project? Creswell (2003) suggests two different models for mixed-methods research design that address this issue. First, he defines a “Concurrent Triangulation Strategy” as one in which the researcher uses multiple concurrent methods to address a research problem as a means of triangulating data and offsetting the weaknesses of each method. In practice, however, it can be difficult for two methods to share equal priority. Creswell notes that “ideally, the priority would be equal between the two methods, but in practical application the priority may be given to either. . .” Creswell (2003, p. 217). A “Concurrent Nested Strategy,” on the other hand, explicitly recognizes that one method is dominant and guides the research project.

I began this project with the intention that the qualitative and experimental work would be equal partners. In retrospect, however, it is clear that the social psychological point of view was dominant. As a practical matter of ordering, experimental design came first, and the meticulous work of theory and hypothesis-building was heavily influential in setting the tone of the project and informing the design of the interview protocol. A key implication for future research, then, is to consider the consequences of seemingly mundane or practical decisions such as the ordering of methods, and how those factors can influence the structure of research designs and the character of research outcomes. Placing the social psychological, experimental paradigm first certainly tilted qualitative research questions and analysis towards topics of interest to social psychology. A reflective methodological strategy might ultimately have taken on the same structure, but done so with deliberate foresight and understanding of the potential biases.

7.4 Design Implications: The Case for Adaptive Incentive Systems

This study has placed social operational information at the core of how relative competence feedback works to influence contribution rates. Like many types of incentives, relative competence feedback relies on what individuals think and believe about others in the group. An overarching finding of this study that unifies the qualitative and experimental phases is that people can and do hold very different attitudes about other contributors, their competence, their characteristics, their motivations, and their likelihood of contributing. A key implication of this finding is that, because of the diversity in these attitudes and the fact that they can be central to the operation of incentives for participation, future designs for online incentives systems should adapt to individuals' attitudes and knowledge and present customized incentives.

Current incentive systems rely heavily on social comparisons: competitive rankings, points and levels, and badges / labels all rely on keeping track of participants contributions and comparing them to others along a given dimension. While there is great diversity in how these systems are implemented, they all suffer from a key weakness: their design assumes that everyone will respond similarly to each incentive. This research adds to a growing body of research suggesting that this is not the case. The manner in which incentives operate — indeed whether they encourage or discourage participation, or have no effect at all — can hinge on a variety of social psychological attitudes and dispositions.

This study has illustrated that one such moderating attitude is social value orientation. As I have already suggested, SVO may influence the operation of a variety of other rewards that rely on social comparisons. Furthermore, there are likely to be many more — and many more specific — attitudes which moderate the influence of incentives. Stable dispositions that relate to issues such as trust, caution, fairness, and equity may also moderate the effect of many incentives. Similarly important for designing adaptive incentive systems is accounting for mediating attitudes, especially as those attitudes may themselves relate to dispositional characteristics such as SVO. I have highlighted the importance of social responsibility and group benefit self-efficacy, but there are likely to be many more.

Little attention has thus far been paid to the design of adaptive systems. Going forward, it will be essential to take a mixed-methods approach to design research. Laboratory experiments are necessary to explore causal relationships in controlled conditions. Qualitative studies will give those relationships context and enhance their ecological validity. Surveys can help connect behavioral patterns, attitudes, and dispositions, and provide clues to moderating and mediating social psychological factors. Finally, large-scale design interventions and field studies will allow for the exploitation of these issues in the real-world contexts.

Several other overarching design implications are also important to mention. First, both phases of this study have suggested that what potential contributors think about others in the collaborative group is key to attitudes about behavior. The qualitative study in particular illustrated that negative stereotypes of contributors could be a real challenge for promoting more contribution to Wikipedia. Wikipedia is similar to other information pools (e.g. other wikis, open-source software) in that it embodies a deliberate decision to hide the identities of individual authors in favor of a kind of collective authorship. This decision in favor of collective authorship has many consequences. An important one may be that removing a sense of authorship from collaboratively created content could allow for other users to take what little they know or believe about other contributors and then engage in a kind of free association. In the absence of other specific information, this process may encourage some to fill in the gaps with stereotypes such as the “geek” or the “hacker” which are common in popular media and associated with the domain of the web and information technology. Theories of computer-mediated communication such as “hyperpersonal communication” (Walther, 1996) suggest this process occurs often in online communication, although the effect is usually positive rather than negative.

Understanding these negative stereotypes is key for systems like Wikipedia since, as I discussed in Chapter 6, they can be a formidable barrier to participation. Short of redesigning these systems to recapture the notion of the individual author, one response might be to promote a kind of “meet the author” informational campaign which highlights the identities of heavy contributors. Bringing potential contributors closer to actual contributors could encourage them to make positive rather than negative attributions given incomplete information, and to identify with them more strongly. While enhancing group identification has the potential to increase detrimental effects such as social loafing (Latane et al., 1979), it may be that non-optimal contribution is better than no contribution at all. The effects of providing more information about contributors is also likely to be inconsistent across users for many reasons that I have just discussed.

Another design implication concerns the potential connections between perceptions of competence and territorial behavior in online systems. In a quasi-experimental study of a collaborative image tagging system Thom-Santelli et al. (2010) found that more expert taggers were more likely to exhibit territorial behavior, maintaining and defending the topic areas and terminologies that corresponded to their perceived areas of expertise. Similar behaviors have also been observed in the context of Wikipedia (Thom-Santelli et al., 2009). While there are both negative and positive consequences to territorial behavior in collaborative systems, encouraging limited territoriality aimed at specific goals could be beneficial. Providing social comparisons such as relative competence feedback could help to temper territorial behavior by encouraging and discouraging perceptions of relative competence among different contributors. In other words, relative competence feedback could help to tame potentially destructive or overly defensive behavior on the part of contributors who have overly positive perceptions of their own competence by showing them how they truly compare to others.

7.5 Conclusion

In this dissertation I have explored the variety of ways that social operational information — information and perceptions about other who work in a collaborative system — is important to understanding online participation. In an experimental study I examined how a particular kind of social operational information, relative competence feedback, can influence contribution to collective outcomes. Results showed that low competence feedback in particular significantly reduced contribution rates overall, but also that the pattern of effects differed as a function of the participants' social value orientation. I demonstrated that social attitudes about one's own and others' abilities and responsibilities in inter-dependent situations, specifically social responsibility and group benefit self-efficacy, mediated the competence-contribution relationship. In a qualitative case study of Wikipedia I described a variety of tensions that stem from what people know and believe about others who work in the collaborative system. I argued that many individuals remain uneasy with the user-generated process and their own role within it. My participants believed that contributors do good, valuable, and pro-social work, and that they are driven by passion, excitement, and a genuine desire to share with others. At the same time, however, they ascribed negative characteristics to those people, and caricatured them as intellectuals, geeks, and hackers, despite an abstract ideology of “the contributor as everyone.”

Together, I believe these findings are an important step in our understanding of how information about and perceptions of others are key to our online collaborative experiences. Partly through technological innovations and partly through evolving social and cultural patterns, the web has become a fundamentally collaborative place. There is increasing pressure to put communication, group-ness, and interactivity at the center of online activities and products in entertainment, government, and media. Huge amounts of content are being produced and shared in environments that are rich with information about others and through information presentations that highlight social presence and social comparison. In this environment, understanding how social operational information and the perceptions about others they engender can influence behaviors and attitudes will allow us to better harness the social Web. Up to this point, arguably, innovation has been swept along in the wake of the user-generated, peer-produced tidal wave. But as we reach saturation with this new and evolving form of production of exchange, it will be necessary to harness that wave rather than simply to ride it. I believe that social psychological insights such as those presented in this study are a key first step in that direction. Researchers should focus not merely on how incentives work, but why. Future research should identify the ways in which specific social psychological attitudes and dispositions can have a powerful influence on motivation and behavior. With ongoing basic research and design I believe a better understanding of social information online, in the context of massive collaborative systems, has the power to improve the user experience, create better content, and produce collective outcomes that are more beneficial for everyone.

REFERENCES

- Adamic, Lada A., Jun Zhang, Eytan Bakshy, and Mark S. Ackerman. 2008. "Knowledge sharing and yahoo answers: everyone knows something." In *Proceeding of the 17th international conference on World Wide Web*, pp. 665–674, Beijing, China. ACM.
- Agar, Michael. 1980. *The Professional Stranger : An Informal Introduction to Ethnography*. New York: Academic Press.
- Akerlof, George. 1970. "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism." *The Quarterly Journal of Economics* 84:488–500.
- Alicke, M.D. and O. Govorun. 2005. "The Better-than-Average Effect." In *The Self in Social Judgment*, edited by Mark D. Alicke, David Dunning, and Joachim I. Krueger. New York, NY: Psychology Press.
- Ames, Morgan and Mor Naaman. 2007. "Why we tag: motivations for annotation in mobile and online media." In *Proceedings of the SIGCHI conference on Human factors in computing systems*, pp. 971–980, San Jose, California, USA. ACM.
- Antin, Judd. 2009. "Motivated by information: information about online collective action as an incentive for participation." In *Proceedings of the ACM 2009 international conference on Supporting group work*, pp. 371–372, Sanibel Island, Florida, USA. ACM.
- Antin, Judd and Coye Cheshire. 2010. "Readers are not free-riders: reading as a form of participation on wikipedia." In *Proceedings of the 2010 ACM conference on Computer supported cooperative work*, pp. 127–130, Savannah, Georgia, USA. ACM.
- Ariely, Dan. 2008. *Predictably Irrational: The Hidden Forces That Shape Our Decisions*. HarperCollins, 1st edition.
- Axelrod, Robert M. 1984. *The evolution of cooperation*. New York: Basic Books.
- Bandura, Albert. 1993. "Perceived Self-Efficacy in Cognitive Development and Functioning." *Educational Psychologist* 28:117.
- Bandura, Albert. 1994. "Self-Efficacy." In *Encyclopedia of Human Behavior*, edited by V.S. Ramachaudran, volume Vol. 4, pp. 71–81. San Diego, CA: Academic Press.
- Bandura, Albert. 2006. "Guide for Constructing Self-Efficacy Scales." In *Self-Efficacy Beliefs of Adolescents*, edited by Frank Pajares and Timothy C. Urdan, pp. 307–337. Greenwich, CT: Information Age Publishing.

- Bandura, A., C. Barbaranelli, G.V. Caprara, and C. Pastorelli. 1996. "Multifaceted impact of self-efficacy beliefs on academic functioning." *Child development* 67:1206–1222.
- Bandura, A. et al. 1977. "Self-efficacy: Toward a unifying theory of behavioral change." *Psychological review* 84:191–215.
- Bargh, John A, Mark Chen, and Lara Burrows. 1996. "Automaticity of social behavior: Direct effects of trait construct and stereotype activation on action." *Journal of Personality and Social Psychology*. Vol. 71(2) 71:230–244.
- Baron, Reuben M and David A Kenny. 1986. "The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations." *Journal of Personality and Social Psychology*. Vol. 51(6) 51:1173–1182.
- Barry, Brian and Russell Hardin. 1982. *Rational man and irrational society? : an introduction and sourcebook*. Beverly Hills: Sage Publications.
- Batson, Daniel, Paul A. M Van Lange, Nadia Ahmad, and David A. Lishner. 2007. "Altruism and Helping Behavior." In *The SAGE Handbook of Social Psychology: Concise Student Edition*, edited by Michael A. Hogg and Mr. Joel M. Cooper. Sage Publications Ltd, student edition.
- Baumeister, Roy F., Jennifer D. Campbell, Joachim I. Krueger, and Kathleen D. Vohs. 2003. "Does high self-esteem cause better performance, interpersonal success, happiness, or healthier lifestyles?" *Psychological Science in the Public Interest* 4:1–44.
- Bem, Daryl J and Charles G Lord. 1979. "Template matching: A proposal for probing the ecological validity of experimental settings in social psychology." *Journal of Personality and Social Psychology*. Vol. 37(6) 37:833–846.
- Benkler, Yochai. 2006. *The Wealth of Networks*. New Haven, CT: Yale University Press.
- Berkowitz, L. and L. Berkowitz. 1972. "Social Norms, Feelings, and Other Factors Affecting Helping and Altruism." In *Advances in Experimental Social Psychology*, volume 6, pp. 63–108. New York, NY: Academic Press.
- Berkowitz, L. and W. H Connor. 1966. "Success, failure, and social responsibility." *Journal of Personality and Social Psychology* 4:664–669.
- Berkowitz, L. and L. R Daniels. 1964. "Affecting the salience of the social responsibility norm: Effects of past help on the response to dependency relationships." *Journal of Abnormal and Social Psychology* 68:275–281.
- Blau, Peter Michael. 1964. *Exchange and power in social life*. New York: J. Wiley.
- Bollen, Kenneth A. and Robert Stine. 1990. "Direct and Indirect Effects: Classical and Bootstrap Estimates of Variability." *Sociological Methodology* 20:115–140. ArticleType: primary_article / Full publication date: 1990 / Copyright 1990 American Sociological Association.

- boyd, danah. 2006. "A Blogger's Blog: Exploring the Definition of a Medium." *Reconstruction: Studies in Contemporary Culture* 6.
- Brewer, Marilynn B. 2000. "Research Design and Issues of Validity." In *Handbook of Research Methods in Social and Personality Psychology*. Cambridge, UK: Cambridge University Press.
- Brewer, Marilynn B. and Roderick M. Kramer. 1986. "Choice Behavior in Social Dilemmas: Effects of Social Identity, Group Size, and Decision Framing." *Journal of Personality and Social Psychology* 50:543–549.
- Brown, J. 1986. "Evaluations of self and others: Self-enhancement biases in social judgements." *Social Cognition* 4:353–376.
- Bryant, Susan L., Andrea Forte, and Amy Bruckman. 2005. "Becoming Wikipedian: transformation of participation in a collaborative online encyclopedia." In *Proceedings of the 2005 international ACM SIGGROUP conference on Supporting group work*, pp. 1–10, Sanibel Island, Florida, USA. ACM.
- Buchanan, James M. 1965. "An Economic Theory of Clubs." *Economica* 32:1–14.
- Burke, Moira and Robert Kraut. 2008. "Mopping up: modeling wikipedia promotion decisions." In *Proceedings of the 2008 ACM conference on Computer supported cooperative work*, pp. 27–36, San Diego, CA, USA. ACM.
- Camerer, Colin and Martin Weber. 1992. "Recent Developments in Modeling Preferences: Uncertainty and Ambiguity." *Journal of Risk and Uncertainty* 5:325–370.
- Campbell, D. and D.w. Fiske. 1959. "Convergent and Discriminant Validation by the Multitrait-Multimethod Matrix." *Psychological Bulletin* 56:81–105.
- Caprara, Gian Vittorio. 2002. "Personality Psychology: Filling the Gap Between Basic Processes and Molar Functioning." In *Psychology at the Turn of the Millennium, Volume 2: Social, Developmental and Clinical Perspectives*, edited by Lars Backman and Claes von Hofsten, pp. 201–224. Psychology Press.
- Caprara, Gian Vittorio, Guido Alessandri, Laura Di Giunta, Laura Panerai, and Nancy Eisenberg. 2010. "The contribution of agreeableness and self-efficacy beliefs to prosociality." *European Journal of Personality* 24:36–55.
- Carlson, Michael, Ventura Charlin, and Norman Miller. 1988. "Positive mood and helping behavior: A test of six hypotheses." *Journal of Personality and Social Psychology*. Vol. 55(2) 55:211–229.
- Castells, Manuel. 1996. *The Information Age: Economy, Society and Culture. Vol. 1: The Rise of the Network Society*. Malden, Mass.: Blackwell.
- Charlton, Bruce G. 1997. "The Inequity of Inequality: Egalitarian Instincts and Evolutionary Psychology." *J Health Psychol* 2:413–425.

- Charmaz, Kathy. 2006. *Constructing Grounded Theory*. Thousand Oaks, CA: Sage Publications.
- Cheshire, C. 2007. "Selective Incentives and Generalized Information Exchange." *Social Psychology Quarterly* 70:82–100.
- Cheshire, C. and J. Antin. 2007. "Producing Online Information Pools: The Effects of Social Psychological Incentives on Repeat Contributions." In *IIS Symposium on Self-Organizing Online Collective Action*, Ithaca, NY.
- Cheshire, C. and J. Antin. 2008. "The Social Psychological Effects of Feedback on the Production of Internet Information Pools." *Journal of Computer Mediated Communication* 13:705727.
- Cheshire, C. and J. Antin. 2009. "Order, Coordination and Uncertainty." In *Trust and Reputation*, edited by K. S. Cook, C. Snijders, V. Buskins, and C. Cheshire, pp. 266–291. New York, NY: Russell Sage Foundation Publications.
- Cialdini, Robert B and Douglas T Kenrick. 1976. "Altruism as hedonism: A social development perspective on the relationship of negative mood state and helping." *Journal of Personality and Social Psychology*. Vol. 34(5) 34:907–914.
- Coase, Ronald. 1937. "The Nature of the Firm." *Economica* 4:386–405.
- Cohen, A.P. 1985. *The Symbolic Construction of Community*. London, UK: Routledge.
- Cook, K. S. and R. M. Emerson. 1978. "Power, Equity and Commitment in Exchange Networks." *American Sociological Review* 43:721–739.
- Cook, K. S., Russell Hardin, and Margaret Levi. 2005. *Cooperation Without Trust?* New York, NY: Russell Sage Publications.
- Cooper, Mark. 2006. "From Wifi to Wikis and Open Source." *Journal on Law and High Technology* 5:125–158.
- Creswell, John. 2003. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. Thousand Oaks, CA: Sage Publications.
- Creswell, John. 2009. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. Thousand Oaks Calif.: Sage Publications, 3rd ed. edition.
- Creswell, John and V.L. Plano Clark. 2007. *Designing and Conducting Mixed Methods Research*. Thousand Oaks, CA: Sage Publications.
- Creswell, John, V.L. Plano Clark, M. Gutmann, W. Hanson, A. Tashakkori, and C. Teddlie. 2003. "Advanced Mixed Methods Research Design." In *Handbook of Mixed Methods in Social and Behavioral Research*, pp. 209–240. Thousand Oaks, CA: Sage Publications.
- Curley, Shawn P., J. Frank Yates, and Richard A. Abrams. 1986. "Psychological sources of ambiguity avoidance." *Organizational Behavior and Human Decision Processes* 38:230–

- Darlington, Richard B and Clifford E Macker. 1966. "Displacement of guilt-produced altruistic behavior." *Journal of Personality and Social Psychology*. Vol. 4(4) 4:442-443.
- Dawes, R.M., D.R. Brown, and Smith J.E.K. 1991. "Social dilemmas, economic self-interest and evolutionary theory." In *Recent Research in Psychology: Frontiers of Mathematical Psychology: Essays in Honor of Clyde Coombs*, pp. 53-79. New York, NY: Springer-Verlag.
- De Cremer, David and Paul A. M. Van Lange. 2001. "Why prosocials exhibit greater cooperation than proselves: the roles of social responsibility and reciprocity." *European Journal of Personality* 15:S5-S18.
- Deci, E.L. 1971. "Effects of Externally Mediated Rewards on Intrinsic Motivation." *Journal of Personality and Social Psychology* 18:105-115.
- Deci, E.L. 1972. "Intrinsic Motivation, Extrinsic Reinforcement, and Inequity." *Journal of Personality and Social Psychology* 22:113-120.
- Deci, Edward L. 2002. "An Overview of Self-Determination Theory: An Organismic-Dialectical Perspective." In *The Handbook of Self-Determination Research*, pp. 3-36. Rochester, NY: University of Rochester Press, 1st edition.
- Denzin, N.K. 1970. *The Research Act: A Theoretical Introduction to Sociological Methods*. Chicago, Illinois: Aldine Publishing.
- Ekeh, Peter Palmer. 1974. *Social exchange theory : the two traditions*. London: Heinemann Educational.
- Emerson, R M. 1976. "Social Exchange Theory." *Annual Review of Sociology* 2:335-362.
- Emerson, R. M., J. Berger, M. Zelditch Jr., and B. Anderson. 1972. "Exchange Theory, Parts I-II: A Psychological Basis for Social Exchange and Exchange Relations in Network Structures." In *Sociological Theories in Progress*, pp. 38-87. Boston, MA: Houghton Mifflin.
- Fehr, Ernst and Urs Fischbacher. 2002. "Why Social Preferences Matter: The Impact of Non-Selfish Motives on Competition, Cooperation and Incentives." *The Economic Journal* 112:C1-C33.
- Fisher, Danyel, Marc Smith, and Howard T. Welser. 2006. "You Are Who You Talk To: Detecting Roles in Usenet Newsgroups." In *Proceedings of the 39th Annual Hawaii International Conference on System Sciences - Volume 03*, p. 59.2. IEEE Computer Society.
- Form, William Humbert and Sigmund Nosow. 1958. *Community in Disaster*. New York, NY: Harper.
- Frey, Bruno S. 1997. *Not just for the money : an economic theory of personal motivation*. Cheltenham, UK; Brookfield, Vt.: Edward Elgar Pub.

- Fulk, Janet, Andrew J. Flanagin, Michael E. Kalman, Peter R. Monge, and Timothy Ryan. 1996. "Connective and Communal Public Goods in Interactive Communication Systems." *Communication Theory* 6:60–87.
- Gecas, V. 1989. "The social psychology of self-efficacy." *Annual review of sociology* 15:291–316.
- Geertz, Clifford. 1973. *The Interpretation of Cultures: Selected Essays*. New York, NY: Basic Books.
- Gigerenzer, Gerd. 2007. *Gut Feelings: The Intelligence of the Unconscious*. Viking Adult, 1 edition.
- Glance, N. and B. Huberman. 1994. "The Dynamics of Social Dilemmas." *Scientific American* pp. 76–81.
- Golder, Scott A. and Bernardo A. Huberman. 2006. "Usage patterns of collaborative tagging systems." *Journal of Information Science* 32:198–208.
- Goodenough, Ward Hunt. 1970. *Description and comparison in cultural anthropology*. Aldine Pub. Co, 1st ed. edition.
- Gordon, H. Scott. 1954. "The Economic Theory of a Common-Property Resource: The Fishery." *Journal of Political Economy* 62:124.
- Gosling, Samuel D., Peter J. Rentfrow, and William B. Swann. 2003. "A very brief measure of the Big-Five personality domains." *Journal of Research in Personality* 37:504–528.
- Gottfredson, Linda S. 1981. "Circumscription and compromise: A developmental theory of occupational aspirations." *Journal of Counseling Psychology* 28:545–579.
- Gray-Little, Bernadette, Valerie S. L. Williams, and Timothy D. Hancock. 1997. "An Item Response Theory Analysis of the Rosenberg Self-Esteem Scale." *Personality and Social Psychology Bulletin* 23:443–451.
- Greene, Jennifer C. and Valerie J. Caracelli. 2002. "Making Paradigmatic Sense of Mixed Methods Practice." In *Handbook of Mixed Methods Social and Behavioral Research*, pp. 91–110. Sage Publications, Inc, 1st edition.
- Griesinger, Donald W. and James W. Livingston. 1973. "Toward a Model of Interpersonal Motivation in Experimental Games." *Behavioral Science* 18:173–188.
- Hardin, Russell. 1982. *Collective Action*. Baltimore, MD: Johns Hopkins University Press.
- Harper, F., Sherry Xin Li, Yan Chen, and Joseph Konstan. 2007. "Social Comparisons to Motivate Contributions to an Online Community." In *Persuasive Technology*, pp. 148–159. Springer.
- Harter, S. 1978. "Effectance motivation reconsidered: Toward a developmental model." *Human development* 21:3464.

- Heath, Chip and Amos Tversky. 1991. "Preference and Belief: Ambiguity and Competence in Choice Under Uncertainty." *Journal of Risk and Uncertainty* 4:5–28.
- Herring, Susan C., Lois Ann Scheidt, Sabrina Bonus, and Elijah Wright. 2004. "Bridging the Gap: A Genre Analysis of Weblogs." *Hawaii International Conference on System Sciences* 4:40101b.
- Herz, J. 1997. *Joystick nation : how videogames ate our quarters, won our hearts, and rewired our minds*. Boston: Little Brown and Co., 1st ed. edition.
- Himanen, Pekka. 2001. *The hacker ethic, and the spirit of the information age*. New York: Random House, 1st ed. edition.
- Holland, John. 1985. *Making vocational choices: a theory of vocational personalities and work environments*. Englewood Cliff NJ: Prentice-Hall, 2nd ed. edition.
- Homans, George C. 1958. "Social Behavior as Exchange." *American Journal of Sociology* 63:597–606.
- Ipeirotis, Panos. 2008. "Why People Participate on Mechanical Turk." <http://behind-the-enemy-lines.blogspot.com/2008/09/why-people-participate-on-mechanical.html>.
- Isen, Alice M, Nancy Horn, and D. L Rosenhan. 1973. "Effects of success and failure on children's generosity." *Journal of Personality and Social Psychology*. Vol. 27(2) 27:239–247.
- Java, Akshay, Xiaodan Song, Tim Finin, and Belle Tseng. 2007. "Why we twitter: understanding microblogging usage and communities." In *Proceedings of the 9th WebKDD and 1st SNA-KDD 2007 workshop on Web mining and social network analysis*, pp. 56–65, San Jose, California. ACM.
- Johnson, George. 2007. "King Algorithm: An Oracle for Our Time, Part Man, Part Machine." *New York Times* Week in Review.
- Jr., M. Zelditch. 1968. "Can You Really Study an Army in the Laboratory?" In *Complex Organizations: A Sociological Reader*, edited by A. Etzioni, pp. 528–539. New York, NY: Holt, Rinehart, and Winston, 2nd edition.
- Jrgen, Bitzer, Schrettl Wolfram, and J. H. Schrder Philipp. 2005. "Intrinsic Motivation in Open Source Software Development." Technical report, EconWPA.
- Kahneman, Daniel. 2003. "Maps of bounded rationality: psychology for behavioral economics." *The American Economic Review* 93:1449–1475.
- Kalman, Michael E., Peter Monge, Janet Fulk, and Rebecca Heino. 2002. "Motivations to Resolve Communication Dilemmas in Database-Mediated Collaboration." *Communication Research* 29:125–154.

- Katz, I. and R. Glen Hass. 1988. "Racial ambivalence and American value conflict: Correlational and priming studies of dual cognitive structures." *Journal of Personality and Social Psychology* 55:893–905.
- Kazdin, Alan E. and James H. Bryan. 1971. "Competence and volunteering." *Journal of Experimental Social Psychology* 7:87–97.
- Kelley, Harold. 1978. *Interpersonal relations : a theory of interdependence*. New York: Wiley.
- Kendall, Lori. 1999. "'The Nerd Within': Mass Media and the Negotiation of Identity Among Computer-Using Men." *The Journal of Men's Studies* 7:353–369.
- Kittur, A., E. Chi, B.A. Pendleton, B. Suh, and T. Mytkowicz. 2007. "Power of the few vs. wisdom of the crowd: Wikipedia and the rise of the bourgeoisie." *World Wide Web* 1:19.
- Kollock, P. 1994. "The Emergence of Exchange Structures - an Experimental-Study of Uncertainty, Commitment, and Trust." *American Journal of Sociology* 100:313–345.
- Kollock, P. 1998. "Social Dilemmas: The Anatomy of Cooperation." *Annual Review of Sociology* 24:183–214.
- Kollock, Peter, Marc Smith, and Peter Kollock. 1999. "The economies of online cooperation: Gifts and public goods in cyberspace." In *Communities in cyberspace*, pp. 220–242. London: Routledge.
- Kraut, Robert, Sara Kiesler, Bonka Boneva, Jonathon Cummings, Vicki Helgeson, and Anne Crawford. 2002. "Internet Paradox Revisited." *Journal of Social Issues* 58:49–74.
- Krebs, Dennis L. 1970. "Altruism: An examination of the concept and a review of the literature." *Psychological Bulletin*. Vol. 73(4) 73:258–302.
- Kriplean, Travis, Ivan Beschastnikh, and David W. McDonald. 2008. "Articulations of wikiwork: uncovering valued work in wikipedia through barnstars." In *Proceedings of the 2008 ACM conference on Computer supported cooperative work*, pp. 47–56, San Diego, CA, USA. ACM.
- Kruger, J. 1999. "Lake Wobegon be gone! The "below-average effect" and the egocentric nature of comparative ability judgments." *Journal of Personality and Social Psychology* 77:221–32.
- Kruglanski, Arie W. 1980. "Lay epistemo-logicprocess and contents: Another look at attribution theory." *Psychological Review*. Vol. 87(1) 87:70–87.
- Kuhlman, D. Michael and Alfred F.J. Marshello. 1975. "Individual differences in game motivation as moderators of preprogrammed strategy effects in prisoner's dilemma." *Journal of Personality and Social Psychology* 32:922–931.
- Kunda, Ziva. 1990. "The case for motivated reasoning." *Psychological Bulletin*. Vol. 108(3)

108:480–498.

- Kuznetsov, Stacey. 2006. “Motivations of contributors to Wikipedia.” *SIGCAS Computers and Society* 36:1.
- Kvale, Steinar. 1996. *Interviews : an introduction to qualitative research interviewing*. Thousand Oaks Calif.: Sage Publications.
- Lakhani, K. R. and E. von Hippel. 2003. “How open source software works: ”free” user-to-user assistance.” *Research Policy* 32:923–943.
- Lakhani, K. R., Robert G. Wolf, J. Feller, B. Fitzgerald, S. Hissam, and K. R. Lakhani. 2005. “Why Hackers Do What They Do: Understanding Motivation and Effort in Free/Open Source Software Projects.” In *Perspectives on Free and open Source Software*, pp. 3–22. Cambridge, Mass: MIT Press.
- Lange, Paul A. M Van. 1999. “The pursuit of joint outcomes and equality in outcomes: An integrative model of social value orientation.” *Journal of Personality and Social Psychology*. Vol. 77(2) 77:337–349.
- Lange, Paul A. M Van and D. Michael Kuhlman. 1994. “Social value orientations and impressions of partner’s honesty and intelligence: A test of the might versus morality effect.” *Journal of Personality and Social Psychology*. Vol. 67(1) 67:126–141.
- Latane, B., K. D Williams, and S. Harkins. 1979. “Many Hands Make Light the Work: The Causes and Consequences of Social Loafing.” *Journal of Personality and Social Psychology* 37:822–832.
- Lee, Kathy J. 2006. “What goes around comes around: an analysis of del.icio.us as social space.” In *Proceedings of the 2006 20th anniversary conference on Computer supported cooperative work*, pp. 191–194, Banff, Alberta, Canada. ACM.
- Lenin, Vladimir. 1937. *V.I. Lenin Selected Works : Volume VIII The Period of War Communism (1918-1920)*. London: Lawrence and Wishart.
- Lessig, Lawrence. 2008. *Remix*. Penguin Group.
- Lett, James William. 1997. *Science, reason, and anthropology*. Rowman & Littlefield.
- Levy, Steven. 1984. *Hackers : heroes of the computer revolution*. Garden City N.Y.: Anchor Press/Doubleday, 1st ed. edition.
- Liebrand, W.B.G., Ronald W. Jansen, Victor M. Rijken, and Cor J. Suhre. 1986. “Might over morality: Social values and the perception of other players in experimental games.” *Journal of Experimental Social Psychology* 22:203–215.
- Ling, K., G. Beenen, X. Wang, K. Chang, D. Frankowski, P. Resnick, and R.E. Kraut. 2005. “Using social psychology to motivate contributions to online communities.” *Journal of Computer Mediated Communication* 10.

- Lippman, S. and J. McCall. 1976a. "The Economics of Job Search: A Survey – Part I." *Economic Inquiry* 14:155–190.
- Lippman, S. and J. McCall. 1976b. "The Economics of Job Search: A Survey – Part II." *Economic Inquiry* 14:347–69.
- Ludwig, Kristin B. and Joe F. Pittman. 1999. "Adolescent Prosocial Values and Self-Efficacy in Relation to Delinquency, Risky Sexual Behavior, and Drug Use." *Youth Society* 30:461–482.
- Lutz, John, Thomas W. Durham, and Charles R. Coble. 1988. "Personality characteristics of junior high school students successful with computers." *Computers in the Schools* 5:257–269.
- Marwell, Gerald, Pamela E. Oliver, and Ralph Prahl. 1988. "Social Networks and Collective Action: A Theory of the Critical Mass. III." *The American Journal of Sociology* 94:502–534.
- Marx, Karl, Friedrich Engels, Vladimir Ilich Lenin, C. P. Dutt, and Institut Marksa-Engelsa-Lenina. 1938. *Critique of the Gotha programme*. New York: International Publishers.
- McClintock, C.G. and W.B.G. Liebrand. 1988. "Role of Interdependence Structure, Individual Value Orientation, and Another's Strategy in Social Decision Making: A Transformational Analysis." *Journal of Personality and Social Psychology* 55:396–409.
- Messick, D. M., S.T. Allison, C.D. Samuelson, and S. Maital. 1988. "Framing and communication effects on group members' responses to environmental and social uncertainty." In *Applied Behavioral Economics, Vol. 2*, pp. 677–700. New York, NY: New York University Press.
- Messick, David M. and Charles G. McClintock. 1968. "Motivational bases of choice in experimental games." *Journal of Experimental Social Psychology* 4:1–25.
- Metz, Cade. 2009. "Wikipedia bans Church of Scientology - The Register." http://www.theregister.co.uk/2009/05/29/wikipedia_bans_scientology/.
- Mieszkowski, Katharine. 2007. "'I make \$1.45 a week and I love it'." http://www.salon.com/tech/feature/2006/07/24/turks/index_np.html.
- Monge, P., Janet Fulk, Michael E. Klamann, A. J. Flanagan, Claire Parnassa, and Suzanne Rumsey. 1998. "Production of Collective Action in Alliance-Based Interorganizational Communication and Information Systems." *Organization Science* 9:411–433.
- Moore, Robert J. 2009. "Twitter Data Analysis: An Investors Perspective." <http://www.techcrunch.com/2009/10/05/twitter-data-analysis-an-investors-perspective/>.
- Musgrave, R. 1959. *The theory of public finance; a study in public economy*. New York, NY: McGraw-Hill.

- Naaman, Mor, Jeffrey Boase, and Chih-Hui Lai. 2010. "Is it really about me?: message content in social awareness streams." In *Proceedings of the 2010 ACM conference on Computer supported cooperative work*, pp. 189–192, Savannah, Georgia, USA. ACM.
- Nam, K.K., M.S. Ackerman, and L.A. Adamic. 2009. "Questions in, Knowledge in?: A study of Naver's question answering community." In *Proceedings of the 27th international conference on Human factors in computing systems*, pp. 779–788. ACM New York, NY, USA.
- Nardi, Bonnie, Diane J. Schiano, Michelle Gumbrecht, and Luke Swartz. 2004a. "Why We Blog." *Communications of the ACM* 47:41–46.
- Nardi, Bonnie A., Diane J. Schiano, and Michelle Gumbrecht. 2004b. "Blogging as social activity, or, would you let 900 million people read your diary?" In *Proceedings of the 2004 ACM conference on Computer supported cooperative work*, pp. 222–231, Chicago, Illinois, USA. ACM.
- Nisbett, R. and T.D. Wilson. 1977. "Telling More Than We Can Know: Verbal Reports on Mental Processes." *Psychological Review* 84:231–259.
- Noguchi, Yuki. 2006. "Wikipedia's Help From the Hill: Edits Lead Site to Block Some Lawmakers' Offices." *The Washington Post* .
- Nov, Oded. 2007. "What motivates Wikipedians?" *Communications of the ACM* 50:60–64.
- Nov, Oded, Mor Naaman, and Chen Ye. 2008. "What drives content tagging: the case of photos on Flickr." In *Proceeding of the twenty-sixth annual SIGCHI conference on Human factors in computing systems*, pp. 1097–1100, Florence, Italy. ACM.
- Oliver, Pamela E. 1980. "Rewards and Punishments as Selective Incentives for Collective Action: Theoretical Investigations." *American Journal of Sociology* 85:1356–1375.
- Oliver, P. E. 1993. "Formal Models of Collective Action." *Annual Review of Sociology* 19:271–300.
- Oliver, Pamela E. and Gerald Marwell. 1988. "The Paradox of Group Size in Collective Action: A Theory of the Critical Mass. II." *American Sociological Review* 53:1–8.
- Olson, Mancur. 1965. *The logic of collective action; public goods and the theory of groups*. Cambridge, Mass.: Harvard University Press.
- Ordober, Janusz A. and Robert D. Willig. 1978. "On the Optimal Provision of Journals qua Sometimes Shared Goods." *American Economic Review* 68:324–338.
- Oreg, Shaul and Oded Nov. 2008. "Exploring motivations for contributing to open source initiatives: The roles of contribution context and personal values." *Computers in Human Behavior* 24:2055–2073.
- Ortega, Felipe, Jesus M. Gonzalez-Barahona, and Gregorio Robles. 2008. "On the Inequality

- of Contributions to Wikipedia.” In *Hawaii International Conference on System Sciences*, volume 0, p. 304, Los Alamitos, CA, USA. IEEE Computer Society.
- Preacher, K. and A. Hayes. 2004. “SPSS and SAS procedures for estimating indirect effects in simple mediation models.” *Behavior Research Methods, Instruments, & Computers* 36:717–731.
- Puca, Rosa Maria and Heinz-Dieter Schmalt. 1999. “Task Enjoyment: A Mediator Between Achievement Motives and Performance.” *Motivation and Emotion* 23:15–29.
- Putnam, Robert D. 2000. *Bowling Alone: The Collapse and Revival of American Community*. Simon & Schuster.
- Rafaeli, S., Yaron Ariel, and Azy Barak. 2008. “Online Motivational Factors: Incentives for Participation and Contribution in Wikipedia.” In *Psychological Aspects of Cyberspace*, pp. 243–267. New York, NY: Cambridge University Press.
- Rafaeli, S. and D. Raban. 2005. “Information sharing online: a research challenge.” *International Journal of Knowledge and Learning* 1:62–79.
- Rafaeli, S., D.R. Raban, and G. Ravid. 2007. “How social motivation enhances economic activity and incentives in the Google Answers knowledge sharing market.” *International Journal of Knowledge and Learning* 3:1–11.
- Rafaeli, Sheizaf, Daphne R. Raban, and Gliad Ravid. 2005. “Social and Economic Incentives in Google Answers.” In *GROUP05 - Sustaining Community: The Role and Design of Incentive Mechanisms in Online Systems Workshop*, Sanibel Island, FL.
- Ranie, Lee and Bill Tancer. 2007. “Wikipedia Users.” Technical report, Pew Internet & American Life Project, Washington, D.C.
- Rashid, Al M., Kimberly Ling, Regina D. Tassone, Paul Resnick, Robert Kraut, and John Riedl. 2006. “Motivating participation by displaying the value of contribution.” In *Proceedings of the SIGCHI conference on Human Factors in computing systems*, pp. 955–958, Montreal, Qubec, Canada. ACM.
- Rosenberg, Morris. 1965. *Society and the adolescent self-image*. Princeton University Press.
- Samuelson, Paul A. 1954. “The Pure Theory of Public Expenditure.” *The Review of Economics and Statistics* 36:387–389. ArticleType: primary_article / Full publication date: Nov., 1954 / Copyright 1954 The MIT Press.
- Schensul, Stephen L., Jean J. Schensul, and Margaret D. LeCompte. 1999. *Essential ethnographic methods : observations, interviews, and questionnaires*, volume 2 of *Designing and Conducting Ethnographic Fieldwork*. Walnut Creek Calif.: AltaMira Press.
- Schopler, John and Marjorie W Matthews. 1965. “The influence of the perceived causal locus of partner’s dependence on the use of interpersonal power.” *Journal of Personality and Social Psychology*. Vol. 2(4) 2:609–612.

- Schott, Gareth and Neil Selwyn. 2000. "Examining the "Male, Antisocial" Stereotype of High Computer Users." *Journal of Educational Computing Research* 23:291–303.
- Schunk, Dale. 1989. "Self-efficacy and achievement behaviors." *Educational Psychology Review* 1:173–208.
- Schwartz, Shalom. 1977. "Normative Influences on Altruism." In *Advances in Experimental Social Psychology*, volume 10, pp. 221–279. New York, NY: Academic Press.
- Seigenthaler, John. 2005. "A false Wikipedia 'biography'." http://www.usatoday.com/news/opinion/editorials/2005-11-29-wikipedia-edit_x.htm.
- Selwyn, Neil. 1998. "Whats in the Box? Exploring Learners Rejection of Educational Computing." *Educational Research and Evaluation* 4:193–212.
- Sen, Shilad, Shyong K. Lam, Al Mamunur Rashid, Dan Cosley, Dan Frankowski, Jeremy Osterhouse, F. Maxwell Harper, and John Riedl. 2006. "tagging, communities, vocabulary, evolution." In *Proceedings of the 2006 20th anniversary conference on Computer supported cooperative work*, pp. 181–190, Banff, Alberta, Canada. ACM.
- Shah, S.K. and S. Levine. 2003. "Towards a Theory of Large-Scale Generalized Exchange." In *American Sociological Association - Theoretical Issues in Economic Sociology*, Atlanta, GA.
- Shapiro, Carl and Hal R. Varian. 1998. "Information rules: a strategic guide to the network economy."
- Simon, Herbert A. 1955. "A Behavioral Model of Rational Choice." *The Quarterly Journal of Economics* 69:99–118. ArticleType: primary_article / Full publication date: Feb., 1955 / Copyright 1955 The MIT Press.
- Simpson, Brent and Robb Willer. 2008. "Altruism and Indirect Reciprocity: The Interaction of Person and Situation in Prosocial Behavior." *Social Psychology Quarterly* 71:37–52.
- Spradley, James P. 1979. *The Ethnographic Interview*. New York, NY: Holt, Rinehart, and Winston.
- Stanley, Laura D. 2003. "Beyond Access: Psychosocial Barriers to Computer Literacy." *The Information Society* 19:407–416.
- Staub, Ervin. 1973. "Childrens' Sharing Behavior: Success and Failure, the "Norm of Deserving" and Reciprocity in Sharing."
- Stoeckl, Ralph and Patrick Rohrmeier. 2007. "Motivations to produce User Generated Content: differences between webbloggers and videobloggers." In *The 20th Bled eConference*, Bled, Slovenia.
- Stvilia, B., M. B Twidale, L. C Smith, and L. Gasser. 2005. "Assessing Information Quality Of A Community-Based Encyclopedia." In *International Conference on Information*

- Quality*, pp. 442–454, Cambridge, MA.
- Swartz, Aaron. 2006. “Who Writes Wikipedia?” <http://www.aaronsw.com/weblog/whowriteswikipedia>.
- Tashakkori, Abbas and Dr. Charles B. Teddlie. 2002. “Major Issues and Controversies in the Use of Mixed Methods in the Social and Behavioral Sciences.” In *Handbook of Mixed Methods Social and Behavioral Research*, pp. 3–50. Sage Publications, Inc, 1st edition.
- Thibaut, John W. and Harold H. Kelley. 1978. *Interpersonal Relations: A Theory of Interdependence*. John Wiley & Sons Inc.
- Thom-Santelli, Jennifer, Dan Cosley, and Geri Gay. 2010. “What do you know?: experts, novices and territoriality in collaborative systems.” In *Proceedings of the 28th international conference on Human factors in computing systems*, pp. 1685–1694, Atlanta, Georgia, USA. ACM.
- Thom-Santelli, Jennifer, Dan R. Cosley, and Geri Gay. 2009. “What’s mine is mine: territoriality in collaborative authoring.” In *Proceedings of the 27th international conference on Human factors in computing systems*, pp. 1481–1484, Boston, MA, USA. ACM.
- Thomas, Douglas. 2002. *Hacker culture*. Minneapolis: University of Minnesota Press.
- Trevino, E.M. 2005. “Blogger motivations: Power, pull, and positive feedback.” *Internet Research* 6.
- Turkle, Sherry. 1995. *Life on the Screen*. New York, NY: Touchstone.
- Turner, TC, MA Smith, D Fisher, and HT Welser. 2005. “Picturing Usenet: Mapping Computer-Mediated Collective Action.” *Journal of Computer-Mediated Communication* 10.
- Ubois, Jeff. 2003. “Online Reputation Systems.” <http://downloads.oreilly.com/radar/r1/10-03.pdf>.
- Utz, Sonja, Jaap W. Ouwerkerk, and Paul A. M. Van Lange. 2004. “What is smart in a social dilemma? differential effects of priming competence on cooperation.” *European Journal of Social Psychology* 34:317–332.
- van Dijk, Eric, H. Wilke, Marieke Wilke, and Linda Metman. 1999. “What Information Do We Use in Social Dilemmas? Environmental Uncertainty and the Employment of Coordination Rules.” *Journal of Experimental Social Psychology* 35:109–135.
- van Lange, Paul A. M., W. Otten, E. M. N. De Bruin, and J.A. Joireman. 1997. “Development of prosocial, individualistic, and competitive orientations: Theory and preliminary evidence.” *Journal of Personality and Social Psychology* 73:733–746.
- van Lange, Paul A. M., Mark Van Vugt, Ree M. Meertens, and Rob A. C. Ruiters. 1998. “A Social Dilemma Analysis of Commuting Preferences: The Roles of Social Value Orientation

- and Trust.” *Journal of Applied Social Psychology* 28:796–820.
- van Velsen, Lex and Mark Melenhorst. 2009. “Incorporating user motivations to design for video tagging.” *Interacting with Computers* 21:221–232.
- Varian, Hal R. 1998. “Markets for Information Goods.” In *Monetary Policy in a World of Knowledge-Based Growth, Quality Change, and Uncertain Measurement*, Tokyo, Japan. School of Information, University of California, Berkeley.
- Viegas, Fernanda, Martin Wattenberg, and Frank van Ham. 2007. “Talk Before You Type: Coordination in Wikipedia.” In *Hawaii International Conference on System Sciences (HICSS)*, p. 78, Oahu, Hawaii.
- Viegas, Fernanda B., Martin Wattenberg, and Kushal Dave. 2004. “Studying cooperation and conflict between authors with history flow visualizations.” In *Proceedings of the SIGCHI conference on Human factors in computing systems*, pp. 575–582, Vienna, Austria. ACM.
- Voss, J. 2005. “Measuring Wikipedia.” In *Proceedings of the ISSI*, Stockholm, Sweden.
- Walther, Joseph. 1996. “Computer-Mediated Communication: Impersonal, Interpersonal, and Hyperpersonal Interaction.” *Communication Research* 23:3–43.
- Waszak, C., M. C. Sines, A. Tashakkori, and C. Teddlie. 2003. “Mixed Methods in Psychological Research.” In *Handbook of Mixed Methods in Social & Behavioral Research*, pp. 557–576. Sage Publications: Thousand Oaks, CA.
- Weber, Max. 2003. *The Protestant Ethic and the Spirit of Capitalism*. Dover Publications.
- Weber, Steven. 2004. *The Success of Open Source*. Harvard University Press.
- Weinstein, Neil D. 1980. “Unrealistic optimism about future life events.” *Journal of Personality and Social Psychology*. Vol. 39(5) 39:806–820.
- Weiss, Robert S. 1994. *Learning From Strangers: The Art and Method of Qualitative Interview Studies*. New York, NY: The Free Press.
- White, R. W. 1959. “Motivation reconsidered: The concept of competence.” *Psychological review* 66:297–333.
- Wikipedia. 2010. “Wikipedia biography controversy.” http://en.wikipedia.org/wiki/Wikipedia_biography_controversy.
- Winett, R.A., J.H. Kagel, R.C. Battalio, and R.C. Winkler. 1978. “The Effects of Monetary Rebates, Feedback, and Information on Residential Energy Consumption.” *Journal of Applied Psychology* 63:73–80.
- Yamagishi, T. and K. S. Cook. 1993. “Generalized Exchange and Social Dilemmas.” *Social Psychology Quarterly* 56:235–248.

- Yamagishi, T., K. S. Cook, G. Fine, and J. House. 1995. "Social Dilemmas." In *Sociological Perspectives on Social Psychology*, pp. 311–335. Boston: Allyn & Bacon.
- Yamagishi, T. and M. Yamagishi. 1994. "Trust and commitment in the United States and Japan." *Motivation and Emotion* 18:129–166.
- Zhang, Xiaoquan and Feng Zhu. 2006. "Intrinsic Motivation of Open Content Contributors: the Case of Wikipedia." In *Workshop on Information Systems and Economics (WISE) 2006*.

Appendices

EXPERIMENTAL INSTRUCTIONS

Welcome to the study and thank you for coming!

Please have a seat and make yourself comfortable. The experimenter will let you know once everyone has arrived and its time for the study to begin. Until then, feel free to do anything youd like at your seat, but please **do not get up, talk to other participants you may notice around you, or attempt to use the computer in front of you until the experimenter tells you to.**

We would also like to familiarize you with some of the studys procedures. All of your interactions will take place using the laptop and mouse in front of you. In addition, during the study we ask that all participants wear headsets. It is important that you make decisions in the study without disruptions. We use headsets and ocean sounds to reduce distractions from noise within this room. In addition, there can sometimes be disruptive noise from outside and the adjacent offices and hallways. It is essential that you wear the headset for the duration of the study. However, **do not put on the headset until the experimenter tells you to.** You will then receive instructions on the computer when it is OK to remove the headset. If the volume level is uncomfortable for you, please let the experimenter know and it will be adjusted. Please do not adjust the volume yourself.

Finally, please read and sign the consent form placed at your seat. If you have any questions about the form, please raise your hand and the experimenter will be happy to help. Thanks again!

ATTITUDE AND DISPOSITION SCALES USED IN EXPERIMENTAL STUDIES

General Trust and Caution (Yamagishi and Yamagishi, 1994)

1-7 Scale (Strongly Disagree, Disagree, Slightly Disagree, Neither Disagree or Agree, Slightly Agree, Agree, Strongly Agree)

1. Most people are basically honest. (Trust #1)
2. One can avoid falling into trouble by assuming that all people have a vicious streak. (Caution #1)
3. If anything, I trust others. (Trust #2)
4. Most people are basically good-natured and kind. (Trust #3)
5. You cannot be too cautious in dealing with others. (Caution #2)
6. Most people trust others. (Trust #4)
7. We do not always have to guard ourselves against being used by someone. (Caution #3 Reverse Coded)
8. Most people are trustworthy. (Trust #5)
9. If you are not careful enough, people will take advantage of you. (Caution #4)
10. It is safer to believe that everyone has the capacity to be malicious. (Caution #5)

Self-Esteem Scale Rosenberg (1965)

1-7 Scale (Strongly Disagree, Disagree, Slightly Disagree, Neither Disagree or Agree, Slightly Agree, Agree, Strongly Agree)

1. On the whole, I am satisfied with myself.
2. At times I think I am no good at all.
3. I feel that I have a number of good qualities.
4. I am able to do things as well as most other people.
5. I feel I do not have much to be proud of.
6. I certainly feel useless at times.
7. I feel that I'm a person of worth, at least on an equal plane with others.
8. I wish I could have more respect for myself.
9. All in all, I am inclined to feel that I am a failure.
10. I take a positive attitude toward myself.

Humanitarianism-Egalitarianism Scale Katz and Hass (1988)

1-7 Scale (Strongly Disagree, Disagree, Slightly Disagree, Neither Disagree or Agree, Slightly Agree, Agree, Strongly Agree)

1. One should be kind to all people.
2. One should find ways to help others less fortunate than oneself.
3. A person should be concerned about the well-being of others.
4. There should be equality for everyone - because we are all human beings.
5. Those who are unable to provide for their basic needs should be helped by others.
6. A good society is one in which people feel responsible for one another.
7. Everyone should have an equal chance and an equal say in most things.
8. Acting to protect the rights and interests of other members of the community is a major obligation for all persons.
9. In dealing with criminals the courts should recognize that many are victims of circumstances.
10. Prosperous nations have a moral obligation to share some of their wealth with poor nations.

Social Value Orientation Scale Messick and McClintock (1968)

Instructions: In the set of questions that follows, we ask you to imagine that you have been randomly paired with another person, whom we will refer to simply as the "other." Other is someone you do not know and that you will not meet in the future. Both you and Other will be making choices by selecting either A, B, or C. Your own choices will produce points for yourself and Other. Likewise, Other's choice will produce points for him/her and for you. Every point has value: The more points you receive, the better for you, and the more points Other receives, the better for him/her. Here's an example of how this task works.

	A	B	C
You Get	500	500	550
Other Gets	100	500	300

In this example, if you chose A you would receive 500 points and Other would receive 100 points; if you chose B, you would receive 500 points and Other 500; and if you chose C, you would receive 550 points and Other 300. So, you see that your choice influences both the number of points you receive and the number of points the other receives.

Before you begin making choices, keep in mind that there are no right or wrong answers - choose the option that you, for whatever reason, prefer most. Also, remember that the points have value: The more of them you accumulate, the better for you. Likewise, from the Other's point of view, the more points s/he accumulates, the better for him/her. For the choice situations below, Select A, B or C, depending on which column you prefer most.

	A	B	C
You Get	480	540	480
Other Gets	80	280	480

	A	B	C
You Get	560	500	500
Other Gets	300	500	100

	A	B	C
You Get	520	520	580
Other Gets	520	120	320

	A	B	C
You Get	500	560	490
Other Gets	100	300	490

	A	B	C
You Get	560	500	490
Other Gets	300	500	90

	A	B	C
You Get	500	500	570
Other Gets	500	100	300

	A	B	C
You Get	510	560	510
Other Gets	510	300	110

	A	B	C
You Get	550	500	500
Other Gets	300	100	500

	A	B	C
You Get	480	490	540
Other Gets	100	490	300

Ten Item Personality Inventory (TIPI) (Gosling et al., 2003)

1-7 Scale (Strongly Disagree, Disagree, Slightly Disagree, Neither Disagree or Agree, Slightly Agree, Agree, Strongly Agree)

Instructions: Here are a number of personality traits that may or may not apply to you. Please select a response to each statement to indicate the extent to which you agree or disagree with that statement. You should rate the extent to which the pair of traits applies to you, even if one characteristic applies more strongly than the other.

1. I see myself as extroverted, enthusiastic.
2. I see myself as critical, quarrelsome.
3. I see myself as dependable, self-disciplined.
4. I see myself as anxious, easily upset.
5. I see myself as open to new experiences, complex.
6. I see myself as reserved, quiet.
7. I see myself as sympathetic, warm.
8. I see myself as disorganized, careless.
9. I see myself as calm, emotionally stable.
10. I see myself as conventional, uncreative.

Social Responsibility Scale

1-7 Scale (Strongly Disagree, Disagree, Slightly Disagree, Neither Disagree or Agree, Slightly Agree, Agree, Strongly Agree)

1. I felt it was only fair that I contribute information tasks.
2. It was my responsibility to contribute information tasks.
3. It was important to me that I do my share of contributing information tasks to benefit others.
4. I feel personally responsible for contributing in order to benefit the group.

Task Self-Efficacy Scale

This group of questions is designed to help us get an idea of how you felt about the tasks we asked you to do in this study. We are interested in your responses whether or not you chose to contribute at all. Please rate how certain you are that you were able to accomplish each of the following during this study. Again, consider how certain you are about your ability to accomplish the following things whether or not you actually chose to contribute during the study. Use the following scale: 1 = 'Cannot do at All', 4 = 'Moderately Can Do', and 7 = 'Can Do'

1. Decipher ambiguous characters and spacing in images of text.
2. Complete information tasks accurately.

Group Benefit Self-Efficacy Scale

This group of questions is designed to help us get an idea of how you felt about the tasks we asked you to do in this study. We are interested in your responses whether or not you chose to contribute at all. Please rate how certain you are that you were able to accomplish each of the following during this study. Again, consider how certain you are about your ability to accomplish the following things whether or not you actually chose to contribute during the study. Use the following scale: 1 = 'Cannot do at All', 4 = 'Moderately Can Do', and 7 = 'Can Do'

1. Complete information tasks that are beneficial to the group.
2. Maximize the number of points others earn in this study.

Task Enjoyment Scale

1. I liked doing information tasks.
2. I found the information tasks to be entertaining.
3. I found the information tasks to be interesting.
4. I found the information tasks to be challenging.

INTERVIEW PROTOCOL

Background

So, if it's okay with you, first I'd just like to learn a little bit about you, to give some background and context to the rest of our discussion.

1. Tell me a little about yourself

- (a) Where are you from?
- (b) What do you do?

2. Tell me a little about how you use technology in your daily life.

- (a) What types of gadgets do you have?
- (b) Do you tend to stay on top of the latest technology news?
- (c) Overall, would you consider yourself a tech. savvy person? Why are you interested in technology, or why not?

Wikipedia

Now that I've learned a bit about you, I want to talk about how you use Wikipedia and what you think about it.

1. How would you describe Wikipedia to someone who had never heard of it before? Give me as much detail as you can think of off the top of your head.

2. Tell me about how you usually use Wikipedia.

- (a) How long have you been a Wikipedia user?

- (b) How often do you visit Wikipedia?
 - (c) How do you usually end up there?
 - (d) What do you tend to do there? / What tasks bring you there?
3. **What do you think are some of the ways that people use Wikipedia?**
 4. **Over the time that you've used Wikipedia, would you say anything has changed about the way you use it?**
 5. **How do you feel about the quality of the information you find on Wikipedia?**
 - (a) How do you think it got to be that good / bad?
 6. **In your opinion, what does it mean to "contribute" to Wikipedia? What could it mean for someone to say that they are a "contributor"?**
 - (a) What counts as contribution? What doesn't? Why?
 - (b) Do you think that someone who just reads Wikipedia is making a contribution? Why / why not?
 7. **Do you contribute to Wikipedia?**
 - (a) Can you think of any specific examples of times you've contributed in the past?
 8. **How do you decide whether or not to contribute, or when to contribute?**
 9. **Some people talk a lot about the "Wikipedia community." Do you think of Wikipedia as a community? If so, how so? If not, why not?**
 - (a) Do you ever think about the other people who use or contribute to Wikipedia? What do you think about them?
 - (b) In your mind, who are those people?

Operational Information

I'm interested in what's important to you about how Wikipedia works, how it's produced and maintained, if anything.

1. **How much would you say you know about the "nuts and bolts" of how Wikipedia works?**
 - (a) Are there times when you are using Wikipedia when you feel it's important to you to know how it works?

2. **How interested would you say you are in the details about how Wikipedia works?**
3. **Do you pay much attention to the bureaucratic, organizations, governance aspects of Wikipedia?**
 - (a) Are those things important to you? Do you think about them?
4. **Some people say that not completely understanding all the details about how Wikipedia works influences the way they use it. How do you respond to that?**
 - (a) Can you think of an example of a time when you were using Wikipedia and you felt uncertain about how something worked?
5. **Do you feel like there's a lot about Wikipedia that happens behind the scenes? If so, tell me about that.**
 - (a) Do you feel like Wikipedia is complicated at all? Why?
6. **Do you have any concerns about using Wikipedia?**
 - (a) Is there anything Wikipedia could change that might help with your concerns?
7. **Have you seen Wikipedia change or evolve over the course of the time you've been using it?**
 - (a) What kinds of changes, if any, do you think Wikipedia will see in the future?
 - (b) How do you feel about the growth of Wikipedia? Is it good, bad, both? Why?
8. **How do you feel about the fact that Wikipedia exists even though no one is paid to contribute?**
 - (a) Why do you think people devote their time and effort?
 - (b) What do you think would happen if Wikipedia started to pay people?
9. **When you or other people choose only to read Wikipedia instead of editing, what do you think are the consequences of that?**
 - (a) Do you think people who choose not to contribute feel guilty about that? Should they?
 - (b) Do you worry that there will be too many takers?
10. **I just have one final question: some people have said that the way Wikipedia is set up, people can read all they want and never choose to help produce Wikipedia, but if everyone did that, there would be no Wikipedia. What do you think about that idea?**

(a) Is this something that ever occurs to you when you use Wikipedia? Why / why not?

INTERVIEW RECRUITMENT SURVEY

1. Please enter your email address.
2. What is your gender? (Female, Male)
3. How old are you?
4. What is the highest level of education that you have achieved? (Some High School, High School Graduate, Some College, College Graduate, Some Postgraduate, Postgraduate)
5. What is your zip code?
6. I have a lot of experience using Wikipedia. (7 point scale, Strongly Disagree — Strongly Agree)
7. I know a lot about Wikipedia. (7 point scale, Strongly Disagree — Strongly Agree)
8. I am interested in Wikipedia. (7 point scale, Strongly Disagree — Strongly Agree)
9. Thinking only about the last six months or so, please indicate how many times in an average week do you read a Wikipedia page? (Less than 1 Time, 1-3 Times, 4-6 Times, 7-9 Times, 10+ Times)
10. Thinking only about the last six months or so, please indicate how many times in an average week do you edit a Wikipedia page? (Less than 1 Time, 1-3 Times, 4-6 Times, 7-9 Times, 10+ Times)
11. Thinking only about the last six months or so, please indicate how many times in an average week do you read a Wikipedia Talk page? (Less than 1 Time, 1-3 Times, 4-6 Times, 7-9 Times, 10+ Times)
12. Thinking only about the last six months or so, please indicate how many times in an average week do you edit a Wikipedia Talk page? (Less than 1 Time, 1-3 Times, 4-6 Times, 7-9 Times, 10+ Times)
13. If you regularly engage in any activities on Wikipedia other than the ones listed above, please briefly describe each of them here. (Free Response)

CREATIVE COMMONS LICENSE

This is the text of Creative Commons' Attribution-NonCommercial-NoDerivs License, version 3.0.¹

E.1 License

THE WORK (AS DEFINED BELOW) IS PROVIDED UNDER THE TERMS OF THIS CREATIVE COMMONS PUBLIC LICENSE (“CCPL” OR “LICENSE”). THE WORK IS PROTECTED BY COPYRIGHT AND/OR OTHER APPLICABLE LAW. ANY USE OF THE WORK OTHER THAN AS AUTHORIZED UNDER THIS LICENSE OR COPYRIGHT LAW IS PROHIBITED.

BY EXERCISING ANY RIGHTS TO THE WORK PROVIDED HERE, YOU ACCEPT AND AGREE TO BE BOUND BY THE TERMS OF THIS LICENSE. TO THE EXTENT THIS LICENSE MAY BE CONSIDERED TO BE A CONTRACT, THE LICENSOR GRANTS YOU THE RIGHTS CONTAINED HERE IN CONSIDERATION OF YOUR ACCEPTANCE OF SUCH TERMS AND CONDITIONS.

1. Definitions

- (a) **“Collective Work”** means a work, such as a periodical issue, anthology or encyclopedia, in which the Work in its entirety in unmodified form, along with one or more other contributions, constituting separate and independent works in themselves, are assembled into a collective whole. A work that constitutes a Collective Work will not be considered a Derivative Work (as defined below) for the purposes of this License.

¹See: <http://creativecommons.org/licenses/by-nc-nd/3.0/us/>.

- (b) **“Derivative Work”** means a work based upon the Work or upon the Work and other pre-existing works, such as a translation, musical arrangement, dramatization, fictionalization, motion picture version, sound recording, art reproduction, abridgment, condensation, or any other form in which the Work may be recast, transformed, or adapted, except that a work that constitutes a Collective Work will not be considered a Derivative Work for the purpose of this License. For the avoidance of doubt, where the Work is a musical composition or sound recording, the synchronization of the Work in timed-relation with a moving image (“synchronizing”) will be considered a Derivative Work for the purpose of this License.
 - (c) **“Licensor”** means the individual, individuals, entity or entities that offers the Work under the terms of this License.
 - (d) **“Original Author”** means the individual, individuals, entity or entities who created the Work.
 - (e) **“Work”** means the copyrightable work of authorship offered under the terms of this License.
 - (f) **“You”** means an individual or entity exercising rights under this License who has not previously violated the terms of this License with respect to the Work, or who has received express permission from the Licensor to exercise rights under this License despite a previous violation.
2. **Fair Use Rights.** Nothing in this license is intended to reduce, limit, or restrict any rights arising from fair use, first sale or other limitations on the exclusive rights of the copyright owner under copyright law or other applicable laws.
3. **License Grant.** Subject to the terms and conditions of this License, Licensor hereby grants You a worldwide, royalty-free, non-exclusive, perpetual (for the duration of the applicable copyright) license to exercise the rights in the Work as stated below:
- (a) to reproduce the Work, to incorporate the Work into one or more Collective Works, and to reproduce the Work as incorporated in the Collective Works; and,
 - (b) to distribute copies or phonorecords of, display publicly, perform publicly, and perform publicly by means of a digital audio transmission the Work including as incorporated in Collective Works.

The above rights may be exercised in all media and formats whether now known or hereafter devised. The above rights include the right to make such modifications as are technically necessary to exercise the rights in other media and formats, but otherwise you have no rights to make Derivative Works. All rights not expressly granted by Licensor are hereby reserved, including but not limited to the rights set forth in Sections 4(d) and 4(e).

4. **Restrictions.** The license granted in Section 3 above is expressly made subject to and limited by the following restrictions:

- (a) You may distribute, publicly display, publicly perform, or publicly digitally perform the Work only under the terms of this License, and You must include a copy of, or the Uniform Resource Identifier for, this License with every copy or phonorecord of the Work You distribute, publicly display, publicly perform, or publicly digitally perform. You may not offer or impose any terms on the Work that restrict the terms of this License or the ability of a recipient of the Work to exercise the rights granted to that recipient under the terms of the License. You may not sublicense the Work. You must keep intact all notices that refer to this License and to the disclaimer of warranties. When You distribute, publicly display, publicly perform, or publicly digitally perform the Work, You may not impose any technological measures on the Work that restrict the ability of a recipient of the Work from You to exercise the rights granted to that recipient under the terms of the License. This Section 4(a) applies to the Work as incorporated in a Collective Work, but this does not require the Collective Work apart from the Work itself to be made subject to the terms of this License. If You create a Collective Work, upon notice from any Licensor You must, to the extent practicable, remove from the Collective Work any credit as required by Section 4(c), as requested.
- (b) You may not exercise any of the rights granted to You in Section 3 above in any manner that is primarily intended for or directed toward commercial advantage or private monetary compensation. The exchange of the Work for other copyrighted works by means of digital file-sharing or otherwise shall not be considered to be intended for or directed toward commercial advantage or private monetary compensation, provided there is no payment of any monetary compensation in connection with the exchange of copyrighted works.
- (c) If You distribute, publicly display, publicly perform, or publicly digitally perform the Work (as defined in Section 1 above) or Collective Works (as defined in Section 1 above), You must, unless a request has been made pursuant to Section 4(a), keep intact all copyright notices for the Work and provide, reasonable to the medium or means You are utilizing: (i) the name of the Original Author (or pseudonym, if applicable) if supplied, and/or (ii) if the Original Author and/or Licensor designate another party or parties (e.g. a sponsor institute, publishing entity, journal) for attribution (“Attribution Parties”) in Licensor’s copyright notice, terms of service or by other reasonable means, the name of such party or parties; the title of the Work if supplied; to the extent reasonably practicable, the Uniform Resource Identifier, if any, that Licensor specifies to be associated with the Work, unless such URI does not refer to the copyright notice or licensing information for the Work. The credit required by this Section 4(c) may be implemented in any reasonable manner; provided, however, that in the case of

a Collective Work, at a minimum such credit will appear, if a credit for all contributing authors of the Collective Work appears, then as part of these credits and in a manner at least as prominent as the credits for the other contributing authors. For the avoidance of doubt, You may only use the credit required by this clause for the purpose of attribution in the manner set out above and, by exercising Your rights under this License, You may not implicitly or explicitly assert or imply any connection with, sponsorship or endorsement by the Original Author, Licensor and/or Attribution Parties, as appropriate, of You or Your use of the Work, without the separate, express prior written permission of the Original Author, Licensor and/or Attribution Parties.

(d) For the avoidance of doubt, where the Work is a musical composition:

- i. **Performance Royalties Under Blanket Licenses.** Licensor reserves the exclusive right to collect whether individually or, in the event that Licensor is a member of a performance rights society (e.g. ASCAP, BMI, SESAC), via that society, royalties for the public performance or public digital performance (e.g. webcast) of the Work if that performance is primarily intended for or directed toward commercial advantage or private monetary compensation.
- ii. **Mechanical Rights and Statutory Royalties.** Licensor reserves the exclusive right to collect, whether individually or via a music rights agency or designated agent (e.g. Harry Fox Agency), royalties for any phonorecord You create from the Work (“cover version”) and distribute, subject to the compulsory license created by 17 USC Section 115 of the US Copyright Act (or the equivalent in other jurisdictions), if Your distribution of such cover version is primarily intended for or directed toward commercial advantage or private monetary compensation.

(e) **Webcasting Rights and Statutory Royalties.** For the avoidance of doubt, where the Work is a sound recording, Licensor reserves the exclusive right to collect, whether individually or via a performance-rights society (e.g. SoundExchange), royalties for the public digital performance (e.g. webcast) of the Work, subject to the compulsory license created by 17 USC Section 114 of the US Copyright Act (or the equivalent in other jurisdictions), if Your public digital performance is primarily intended for or directed toward commercial advantage or private monetary compensation.

5. Representations, Warranties and Disclaimer

UNLESS OTHERWISE MUTUALLY AGREED TO BY THE PARTIES IN WRITING, LICENSOR OFFERS THE WORK AS-IS AND ONLY TO THE EXTENT OF ANY RIGHTS HELD IN THE LICENSED WORK BY THE LICENSOR. THE LICENSOR MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND CONCERNING THE WORK, EXPRESS, IMPLIED, STATUTORY OR OTHERWISE, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF TITLE, MAR-

KETABILITY, MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NONINFRINGEMENT, OR THE ABSENCE OF LATENT OR OTHER DEFECTS, ACCURACY, OR THE PRESENCE OF ABSENCE OF ERRORS, WHETHER OR NOT DISCOVERABLE. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES, SO SUCH EXCLUSION MAY NOT APPLY TO YOU.

6. **Limitation on Liability.** EXCEPT TO THE EXTENT REQUIRED BY APPLICABLE LAW, IN NO EVENT WILL LICENSOR BE LIABLE TO YOU ON ANY LEGAL THEORY FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL, PUNITIVE OR EXEMPLARY DAMAGES ARISING OUT OF THIS LICENSE OR THE USE OF THE WORK, EVEN IF LICENSOR HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

7. Termination

- (a) This License and the rights granted hereunder will terminate automatically upon any breach by You of the terms of this License. Individuals or entities who have received Collective Works (as defined in Section 1 above) from You under this License, however, will not have their licenses terminated provided such individuals or entities remain in full compliance with those licenses. Sections 1, 2, 5, 6, 7, and 8 will survive any termination of this License.
- (b) Subject to the above terms and conditions, the license granted here is perpetual (for the duration of the applicable copyright in the Work). Notwithstanding the above, Licensor reserves the right to release the Work under different license terms or to stop distributing the Work at any time; provided, however that any such election will not serve to withdraw this License (or any other license that has been, or is required to be, granted under the terms of this License), and this License will continue in full force and effect unless terminated as stated above.

8. Miscellaneous

- (a) Each time You distribute or publicly digitally perform the Work (as defined in Section 1 above) or a Collective Work (as defined in Section 1 above), the Licensor offers to the recipient a license to the Work on the same terms and conditions as the license granted to You under this License.
- (b) If any provision of this License is invalid or unenforceable under applicable law, it shall not affect the validity or enforceability of the remainder of the terms of this License, and without further action by the parties to this agreement, such provision shall be reformed to the minimum extent necessary to make such provision valid and enforceable.

- (c) No term or provision of this License shall be deemed waived and no breach consented to unless such waiver or consent shall be in writing and signed by the party to be charged with such waiver or consent.
- (d) This License constitutes the entire agreement between the parties with respect to the Work licensed here. There are no understandings, agreements or representations with respect to the Work not specified here. Licensor shall not be bound by any additional provisions that may appear in any communication from You. This License may not be modified without the mutual written agreement of the Licensor and You.

E.2 Creative Commons Notice

Creative Commons is not a party to this License, and makes no warranty whatsoever in connection with the Work. Creative Commons will not be liable to You or any party on any legal theory for any damages whatsoever, including without limitation any general, special, incidental or consequential damages arising in connection to this license. Notwithstanding the foregoing two (2) sentences, if Creative Commons has expressly identified itself as the Licensor hereunder, it shall have all rights and obligations of Licensor.

Except for the limited purpose of indicating to the public that the Work is licensed under the CCPL, Creative Commons does not authorize the use by either party of the trademark “Creative Commons” or any related trademark or logo of Creative Commons without the prior written consent of Creative Commons. Any permitted use will be in compliance with Creative Commons’ then-current trademark usage guidelines, as may be published on its website or otherwise made available upon request from time to time. For the avoidance of doubt, this trademark restriction does not form part of this License.

Creative Commons may be contacted at <http://creativecommons.org/>.