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Reconciling Greed and Altruism in

The Open Source Community

By

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Reconciling Greed and Altruism in
The Open Source Community

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Adam Smith observed in *The Theory of Moral Sentiments,* that people pursue wealth not to "to supply the necessities of nature" but in order to procure "superfluities" that satisfy a basic psychological need to be thought of well by others (Smith, 62). "It is not wealth that men desire, but the consideration and good opinion that wait upon riches" (Smith, 74).

We know that there is some truth to this statement, as even a cursory glance at metrics representing standards of living show them increasing 1 or 2% each year since they were first measured (in terms of GDP per capita (Maddison (2001), Tables A-1c and A-1d). Yet there is something in human beings that drive us to possess non-physical items not necessary for survival in endless quantities. As an example, the market for virtual goods (fake items sold in online virtual worlds) is estimated to grow to become a 2.5 billion dollar market by 2013.[1]

We tend to spend a lot of time thinking about the things we want, or replacing the things that we already have. Today, material goods are produced in such vast quantities that people now pursue items simply to satiate an innate desire to own, and less out of a need for survival. This more relevant now than ever, given changes in standards of living over time that are outpaced by a rise in

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[1] $2.5bn market size estimated for virtual goods in the US by 2013, Jeremy Liew, Piper Jaffray August 30, 2009, June 5th, 2012 <http://goo.gl/siu0U>.

consumption. Humans no longer consume out of need, but to fill the void consuming out of necessity used to fill. Buying feels too much a part of ourselves to stop, even when we have what we need. The personal computer is a perfect example. What began as a tool used for an increasing number of specific functions, and marketed as a tool with specific utility, are now sold and replaced cyclically less for functionality than for aesthetics and impulse.

The power of this impulse can easily be seen when one reads articles about an increases in stabbing and thefts over fashionable items at any given time[2]. The trends swing up and down based on what is considered valuable, not what is necessary for life. It almost appears that the instincts humans have developed, causing them risk bodily harm to obtain goods necessary for survival, has spread into the desire for goods as inessential as tablet computers. A recent example is of a young Chinese boy who sold a kidney to be able to afford a new Apple iPad.[3]

Seemingly incongruent with this natural desire for possessions are demonstrations of human altruism where the act involves the donor giving their possessions. One curious phenomena of altruism is the existence of open-source development. Seemingly, the same desire for ownership that induces a person to give up an internal organ for an entertainment device would prohibit contributions of time and knowledge for the public good. Open-source contributors derive their motivation to volunteer from the same psychological

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[2] Easy to Use, or Steal, but Inching Out of Reach, Ginia Bellafante, New York Times, Oct 28 2011, June 5th 2012, <http://goo.gl/6NfTp>
[3] China: Teenager 'sells kidney for iPad', Martin Patience, BBC News, June 3rd 2011, June 5th 2012, <http://goo.gl/L4VDX>

mechanisms that induce a desire to be selfish and acquire goods. The apparent altruism one displays when contributing, in this respect, is simply greed masked as altruism, or at least altruism viewed differently.

Open-source software designates software, which is developed by an Internet-based community of programmers. Participation is voluntary and participants do not receive direct compensation for their work. In addition, the full source code is made available to the public under a variety of different license options, which almost always include the right to use, redistribute, and modify the software free of charge. Occasionally restrictions are enforced ensuring that attribution for the original creator is kept, or to prevent someone from selling code for a profit.

The origin of open source software can be traced back to the 50s and 60s when software was sold together with hardware. Macros and other utilities were freely exchanged in online user forums. Software soon began to become increasingly commercialized and in 1985, Richard Stallman (then a researcher at MIT) started the Free Software Foundation (FSF). This organization aims to "promote the universal freedom to create, distribute and modify computer software.[4]" Stallman also began a community development effort called GNU, aiming to develop a free UNIX-like operating system.

Though Stallman's dream of a widely used open-source operating system has not materialized in the way he originally envisioned (powering desktop computers), Linux (a Unix like operating system) is among the most popular

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[4] Free Software Foundation, INC. Summary Screen, Peter Brown, Oct 4th 1985, June 5th 2012, <http://goo.gl/1jLq8>

software used for web servers and now, thanks to Google's Android, mobile phones. More than just open-source based software, the movement motivated an interest in making information available in increasingly free forms. One of the most popular examples of this is Wikipedia, which has almost entirely replaced encyclopedias such as Encyclopædia Britannica.

As open-source communities have flourished in a large variety of forms, studies have been performed to better understand the reasons that people have for giving their time or computing resources for the benefit of others. A study by Alexander Hars and Shaosong Ou asked the question, "in the absence of direct compensations what is it that motivates the participants" (Hars, Ou, 1)?

They began answering this question by looking at previous research on motivation. One of the most famous theories of motivations is by Abraham Maslow, known as Maslow's hierarchy of needs. In this hierarchy, Maslow identified five levels of needs that drive human activities. Relevant to open-source contributors are three levels: the need for belonging, self-esteem, and self-actualization.[5]

Maslow's theory allows for an apt comparison between the motivations for ownership as well as open-source contributions as they stem from the same hypothetical personal needs. On a survey asking about participation in open-source projects, 51 out of 79 respondents (70.9%) chose "improving my programming skills" when asked why they participate in open source projects (Hars, Ou, 6). According to Maslow's hierarchy, people contribute to open-source

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[5] Classics in the History of Psychology, A Theory of Human Motivation, A. H. Maslow posted by Christopher Green Aug 2000, June 5th 2012, <http://goo.gl/dlZH>

software out of a desire for a "stable, firmly based…high evaluation of themselves"(Hars, Ou, 3), improving skills being one such example, establishing an identity for the self, being another. The problem with arguments like these, is that they are not taking into account changes in possessiveness, where no goods are lost as part of an altruistic act. To explain open source contributions, we need to first understand material possessiveness.

Sartre once wrote that "being" is defined by having (Sartre, 1943). We are shaped by our possessions, feeling that the items we buy reflect us. Possessions help a person form an image of themselves, as well as to show that image to others. Possessions are a "medium by which a person's character gains visible reality," or a tangible representation of one's self-concept (Simmel, 1978). It is possible we use these tangible goods to more easily communicate what we want others to think of us, to ensure the desired result. A person that wants to signify their passion for music might wear, very visibly, the latest iPod music player. Ironically, Apple stores and malls carry covers to "personalize" a mass-market product, as if the consumer recognizes the lack of individualism in the purchase and thus has to try to restore some after the fact.

Buying expensive clothing may similarly serve as an example of a simple way to achieve an image of success. As the most coveted possessions are often those that are very expensive, it is likely that they can serve as an "indicator of [an individual's] and others' success" (Dawson & Richins, 1992).

Possessions are therefore comparable to participation in an open-source community in that they allow contributors to create or project identities for

themselves. Wearing large plastic headphones may allow a person to communicate that they value music, contributing code to a project that acts as an iTunes open-source alternative may accomplish the same thing. More importantly, they seem to stem from the same psychological place: a desire for a positive and stable self-concept.

A self-concept is a set of perceptions a person has of his/her traits, values, and competencies. It also is made up of qualities a person wants, but does not possess: an ideal self (Rogers, 1959). Leonard et al. (1999) suggest that one's self-concept relates to a person's motivation in two ways: external self-concept motivation and internal self-concept motivation. Relevant to open source contributors, external self-concept motivation is a primary motivator for individuals to adopt behavior congruent with the expectations of a group (Leonard et al., 1999). The goal for these individuals is behavior that elicits positive feedback and feelings of belonging from the group. Chiu, Hsu, and Wang (2006) found a positive association between identification and individual contributions in online communities. External self-concept may lead to altruistic behavior for open-source creations in that it increases a willingness to share knowledge in, for example, Wikipedia or other similar projects (Lai, Yang, 1378).

Edward Deci emphasized a distinction in the locus of the motivation being both internal and external. Deci labeled internal motivation as 'intrinsic motivations' and external as 'external rewards.' As open source programmers are not generally paid for their work, we may presume that they are seeking intrinsic rewards.

An interesting characteristic of contributors to Wikipedia (the largest open-source project based on the number of contributors) is how each volunteer customizes their personal profile page. Many are choose badges specific to their role in the project. For example, there are icons for specific subjects being monitored, or a status obtained for the amount of years contributed. This kind of identification complements research that has predicted just this sort of behavior. For example, McCall & Simmons 1978 suggest that role-identity is an important aspect of the self, and that, once developed, "becomes the primary factor influencing intentions to continue [volunteering]."[6]

Just like a Wikipedia profile page, a person may wear a large gold cross to signify the importance of religion and the desire to share their beliefs. People use belongings as a form of "characterization and communication – in which personal values may be expressed in possessions" (Richins, 530). Possessions allow people to achieve an identity that can be seen consistently from their own eyes as well as others. The desire to own and what one owns then becomes a psychological desire to define oneself; "for the materialist, possessions and their acquisitions represent values central to life; 'things' signal one's own and others' identity, success and happiness" (Hunt, Kernan, & Mitchell, 1996). In the case of a person wearing a golden cross, this iconography is remarkable in its similarity to the way online personas recreate this same representation virtually.

Ownership is as much social as it is a survival instinct because people not only think about what they own, but have to routinely reason about what others own. Studies have been performed to learn about when associations with

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6 Example user profile page: <http://en.wikipedia.org/wiki/User:Gyrobo>

ownership are formed because understanding who owns what, allows us to resolve potential social conflicts that could otherwise arise if we treated someone else's property as our own. This makes understanding who owns what in its myriad of forms (property law, personal objects, virtual objects), essential for normal social interaction. We can safely assume the importance of this awareness as a result of studies that show most conflicts between children concern possession and the use of objects (Friedman, Neary, 830). For example, we know that disputes over property are "among the earliest, most frequent, and most intense conflicts in childhood" (Anderson, Kalish, 66).

As an example many people are familiar with, children's clothing is often labeled so that they and others will recognize ownership. Ownership is not a quality that is innately known, it must be communicated, so by labeling clothing adults "explicitly teach children that ownership effects are mind-dependent; people have to know something is yours" for ownership to exist (Anderson, Kalish, 69). Further, consumers use "mental representations" using prior knowledge in assessing something as a possession, to help separate that which can be owned, and that which can't (Laroche, McDougall, Bergeron, & Yang, 19). Therefore it is safe to assume that this model of communicating ownership may spread to other areas when trying to communicate ownership in a new context, like for contributions to online software.

In addition to establishing a sense of self, community recognition is important to further solidify this identity and to better fit into a group setting. This community identification corresponds to Maslows' needs of belonging and love.

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Survey respondents in one study have explained that participation in open-source projects " demonstrates my abilities" or that this work "can [be used] as a reference" (Hars, Ou, 6). Given that most of this work is done with online projects, any demonstration of ones abilities is naturally in a public space, which could correspond with this desire for belonging. The desire for peer recognition is derived from a desire for fame and esteem (Hars, Ou, 4). Peer recognition is also, partly, a form of self-marketing. Programmers regard working for open-source projects as an effective way to publicly demonstrate or "to publicize one's skillfulness and capabilities" (Hars, Ou, 4). In this sense, there is little altruistic in this view of participation.

Competence is an important component of a sense of self. After a self has been defined, a person will naturally want to feel that this identity has worth. Again just like Maslow and other's models suggest, behavior that helps to add a feeling of competence is essential as a basic human need. Many of the respondents of the previously mentioned survey described their motivation originating from a "feeling of competence, satisfaction and fulfillment that arises from writing programs."(Hars, Ou, 3). Clearly then, programming can correspond with feelings of fulfillment like any other work, encouraging further participation with a project.

Another perspective one may take when looking at programming, is that it may act less as an action, and more as a virtual possession that can be owned in a less literal sense. Avey et al. (2009) noted that people care for and nurture their physical possessions. We also know that people prefer and place more value in

objects they own. Perhaps then, these behaviors extend to the code programmers create. Like music notes, they may exist only when being acted on in a very ephemeral sense, but still retain the sort of feelings of possessiveness that some physical possessions have.

We typically prefer owned objects to similar ones that we do not own (Beggan, 1992; Irwin and Gebhard, 1946). This suggests, and as research has shown, that owned objects enjoy a special processing status (Beggan, 1992). We form such a strong association between owned objects that they are treated as psychological extensions of self and their perception is warped by pervasive self-protecting biases (Belk, 1988, 1991). The impulse to create code then, may be very tightly linked to this bias to protect or enhance one's self-identity.

A similar pattern is demonstrated by the 'mere ownership' effect or the tendency for objects arbitrarily assigned to self to be seen as having more positive characteristics (Beggan, 1992; Belk, 1988, 1991). In some cases, objects of equal worth can be perceived as being more valuable (the endowment effect—Kahneman, Knetsch, & Thaler, 1990) than identical items not assigned to self. These observed effects may also be a reason people code, because they prefer that a program behave in a way specific to their own instructions, as opposed to someone else's. This preference is widely seen in anecdotes when working with programmers who, when viewing another's code, are naturally inclined to either view it as inferior to their own or in some way inefficient.

Another example of intrinsic motivation is altruism, where a person seeks to increase the welfare of others at the cost of their time or money. Altruism is

defined as a "self-destructive behavior performed for the benefit of others...if it benefits the actor less than the recipient" (Charng, Piliavin, 29). Open source volunteers when responding to surveys, "generally give 'altruistic' reasons for becoming involved...however, self oriented reasons are also very common, such as interest in the activity, perceived benefits to those they know, getting job experience, enhancing social status, or simply having social contacts " (Charng, Piliavin, 55).

Biological altruism has been studied in some depth, with explanations ranging from increasing mating opportunities by acting as a "costly signal of fitness and…promote mating opportunities"(Warneken, Tomasello, 455) to reciprocal altruism, in which individuals help others in anticipation of being helped in return. One of the most cited explanations for the existence of altruism is a theory called kin selection. Kin selection suggests that individuals may sacrifice their own resources, time, or lives to increase the odds that their family or species may survive, increasing some aggregate benefit to their genetic code. Without kin selection, explaining phenomena such as termites and ants sacrificing for one another regularly would be inexplicable by previous theories (Warneken, Tomasello, 455).

Some researchers have suggested that the degree to which an animal or person is altruistic is mathematically tied to the degree to which the entity receiving help is genetically similar to the one giving it. For example, Hamilton (1964) quantified how the act of helping relatives would promote one's own genes (ants in the same colonies are highly genetically related). Of these

explanations, studies in social psychology have termed open-source contributions as a kind of "kin selection altruism" by (Hars, Ou, 3). The theory of cultural group selection may also be playing a significant role. In this theory, altruism exists because individuals imitate whatever behavior is the most frequent in their local group (Andre, Morin, 2).

Even though altruism may be both genetic and cultural in origin, humans know from everyday experience that there are many individuals who do not spend time or resources supporting others. What then separates those who act from those who do not? One possible answer is the existence of an altruistic personality. Many articles that review experimental research have found "inconsistent relationships between personality characteristics and pro-social behavior"(Charng, Piliavin, 31). If accurate, these studies find that volunteers are high in self esteem, high in competence, high in internal locus of control, and low in the need for approval. Those who are already high in feelings of approval, belonging, or self-confidence, have less of a motivation to contribute.

It is difficult to attribute open source contributions as not deriving from seeking belonging or recognition as unlike other charitable acts, every step of their contribution (each line of code) is saved and attributed to the individual. A related example that may seem disconnected is the motivations stated by blood donors. Like code, a person utilizing the benefit of this donation does not know who gave blood for their benefit, making this donation anonymous and unrecognized. However, in a 1981 review on studies done with blood donations, Boe & Ponder reported "a strong need for recognition and prestige" in those who

gave blood. In this case recognition still exists, but is given separately from where the contributions are received. Circles of recognition may be smaller (an office of coworkers) and in the case of an open source project (group of all contributors), but it is still present (Charng, Piliavin, 31).

Just like the behavior of those who donate their blood, the acts of those who contribute their time to code are perfectly compatible with a desire for ownership. In both cases, the donor has not lost anything that would suggest the costs were greater than the benefits. This is not to say these acts are not charitable or altruistic, but that they are still compatible with a selfish view of the world were possessiveness takes precedent. If a person begins to contribute code with an altruistic mind-set, attribution theory (Heider 1958, Kelley 1967) suggests that this behavior may persist given that the individual perceives he/she has taken an action without external coercion or reward. Open-source contributors are rarely compensated for their work, so their time may lead to a predisposition toward that action and to be more likely to act in ways consistent with it. People tend to perceive themselves as acting less altruistically if they help "after being offered money as an incentive, under reciprocity pressures, that is, if the person they helped had previously helped them, if normative expectations to help had been made salient" (Charng, Piliavin, 43).

A more recent phenomenon of altruism, which has been of interest to researchers, is the ability for someone to contribute to the public good at little to no cost to themselves. For open source projects, the only cost to the programmer

is time. As for their output "…any number of people can have a copy without the inventor being materially poorer" (Stallabrass,143).

This condition requires further refining the definition of altruism as little to nothing is then risked or given from the donor in this case. This also has implications for the donor's motivations to contribute, if they themselves recognize the minimal cost in participating. Unlike donations of personal property, once code or information has been created "its replication is costless, and it cannot be consumed or spent" (Raban & Rafaeli, 2007). This makes the value of information difficult to ascertain. Shapiro and Varian (1999) argue that information is an "experience good," and that its value is demonstrated only after consumption. This may have implications in terms of reciprocity, which will be explored later.

Tapscott and Williams (2007) argue that society's transition from an industrial to information-based economy changed more than just how we produce information. It also transformed the relationships around those creating this content. They use the term "Wikinomics" to refer to the notion that collaborative, peer production is the key structure to how people create information with a diverse set of motivations and without payment. They also suggest three conditions for the existence of Wikinomics: cost for contributions is low or nonexistent, tasks are segmented into "bite-size[d] pieces" which boosts participation, and little to no quality control.

When considering the various motivations a person has to contribute to Wikipedia, one initially would cite an altruistic desire to increase access to

information. While this is certainly a large component, it's difficult to reconcile an innate desire for personal gain and wealth, with the behavior of many that give their time to produce information for the benefit of others. One perspective that may explain this behavior is to consider altruism as being a means to an end, in a sense, strategic altruism. Recently there have been two notable examples of strategic altruism that facilitate the creation of a public good. In 1994, Merck, one of the largest pharmaceutical companies, financed efforts to detect regions of the genome that harbored active, protein-coding genes (Angrist, Cook-Deegan). At around the same time, companies like Human Genome Sciences were quickly filing patent applications of hundreds of thousands of short snippets of genes. These patents threatened Merck's future ability to create medicines or treatment using genes for advanced targeting. So through funding given to Washington University in St. Louis, Merck was able to preemptively release what other companies were patenting, as a public good.

Similarly, in 1999 a consortium of drug companies spent $30 million to quickly identify and make public millions of genetic variants to identify particular disease and drug responses. Like Merck's response, these actions created a large wealth of freely available public information, but were done to protect their future interests, not out of pure altruism (Angrist, Cook-Deegan, 90).

The comparison to Wikipedia is noteworthy because it suggests that any public good may be the result of a similar strategic altruism on the part of the individual. A person knowledgeable in one area may create publicly available knowledge with the expectation that they will likewise have access to a wealth of

free information, which they do not currently possess. With this perspective, an innate desire to own is perfectly compatible with open-source contributions as a person is giving a small amount of information as an investment for significantly more information in the future.

Wikipedia is an online and collaboratively written encyclopedia. It is often studied as an ideal model of an open source platform because of its scale and how long it has maintained an active community. It is also remarkable for the overall quality it has achieved given the openness with which any individual may create or alter articles. A study by Nature magazine found that articles on Wikipedia are comparable or better than established and commercial alternatives (Giles, 900). Since it's founding in 2001, Wikipedia has grown "in terms of volume, numbers of articles, visitors, and percentage of contributors" and now covers 250 language editions of Wikipedia. The English language version is the largest with over two million articles (Sheizaf, Yaron, 243).

Wikipedia's size acts as an ideal macrocosm of the world of altruism, both because of the pure number of contributors as well as the utility it provides to people around the world. Despite being one of the most visited websites on the Internet and its general popularity, less than 2.5 percent of its visitors contribute 80 percent of all the content (Tapscott &Williams, 2007). Even if you consider that not everyone is an expert in a particular field or qualified to contribute, this 2.5% also includes small spelling and grammatical errors, citations, and other minor edits that most could easily help with.

Other online communities that involve sharing, experience this same disparity with only a minority of users contributing. For example, Adar and Huberman (2000) found only 10 percent of the users on Gnutella (a peer-to-peer file sharing service) supply 87 percent of all content. Similarly, Lakhani and Hippel (2003) found that only 4 percent of the users of open-source development communities provide 50 percent of answers on a help site (Sheizaf, Yaron, 248). Given recent evidence (Angwin & Fowler 2009) that shows user contributions on Wikipedia declining for the first time, there must be a mixture of motivations persuading Wikipedia contributors to volunteer other than pure altruism, which theoretically could sustain their interest.

In 1997, Israeli zoologist Zahavi studied the Arabian Babbler, a bird species that live in small groups of which a subset watch over the others' safety while they are feeding. Zahavi also noted that birds share food with one another when food is scarce (Bishr, 2). Observations like this appear often in nature, and suggest the presence of altruism as an inherited trait. This also suggests that altruistic behavior must carry some benefit for survival, and thus is not altruism in the purest sense.

Zahavi provides a radical explanation for this behavior by suggesting that the birds watching over the others feeding, are really asserting their dominance by guarding subordinate birds. In his words, this is equivalent to saying "Look how superior I am, I can afford to give you food" or "Look how superior I am, I can afford to risk myself … on top of a tree and be vulnerable to hawks while you feed on the ground" (Zahavi, 1997). This has wider implications for altruism as it

suggests it may frequently result from selfish aims, and may be difficult to detect in its varied forms.

Peter Kollock (1999) wrote that "literal altruism" is a rare phenomenon. Kollock suggests several possible alternatives to altruistic reasons people contribute to online communities, including: "anticipated reciprocity, sense of efficacy, and attachment or commitment. Open source contribution may be similar to the behavior of Zahavi's birds in that these contributions are a form of Cost Signaling Theory (CST), which asks what benefit an organism stands to gain by increasing the chances a predator will notice them. For the aforementioned birds, the signal was being vocal and warning other birds, the cost was a higher risk that a predator would hear and find them. Somewhat analogous to this would be users in peer-to-peer networks, of whom many are free riders. Those who share files put themselves at risk for legal consequences if the content is not public.

The altruism we find in online communities would be better termed "participation altruism" (Margolis 1982) which corresponds to Andreoni's (1989) "warm glow" from the act of sharing knowledge. Andreoni refers to participation altruism as "selfish" to distinguish it from the non-selfish "pure altruism." Selfish altruism means that people derive some benefit from the very act of giving (Kyriacou, 827).

In light of the behavior people exhibit with regard to their possessions, similarities begin to form to the behavior of the Wikipedia contributors. Selfless acts, in this frame of reference, co-exist with selfish predispositions because they

are actually occurring out of self☐interest rather than with a strong sense of common good. Contributions to Wikipedia reward the contributor by sending: signals of authority, one's public identity, place and acceptance in a community. Wikipedia's low contribution numbers may be due to "the low number of people who can exhibit altruism … as it is defined as a costly signal" (Bishr, 4).

Hars and Ou (2001) suggest, based on a survey of programmers contributing to open source projects, that many view their participation as a personal investment from which they expect future returns, including: revenues from related services or products, gained human capital from the acquisition of a new skill, self-marketing to demonstrate their capability in programming, and peer recognition (Sheizaf, Yaron, 253).

Reciprocity is especially congruent with the belief that humans are inherently selfish. As something given under the expectation of later receiving, does not leave an individual at a loss. In the case of Wikipedia, "anticipated reciprocity" is a person's motivation to contribute given they have an expectation that they will later receive useful help and information in return (Sheizaf, Yaron, 250). The theory of indirect reciprocity suggests that individuals receive-long term benefits for short-term pro-social acts (Simpson, Willer, 1).

We have seen the importance possessions have on defining an individual, and an important component of defining oneself, is how persistent this self is. In online communities, a stable self-image or "identity persistence" is based on a record of a user's past contributions. Identity is crucial because community members "avoid those who never give or conversely make an effort to help those

who have contributed in the past"(Sheizaf, Yaron, 250). Further, Sheizaf and Yaron believe identification is likely highly tied to motivation. So despite what people may cite, or believe, as reasons for the amount of time given to knowledge sharing activities, research shows that attitude is not sufficient for people to take action. Identity in a virtual community is a more accurate predictor of behavior (Farn, Shih, 265).

Wikipedia articles do not publicize who writes its articles, yet identity plays a crucial role in incentivizing user participation. Interviews with contributors reveal that Wikipedia authors "recognize one another and often claim or compete for ownership of articles" (Bruckman, Forte, 2). One quote from a contributor gives a summary of how identity works in this context: "…because I've become a well-known person in that community—somebody has specifically invited me to come in and look at [an] article …In some ways you get recognized, you get some respect, recognition from your fellow…here's somebody who knows his stuff, who writes good articles and so on and so forth, and you feel happy when one of them puts a posting on your talk page. " Another replied that he or she was hoping to have an article they wrote featured on the homepage. "Featured articles stay on the front page for a day, and then they're swapped for another, so I'm really just trying for bragging rights with this on" (Bruckman, Forte, 2).

These kinds of statements suggest that a person's desire to own while contributing to open source projects, remains very strong and present. Not only are the two congruent, it seems in some cases contributions are a direct form of

ownership, in this case of the information produced, and in another owning and maintaining a sense of self.

Although Wikipedia forbids individuals from explicitly claiming authorship within an article, the site provides indirect ways of establishing ownership and its main contributors are well aware of who writes or owns which articles. Wikipedia users have personal pages where they publicly symbolize ownership by claiming credit to articles they have written. Some Wikipedia users "include elaborate resumes on their user pages" (Bruckman, Forte, 4). Bruckman and Forte go further saying, "the notion of credit exists in Wikipedia both as reward and as credibility that empowers individuals in the community."

This sort of behavior is not exclusive to Wikipedia, and can also be seen in scientific contributions. Latour and Woolgar found that, for the scientific community, the most critical incentive system is the "cycle of credit." Credit, in the scientific context refers to a person's standing in a community and ability to affect change. Credit, ultimately, may affect a scientist's ability to receive a grant or to have future research published. Latour and Woolgar observe that when scientists use the term "credit", what really motivates them is "a sense of credibility that allow[s] them to assume more and more central roles in the scientific community." Credit then, is not an overt acknowledgment of success, but a "measure of power and efficacy" (Bruckman, Forte, 2).

The ultimate difference between Wikipedia and credit received in other circumstances such as in the scientific community is that with Wikipedia, credit is the result of indirect attribution of authorship (Bruckman, Forte, 3). Meaning,

other than how directly it is derived, credit on Wikipedia exists and affects users by motivating them to obtain it just as in other circumstances.

We know credit exists on Wikipedia and is highly valued, because it is a necessary requirement to obtain certain statuses such as to become an administrator. Any user may become an administrator, however voting is required and in addition to past contributions, a prerequisite is the credibility this user has in the Wikipedia community. According to surveys of past contributors, accruing votes is not a pure meritocracy. One contributor voiced his frustration by writing that "you have… people who never ever get name recognition at all, but they've created a huge amount of high quality content and haven't caused trouble and have behaved themselves and nobody knows them…Then I see other people getting voted to be an administrator and everybody is making the comments "Gosh you're not an administrator already? I thought you were already administrator. Of course I'm gonna vote for you"(Bruckman, Forte, 4).

Recognition is directly tied to a user's contributions, and perhaps also the continuity of their assistance. Wiertz and Ruyter (2007) investigated why customers are willing to support other users in technical support forums, for free. Like Bruckman and Forte, they too found that contributions to these communities are strongly influenced by a customer's tendency for "online interaction, feeling of commitment to the community, and the perceived informational value" (Sheizaf, Yaron, 251). In other words, these individuals participate to receive recognition, identity, and acceptance within a community. As discussed previously, these same desires for belonging are seen with the use of personal property.

Individuals maintain a sense of self with personal belongings, and in the case of open source contributions, generate content to reinforce a positive image of oneself. A direct motivation for participating may then be out of a desire for "maintaining notions of [the] self" (Sheizaf, Yaron, 255).

It is not immediately apparent that one may qualify interaction on Wikipedia as a community, and this notion of online interaction, strongest in person, requires some exploration. McMillan and Chavis (1986) define a "sense of community" as feelings of belonging, of being valued by other members in a group, and some sense of commitment to participation and remaining a group. Wikipedia provides ample opportunities for these interactions including being able to track and compare edits made by one another, watch new contributions by specific authors, discussion pages attached to each article, conversations and personalized user pages (Sheizaf, Yaron, 259).

If a sense of community exists in online environments, then the next crucial element required for motivation to exist is one's reputation within this community. Anthony et al. (2005) studied the contributions made from Wikipedia volunteers rather than their motivations to participating. They found that the quality of contributions increased with the number of contributions made, and concluded that these volunteers are motivated by reputation (Utz, 361).

We know reputation affects a person's interest in altruism from studies that look at other forms of giving, including acts such as donating blood. In a survey asking the motivation to give blood (and reasons for doing so on a continual basis), "peer-influence" elicited some of the highest numbers "perhaps

via the mechanism of improving the donor's reputation" (Kuruvatti, 2). The idea in this context is that donors most frequently originate from shared settings or groups, such as offices. In this setting, many volunteer out of fear of hurting one's reputation within the group for not appearing altruistic. A new user adding content to Wikipedia does not have any standing as they begin rather anonymously. This supports the explanation of why peer influence exists after additional contributions, as with each additional article this user will receive increased exposure within the community, and eventually an identity.

Once a user has an identity within the community, their reputation and standing will take on increasing weight. Kollock suggests that users contribute to get prestige in this community, and is a key motivation for participation. He believes that the "history" section of each article, which tracks changes to an article, allows authors to easily track the work of others and that one's reputation correlates with the number of their contributions in this area (Sheizaf, Yaron, 251).

Wikipedia claims altruistic intentions for their authors, but Bosworth (2006) proposes a two-stage reward system along the lines of what has been discussed so far. This system includes the new users that gain satisfaction for basic and incremental participation and the "fanatics" or administrators, who get much larger rewards by receiving special status through additional recognition and competitiveness with others. Bosworth believes this reward system self-selects for people who are obsessive about specific subjects, or those willing to constantly re-assert their dominance by continually changing pages to reflect

their edits or content. This equates to recognition for the most participation, as well as future control over the page for having competed the longest over its content. Famous collaborators are then measured based on the quantity and frequency of their edits. Well known contributors are famous within Wikipedia for "owning" a large number of articles.

With such a myriad of motivations behind participation on Wikipedia, cracks begin to form explaining the recent decline in participation. Virtual communities commonly experience problems sustaining themselves from a lack of contributions. In the case of Wikipedia, sustaining the motivation to contribute is hurt by "lurkers" or "free riders", users who consume but do not contribute content (Adar & Huberman, 2000). Another issue cited with Wikipedia's decline, and predicted years earlier based on the decline of other virtual communities, is the reliance on a very small number of vigorous contributors to keep the rest of the community active. Studies have shown that group activity in online communities follow power laws such as Pareto distribution and Zipf's law of participation in online community (Sheizaf, Yaron, 247). The Pareto distribution and Zipf's law are patterns that have been found accurate to describe behavior, in this case that a decrease in participation fits a regular pattern matching those models.

As we have seen from Kollock (1999), reciprocity is a main driver behind the motivation to create content. If the minority of contributors begins to decline or lose motivation to participate, this could destroy the inherent reciprocity within Wikipedia, creating a negative spiral of declining participation. A decline in

reciprocity and participation, will lead to an increase in free riders. Buchanan's (1968) probabilistic approach to the free rider's choice suggests that an individual will only contribute to the collective good if the expected value from doing so is larger than that from free riding (Kyriacou, 827).

That ownership and self-interest permeate a person's behavior is not difficult to accept. Children from a very early age exhibit a lack of self-control regarding the consideration of others. Greed exists as a defense mechanism to ensure an individual does not suffer from a life of privation, which is the foremost reason traces of greed are found in most human activities. An important consideration is that an excessive greed for material wealth, be separated from this innate desire to own things for survival. It is the latter, which has been discussed in this paper and about which attempts have been made to reconcile two seemingly opposite motivations.

The comparison is more difficult, when the desire to own is less materially focused and more instinctual. It is simple to dismiss reconciling greed for material goods with open source code as nothing materially is given up. Reconciling an instinct for greed is less straightforward. One perspective that may help is to consider that people are not contributing because it is at no material cost to themselves, but from the same primal desire to own. A person contributes code, knowledge, and time because it benefits them to do so, in the same way as an individual who gives up personal freedom for the benefit of a stable society.[7]

The ultimate lesson is not to doubt the charitable intentions of individuals wanting to expand access to the sum of human knowledge, but to more

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[7] Social contract theory <http://en.wikipedia.org/wiki/Social_contract>

accurately describe and understand the various sources of motivation people

have to participate. Understanding this will allow future projects to structure

themselves in such a way as to increase the amount of knowledge shared, and

the continued participation of volunteers. Wikipedia and other open source

initiatives should not disregard personal desires (such as for a positive online

identity) in an effort to cloak themselves as projects benefitting from an

outpouring of pure altruism. They should instead accept the inherent selfishness

of its donors and exploit this psychology for the benefit of their stated purpose.

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