

# Why Do People Seek Anonymity on the Internet? Informing Policy and Design

Ruogu Kang<sup>1</sup>, Stephanie Brown<sup>2</sup>, Sara Kiesler<sup>1</sup>

Human Computer Interaction Institute<sup>1</sup>

Department of Psychology<sup>2</sup>

Carnegie Mellon University

5000 Forbes Ave., Pittsburgh, PA 15213

ruoguk@cs.cmu.edu, smb1@andrew.cmu.edu, kiesler@cs.cmu.edu

## ABSTRACT

In this research we set out to discover why and how people seek anonymity in their online interactions. Our goal is to inform policy and the design of future Internet architecture and applications. We interviewed 44 people from America, Asia, Europe, and Africa who had sought anonymity and asked them about their experiences. A key finding of our research is the very large variation in interviewees' past experiences and life situations leading them to seek anonymity, and how they tried to achieve it. Our results suggest implications for the design of online communities, challenges for policy, and ways to improve anonymity tools and educate users about the different routes and threats to anonymity on the Internet.

## Author Keywords

Anonymity; online community; information disclosure; privacy.

## ACM Classification Keywords

H.4.3. Information systems applications: Communications Applications, K.4.2. Computers and Society: Social Issues.

## General Terms

Human Factors; Security.

## INTRODUCTION

Should people have the right to anonymity on the Internet? Should CHI researchers join with others to make anonymity online easier to achieve? Or should online anonymity be banned? These questions are matters of debate among security researchers [e.g., 9], politicians and policy analysts [e.g., 31], community designers [e.g., 16], architects of the new Internet (e.g., [www.cs.cmu.edu/~xia/](http://www.cs.cmu.edu/~xia/)) and the public. Although hundreds of laboratory and field studies describe positive and negative social effects of anonymous communication [e.g., 7, 30], there is a dearth of research on Internet users' own perspectives on anonymity, and the

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

CHI'13, April 27 – May 2, 2013, Paris, France.

Copyright 2013 ACM 978-1-XXXX-XXXX-X/XX/XX...\$10.00.

literature that exists mainly derives from studies of one or a few online communities or activities (e.g., the study of 4chan in [5]). We lack a full understanding of the real life circumstances surrounding people's experiences of seeking anonymity and their feelings about the tradeoffs between anonymity and identifiability. A main purpose of the research reported here was to learn more about how people think about online anonymity and why they seek it. More specifically, we wanted to capture a broad slice of user activities and experiences from people who have actually sought anonymity, to investigate their experiences, and to understand their attitudes about anonymous and identified communication.

Another purpose of this research was to understand the strategies people use in trying to achieve anonymity online. Most tools available to achieve online anonymity are poorly understood. More than 85% of the interviewees in one study said that they did not know how to surf the Web anonymously [9]; most people do not know who has access to information about them or how they get this information [17]. Indeed, the average person has only a vague notion of how the Internet works [23,25] and the potential threats for users [15]. This knowledge may be important because anonymity is no longer assured just by using pseudonyms or relying on the obscurity of large numbers. People shop online using credit card information often revealed to third parties. They search and browse, and their clicks are recorded. A user's comments in a blog post may be searched and connected to his professional website. Even personal health records, despite attempts to keeping them confidential, are not necessarily safe [27]. How well do people understand this context of increasing social transparency and third party use of their information? We wanted to discover how users try to achieve anonymity, and whether they are confident that they have achieved it.

The intended contribution of this research is to provide a richer understanding of the different situations in which people try to avoid being identified online, to inform debates about anonymity on the Internet, and to suggest improvements for the wellbeing and privacy of users.

## What We Know So Far

Security researchers define anonymity as unidentifiability

“within a set of subjects” [24, p. 2]. The definition we use in this paper is based on Gary Marx’s analysis [18]: being anonymous means a person cannot be identified according to any of seven dimensions of identity knowledge, that is, the person’s legal name, location, pseudonyms that can be linked to the person’s legal name or location, pseudonyms that cannot be linked to specific identity information but that provide other clues to identity, revealing patterns of behavior, membership in a social group, or information, items, or skills that indicate personal characteristics.

Internet users care a lot about their privacy, and surveys suggest they may have reasons to seek privacy by hiding their identity [1]. What we know about these reasons is derived mainly from studies of particular activities or groups who intentionally seek anonymity, including whistle blowers [12], members of stigmatized groups [20], people conducting sensitive searches [9], hackers [8], and lurkers [26].

Anonymity lifts inhibitions and can lead to unusual acts of kindness or generosity, or it can lead to misbehavior, such as harsh or rude language and acts that are illegal or harmful. [30]. People use the protection of anonymity to reduce the social risks of discussing unpopular opinions and taboo topics, and to create different personas online than they exhibit offline [3, 37].

We also can draw on the literature about the different ways people anonymize their Internet activities, including the use of proxy servers, Secure Sockets Layer technology, anonymous emailers, and cookie managers [33]. These options are used by comparatively few Internet users, despite their concerns about privacy and security [2,4,38]. People more often modify their own behavior to manage their identity presentations to other users, for instance, by falsifying their personal information or using multiple email accounts [6], or adjusting their profiles on social networks sites [32].

These studies suggest that attitudes about particular online communities or sites, technical barriers, and personal privacy preferences can help explain people’s motivations to seek anonymity. However, to inform policy and design, we need a better understanding of the real life contexts that lead people to seek anonymity across different Internet activities, and their effectiveness in doing so. We therefore conducted interviews with people who had sought anonymity online to learn about their activities, their experiences, their knowledge, and their opinions of being anonymous online.

## METHOD

We recruited Internet users who said they had done something anonymously online in the past, and who volunteered for a confidential interview study. We conducted one-hour semi-structured remote interviews with them from October 2011 to March 2012 via cell phone,

Skype or IM chat from an anonymous client. All chat logs and audio recordings were coded anonymously.

Because we did not have prior theory or hypotheses to test, we used a qualitative interview approach (see, for example, [11]). The interviews used a protocol with follow-up questions to explore answers in further detail [22]. The interviewer asked interviewees what activities they had done online anonymously, telling them that “anonymous” meant having no connection with personal information such as their legal name or persistent email address. For each activity, the interviewer asked interviewees why they wanted to be anonymous. Interviewees were prompted to give concrete examples of anonymous activities and the history of those activities. The interviewer asked them to describe the methods they used to achieve anonymity and to evaluate their level of anonymity when taking those actions (i.e., unidentifiable to the rest of the world, to some users on the site, to some of their friends, to website moderators, or to anyone outside the community).

In the second part of the interview, the interviewer asked interviewees about the activities they did using their real names or other personal information that identified them. They were asked why they used their real names for those activities. The interview ended by asking interviewees to evaluate the pros and cons of anonymous and identified communication online.

## Participants

We interviewed 44 participants, 23 women and 21 men. They were recruited using Amazon Mechanical Turk, Craigslist, and university forums. We told recruits that we were interested in online anonymity and asked them to participate if they had ever used the Internet anonymously. All of our interviewees said they used the Internet frequently, and had at least one prior experience with anonymous browsing or another type of anonymous online activity. Interviewees were from the United States (15), mainland China (14), Taiwan (9), Hong Kong (1), the Philippines (1), the United Kingdom (1), Romania (1), Greece (1), and Ethiopia (1). Their ages and occupations varied widely; there were students, employees, and retirees. Interviewees reported a range of technical computing skills from practically none to advanced; one interviewee was an IT manager and another had a university degree in network security.

## Data Analysis

All interviews were recorded, transcribed and translated into English. For interviews conducted in Mandarin Chinese, the original transcripts and the translated versions were coded separately and back translated. Discrepancies were resolved in discussion.

We performed qualitative data analysis using a grounded theory approach [10]. The data were coded in NVivo software. In the first stage of analysis, we performed open

coding, identifying anonymous activities, behaviors, and attitudes in the interview transcripts. Two coders independently coded the same subset of the interviews, discussed and resolved differences, and clarified code definitions. We then performed axial coding. We discussed the body of coded transcripts, and performed affinity diagramming to group similar concepts and generate connections. These were clustered into themes. We returned to the interviews to clarify ambiguous codes and to divide themes that were too broad into separate parts. We then examined the relationships between these thematic categories, looking for patterns in reported behaviors and motivations. We refined themes during the writing process.

## RESULTS

The interviewees described a myriad of unique anonymous activities on the Internet. A retired teacher created an anonymous online community for English learners to practice their language skills with each other. A Chinese student used anonymous social networking profiles to play good-natured tricks on his friends. Some interviewees used anonymity as a general online practice, but most used it judiciously, for particular kinds of online interactions.

About half of the interviewees (53%) used anonymity for illegal or malicious activities such as attacking or hacking others, or they engaged in socially undesirable activities like browsing sites depicting violence or pornography. Other socially undesirable activities included downloading files illegally, flaming others, ‘peeping’ others, or searching for others’ personal information online. The line between illegality and undesirability was sometimes fuzzy, and many whose behavior was acceptable in some situations, for example, within a discussion forum, were fearful it would be unacceptable in others, for example, at work. It was also impossible to cleanly separate “bad guys” from “good guys” in our data because many of those who reported antisocial behaviors (e.g., behaviors that are unfriendly, antagonistic, or detrimental to social order) also reported prosocial behaviors (e.g., behaviors that are altruistic, or intended to help others).

### Instrumental and Social Anonymity

Table 1 summarizes the various online activities that interviewees did anonymously. Sixty-one percent of the interviewees mentioned instrumental activities they did anonymously, including browsing websites and downloading files. Many search engines provide personalized search results and recommendations, but some interviewees browsed anonymously to avoid tailored results and access a wider range of information or to avoid personalized advertising. Some interviewees browsed anonymously because they felt that registering or logging in was unnecessary and only benefited a company.

### Anonymous social activities

Ninety-three percent of the interviewees reported

anonymous social interactions online. Some anonymous social activities were idiosyncratic, seemingly done for fun or amusement. An interviewee in mainland China created a fictitious profile on a social networking site to play a trick on a friend.

*I created a profile similar to my friend’s profile on Renren.com. Then I added all the contacts from his ‘friends’ list, and posted some funny updates daily ... since he was on good terms with me, I liked to play tricks on him. He did that to me too. (#30)*

Many anonymous social activities, however, were associated with groups. Anonymity can make it difficult for people to establish trust or get credit for one’s contributions in groups, and may hinder online community building [16]. Our interviewees generally agreed that these were benefits of identifiability. Nonetheless, more than half of our interviewees were anonymously involved in various online interest groups, mostly hobby groups on topics such as fiction, music, pets, games, technology, and sports. One popular reason for anonymity was that the norm of those groups was to be anonymous. In a few cases, the group had an implicit or explicit membership standard that encouraged anonymity in those who did not conform. For instance, interviewee #27 joined a Japanese video sharing

Type of anonymous activity	Number of interviewees (N = 44)
<b>Instrumental Anonymous Activities (61% of interviewees)</b>	
Filesharing and downloading	18 (41%)
Browsing and searching for information	18 (41%)
<b>Social Anonymous Activities (93% of interviewees)</b>	
Participating in special interest groups	25 (57%)
Social networking	24 (55%)
Sharing art or work	20 (45%)
Exchanging help and support	16 (36%)
Buying and selling	13 (30%)
Discussing or being involved in politics	9 (20%)
Reviewing and recommending	4 (9%)

Table 1. Types of anonymous activities

community anonymously to hide his American identity, because the community excluded foreigners.

Although social networking generally requires using one's real identity, half of our interviewees reported using fictitious profiles to go on social networking or dating sites, or used false personal information when chatting online. Some interviewees used different social network profiles to separate the information they shared with different groups of people. A teacher (#17) was very active in a fandom group, and often posted fan fiction online. She wanted to keep in touch with other members of that community, but she was afraid that she might be criticized if her family or her boss found out about her writing because it was not "real" fiction. She therefore maintained two Facebook accounts, one under her real name for family and co-workers and one under a fictitious name for fandom friends.

Nearly half of the interviewees reported posting original artwork, photographs, videos, and writing online to share with others and receive feedback. We expected interviewees to attach their real names to original works to gain status and reputation, but many interviewees chose instead to sacrifice recognition to avoid links to their offline life. Interviewee #1 participated in various online music communities every week. She always posted her songs anonymously so that no one at work would find them and judge her by them.

*The reason I won't use my real name is to not connect my real life with the online community... I don't want my supervisors and colleagues to know about the other side of my life, since that may make my image look bad. (#1)*

Interviewees who posted original work also sought anonymity to manage their online interactions. One artist told us that he built a reputation in online communities by posting his works under a consistent pseudonym, although he wasn't sure that counted as being recognized for his work. He also explained that he preferred not to log into his account at all when reviewing other people's work.

*When I post critiques I tend to be rather harsh.... [I'm afraid off being targeted by someone who can't take a critique, so they might decide to try to find my alias on other art sites, and troll me in return. (#24)*

Consistent with McKenna and Bargh [20], some interviewees sought help in online support groups anonymously. Some joined online domestic abuse or parenting support groups. Others went to forums to ask questions about finances or gaming. In addition, some interviewees provided support or help to others anonymously. Interviewees chose to be anonymous to preserve their public or self-image, or to manage their online relationships. The same interviewee who liked to play tricks on his friend told us that he also visited technology forums and helped people solve technical issues. He was happy to help, but sought to avoid unwanted commitments.

*Once I helped a guy solve a problem, then he asked my real identity and kept coming back to me. It was hard to refuse him since he knew who I was. I don't like this kind of thing being turned into an obligation. (#30)*

Thirteen interviewees mentioned buying or selling products or services with other users. Nine lived in Asian countries where BBS or forums allow people to purchase goods from other users anonymously. Four interviewees from the West also bought and sold goods online. Of these four, two mentioned using fictitious information to buy and sell items on Craigslist to avoid being identified or tracked down by online predators. The other two said they typically used their real information to pay a seller using a credit card, but sometimes they initially communicated with the seller under a pseudonym.

Nine interviewees joined political discussions on anonymous forums to contribute their views and debate with other users. Some also engaged in anonymous online voting, made online donations, or participated in social protests. Interviewees from several different countries mentioned browsing news sites and political blogs and forums anonymously to access information from blocked sites and to protect themselves from social censure or legal consequences.

Four participants anonymously posted their views about products and services. They mentioned their concerns about not knowing who would access their reviews and having their reviews stored online forever. They sought anonymity to avoid negative reactions from the subjects of the reviews or from people with opposing views. One woman explained that she always signed her postal letters with her real name because they were addressed to one person or organization, but that she preferred to write anonymously when online.

*I posted a very bad review [of a restaurant]. And I guess I did that [anonymously]. I live in a small town, so I certainly didn't want to put my real name, although I would have no problem speaking face-to-face with the restaurant owner ... If you speak to somebody face-to-face, you know who you spoke to. But when it's online, you're really potentially speaking to billions of people, and the information will last. (#21)*

In sum, we identified a variety of instrumental and social online activities that people did anonymously. Consistent with prior work, people preferred to be anonymous when seeking help or doing other activities that might make them seem socially undesirable or needy, such as when they were using online dating sites or asking for support in groups, but we also found that people pursued anonymous activities when being identified might expose them to personal threat.

#### **Personal threat models**

When interviewees told us about an activity they did anonymously online, we asked them their reasons for doing

so. Many answers reflected a personal “threat model” of persons or organizations. Frequently, the source of threat lay outside the particular activity, site, or group in which the person sought anonymity. Personal threat fell into five categories: online predators, organizations, known others, other users on the site or in the community, and unknown others.

Online predators included criminals, hackers, scammers, stalkers, and malicious online vendors. Fear of identity theft and spam was the main concern of those who made online sales or purchases with credit cards or account information. Fear of stalking or harassment was a major motivation for hiding one’s identity when chatting, posting on forums, and building social networks.

Organizations that posed a threat included government and business organizations. Government was a threat because it has the power to identify and punish illegal, subversive, or undesirable online activity. Interviewees who told us about illegal downloading or filesharing were concerned with avoiding exposure and arrest. Companies were a threat because they could reuse or sell information to marketers and spammers.

People that the interviewees knew in real life were sometimes named as a threat, mostly as a precaution but sometimes because of a past negative experience. Among those named were specific family members, friends, employers, teachers, co-workers, supervisors, classmates, current significant others, and previous romantic partners. Anonymity was particularly a concern for people who wished to avoid harassment from estranged or controlling parents, former friends, or previous romantic partners.

Other users on a site or in the community could also be considered a threat. For example, a Taiwanese blogger told us that he used to maintain a blog. When he stopped posting for a while in order to keep some personal information private, his friends on the site kept looking for him and asking about his life. This was a source of stress for him.

*Those online friends know what your life looks like, but then suddenly if you don’t talk with anyone, or just disappear, then everyone would ask what had happened to you. This is a huge pressure to me. (#36)*

Finally, interviewees also mentioned nonspecific malicious entities that they felt were lurking online. Thirty-nine percent of interviewees expressed the attitude that revealing personal information online is “dangerous” without any specific threat in mind. A college student who participated in technology and gaming forums lurked almost all the time, manually changed his IP sometimes, and used multiple email accounts, but rarely had any specific threat to hide from.

*If I do something stupid online I want to be prepared... It’s just like when you prepare for a disaster, you don’t know what disaster is going to strike. (#10)*

In sum, interviewees’ personal threat models generally involved protection and privacy from other people and groups; they were either attacker-centric or relationship-protective, as compared with the more typical software-centric model (e.g., STRIDE) used in computer security analysis (e.g., [13]). Participants sought to protect themselves from real-world threats such as getting arrested, physical attacks on themselves or their families, stalking, harassment, and loss of property or jobs. They also feared online attacks, including online harassment, trolling, and flaming. They used anonymity to prevent potential privacy leaks, expressing concerns that once their information was online, it would be stored permanently and anyone could access it. One 4chan user almost always posted anonymously, because he felt that any information he shared online would be out of his hands.

*To a large degree, you cannot control who views, accesses, or uses any data you put on the Internet ... the Internet never forgets. (#12)*

Other interviewees made similar statements.

*The Internet is sticky - pages stay up, info stays up, etc. (#16)*

*I have no clue where [personal information] goes or how people could access it. (#25)*

#### ***Motivations other than threat***

The literature in social psychology and online communities has described motivations for anonymity that are less about threat *per se* than about the emotional effects of anonymity and ways that anonymity can help people manage their social relationships online [20]. In accord with this literature, a few of our interviewees said that using a pseudonym or fictional identity made them feel “cool” or “sophisticated.” Some mentioned feeling more relaxed talking to anonymous strangers than to friends. One student told us that he sometimes added random people to his online chat list to talk about things that bothered him.

*When I’m talking to someone else and neither of us knows who the other person is, there’s no apprehension. Whatever you want to say, you can just say it; you can go ahead and vent some of your frustrations. (#31)*

#### ***Strategies for attaining anonymity***

Participants reported using both technical and behavioral strategies to achieve anonymity. The most commonly used technical method was to change one’s IP address. Interviewees used proxy servers, VPNs, and anonymizing systems like Tor to hide their home IP address, or they changed their IP address manually. Two interviewees used proxy servers every time they went online, and 15 interviewees applied proxies when participating in potentially compromising activities such as torrenting, accessing blocked sites, revealing sensitive information, or browsing special forums (e.g., about hacking, politics, or

health). Those with more advanced technical skills used encryption to protect their information. For users with lower technical abilities, one commonly used method was to change browser settings or website-specific privacy settings to control which other users had access to their profiles. Most, however, said they did not bother because, as one interviewee explained, the tools “*are quite a bit of trouble to use.*” (#13)

All interviewees, regardless of their technical expertise, used behavioral methods to hide their identity. Half of the interviewees obtained anonymity within online communities by not participating. They also limited the information they shared online. Sixteen interviewees reported sharing false information to maintain their anonymity—providing a fictitious name, using a false profile photo, and inventing biographical information when other users asked for personal information.

We asked interviewees how effectively they had achieved anonymity. We did not quiz them on their understanding of the Internet, but many interviewees revealed an incorrect or incomplete understanding of the Internet and anonymity. For example, when discussing the private browsing function of a web browser, interviewee #8 said she was not sure whether it erased her traces from the computer she was using or from the website she visited. Interviewees also confused social anonymity (e.g., hiding name, location, occupation, and so forth) with technical anonymity (e.g., hiding IP address or computer information). Many did not understand that one can be anonymous within a particular group or application but not anonymous to the ISP.

A few possessed greater understanding of the Internet and distinguished between what members of a community knew and what might be discovered about their Internet behavior more generally. For instance, interviewee #21 said she was unidentifiable in a particular online community because of the steps she took to protect her identity (using a specific pseudonym for that community, and not revealing personal information to others), but she also said that there is no true anonymity on the Internet because anyone with technical expertise could find out who she was.

#### *User-defined anonymity and full anonymity*

Under Marx’s definition of anonymity, we found that few achieved full anonymity even when they claimed to do so. Most participants did not reveal their real name or location, and many participants mentioned using pseudonyms to hide their identity, which use would afford incomplete protection. A few participants said that they used variations of their names (#2, #9) or something important to them (#10) in their pseudonyms, and they were aware that some other users or website administrators could identify their real identity from their pseudonyms. Other participants purposefully used one-time or unique pseudonyms in their attempts to be anonymous (e.g., a Taiwanese blogger, #41, used a website to generate a temporary email address for

website registration). Some people reported creating separate identities in different online communities to prevent their friends in one group from learning of their membership in another group. For example, the fandom enthusiast (#16) used a consistent pseudonym for all fandom-related activities that were “unconnected with my real name.” Some others, however, used the same identification information across communities or platforms, which would provide clues to their real identity. Only a few participants were aware that subtle patterns of behavior across time and applications could identify them. The more-aware fandom enthusiast employed different communication patterns when talking with her online friends and her friends in real life. One participant (#12) said that revealing his expertise could identify him. He explained that he maintained a variety of detailed personas, one for each of his unique skill sets, in order to share his expertise without compromising his anonymity.

#### **Factors in the decision to be anonymous**

Our study examined users’ experiences and understanding of online anonymity. From the narratives interviewees told, we gained some insight into their decision making processes for choosing anonymity over revealing their real identity.

The prior literature cited earlier suggests three factors that may lead people to seek anonymity. These include technical constraints and misunderstanding of the Internet, the online community context, and personal privacy preferences (e.g., [34]). Our interviews with people about their experiences of seeking anonymity exposed two other important factors that influenced their activities and their strategies for attaining anonymity: their prior negative experiences, and their desire to manage the boundaries between their online and offline worlds.

#### *The role of prior experience*

Prior negative experiences influenced interviewees’ perceptions of how using their real identity might pose a threat and how anonymity would protect them from future threats. Fifteen interviewees used anonymity because of a prior unpleasant or frightening experience. A European woman told us she used false information in every online activity she participated in because she was once lured to another country by online criminals who pretended to offer her a job. She escaped, but the experience was terrifying.

*My life was in danger... I was even afraid to go on the Internet at that time. But... I learned a lot of things about the Internet, and the most important, you don't have to use real information about yourself. (#19)*

Two of our interviewees had been victims of a “human flesh search” [35]. Interviewee #6 told us about a stalker who searched for her personal information using her username on a BBS. The stalker was able to trace that username to many of her other online activities, including

the forums she visited and the comments she had posted. After the incident, this interviewee created unique usernames for each of her accounts on different sites. Another interviewee was a graduate student (#40) who published some damaging information about a university president candidate on a forum. The candidate's supporters retaliated by exposing all of the student's personal information, including his real name, school, and department, and then spreading a false rumor that he was not a real student.

Friends' or other users' prior experiences also influenced people's decisions. For example, a Chinese woman who always shopped online using fake identity said,

*Actually I'd used my real name before, but I heard of stories like this: a retailer received a bad review, so she posted the buyer's identity information to the web and said some very bad things about the buyer. So I started to use fake names. (#8)*

Having been attacked in the past was not correlated with using a more effective or technical method for attaining anonymity. Many interviewees did not have the technical skills to avoid detection. The woman who had been lured overseas by online criminals began to change her Internet service provider every six months, believing that this action anonymized her on the Internet.

#### ***Managing boundaries***

Interviewees' decisions to seek anonymity were often influenced by their desire to control and manage the boundaries between their different social networks, groups, and environments. Interviewees often sought anonymity to prevent conflict with friends or family, to maintain a professional public image, or to avoid government attention. They wanted to preserve separate identities in real life and online, in different online groups, and in different real life groups. The fan fiction writer with multiple Facebook accounts told us that anonymity was particularly important to her because her writing sometimes contained adult content. As her job involved working with children, she was afraid that people would censure her if they found out she had authored erotic fiction.

*When you work with kids, a lot of people feel like you don't have a right to a personal life. You have to be a role model at all times, even when you're not at work. (#17)*

Twelve interviewees viewed anonymity as a way to protect their real-life relationships. Potential risks to relationships included opposing views, conflicts of interest, and loss of trust. One Chinese interviewee said that she felt less reluctant to post her political opinions on anonymous forums than on social networking sites where friends could identify her posts.

*I've some friends who do not agree with my views. Sometimes I criticized the government on Renren.com.*

*Then these friends would argue with me under my post. I didn't want our friendship to be affected, so I didn't want to express my views under my real name again. (#3)*

Ninety-two percent of the interviewees who talked about anonymity as a way to protect their real-life relationships were from Eastern countries. We speculate that the relational benefits of anonymity might be more important for members of Eastern cultures, consistent with the literature on communal societies and collectivism in Eastern cultures [14].

Some interviewees wished to create boundaries between different online activities. One interviewee had frequented a website about preparing for zombie attacks. Because some of the members liked to post pictures of the weapons they owned, he was more cautious about disclosing personal information on that site than on the game sites he visited:

*In my head, there's a big difference between video game enthusiasts and firearm enthusiasts... whenever I was interacting with the firearm enthusiasts, I wanted that extra level of protection. Not that I thought everyone was bad... I just happen to know all the guns they own. (#13)*

Interviewees who liked to express different social identities in different online settings often created and maintained multiple IDs and personas to reflect how they wanted to appear to work contacts, family and friends, or other members of their online communities. They sought to keep these personas separate by maintaining separate profiles and social circles. One woman (#16) maintained separate email, Facebook, and Twitter accounts for fandom activities and for communicating with real-life friends and colleagues. Another interviewee (#36) told us he kept two Flickr accounts, one for his friends and another he used only to share photos with his parents and older relatives.

Interviewees also used anonymity to manage restrictions in the online environment such as government policies that blocked content. When the websites that participants wanted to browse violated government policy restrictions, interviewees sometimes chose to browse anonymously. Other interviewees in this situation, however, decided not to be anonymous in order to appear "normal" (see [28]). One man told us that he liked to visit subversive websites out of curiosity but would never register or post for fear of drawing government suspicion.

*I just want to be perceived as a harmless voyeur of this stuff, because to me it's like spy novel stuff, and... I don't have the money to defend myself if some overzealous cybераuthority sees me doing more than browsing. (#22)*

Prior experiences and the wish to control and manage the boundaries of their social worlds influenced how interviewees thought about the costs and benefits of anonymity and identifiability.

Category	Advantages of being anonymous	Advantages of being identified
<b>Social connections</b>	Avoid disliked others Avoid commitment to the community Lower barrier to new relationships Protect others one cares about	Connect to real life friends Have stronger social connections Encourages more participation
<b>Reputation and trust</b>	Give honest rating/ recommendation	Good for reputation building Gain trust from other users
<b>Image building</b>	Have control over personal image Avoid embarrassment /judgment /criticism	Avoid harsh criticism Consistent with self-image
<b>Emotional benefit</b>	Feel relax and comfortable Feel cool and sophisticated	Feel real, integrated Feel closer to people
<b>Express opinion</b>	Feel free to express views	Avoid irresponsible behavior
<b>Privacy</b>	Have more control over personal information disclosure	Look innocent
<b>Security</b>	Protect personal safety Avoid legal repercussion/spam/stalk/lost of property	Hide in the crowd
<b>Ease of use</b>	Saves effort to log in	Easy to remember account

**Table 2. Perceived tradeoffs of being anonymous vs. being identified**

#### **Tradeoffs between anonymity and identifiability**

Nearly all of our interviewees (86%) held both positive and negative attitudes about anonymity. Two advocated anonymity as a right and felt that it was essential to privacy and security in the digital age. Twelve said that anonymity could be misused and could allow irresponsible behavior without consequences for the perpetrators, but would not give up their rights to be anonymous because of their own situations.

Ten interviewees thought seeking anonymity as a general online strategy was a futile pursuit because advances in computing and use of digital data have made anonymity virtually impossible across applications. These participants were concerned about hackers, the government, and unknown others capturing their IP address and tracking them down. They expressed concerns about personal information being used by third parties such as proxy or torrent server owners. One government employee felt very strongly that although anonymity is essential for privacy and security, it is exceedingly difficult to achieve:

*We, to a large degree, live in a post-privacy world, where if you know how, you can find out anything about anyone. (#12)*

Table 2 summarizes the balance of factors that interviewees recalled retrospectively about their choice to be anonymous or identified. Tradeoffs included expanding the diversity of their Internet associations versus protecting their image and relationships, freely expressing their opinions versus maintaining their credibility, and getting useful, personalized recommendations versus receiving spam.

#### **DISCUSSION**

The Internet increasingly reveals much about people to each other and to third parties [29]. This trend makes it more pressing that we decide whether anonymity should be easier or more difficult to attain, and whether the usability of anonymity tools should be improved.

#### **Policy and design questions**

Our results show that people from all walks of life had reason, at one time or another, to seek anonymity. A main policy tradeoff is that discouraging anonymity will discourage malicious behavior (about half of the incidents in our data) but will also discourage people from engaging in creative, helpful, and harmless online activities that they might otherwise pursue. Many people would be prevented from managing personal threat and their social boundaries because identifiability increases the bleeding of social information across time, place, and group.

Current Internet design allows for anonymity at the application level (e.g., within a website), but anonymity across applications (especially in some countries) is very difficult to achieve for most users. Further, the demographic information or content that users reveal can be linked across applications and cause them to be identified even if their legal name, email address, and IP address are hidden. An important policy question is whether Internet users should have stronger controls on their levels of anonymity, and whether the risks of anonymity outweigh its benefits. In this paper, we examined only the risks and benefits for individuals rather than for communities or the society as a whole. Recent world events, such as the rapid spread of a viral incendiary video, suggest that the freedom of

individuals to act anonymously will need to be balanced against societal effects.

Forty-five percent of our interviewees expressed uncertainty about what might happen to them or their data online. They also did not have an accurate understanding of how their personal information could be accessed by others and which information would be disclosed. Interviewee #16 mentioned concerns about her practice of entering her telephone number in multiple accounts, and whether that behavior connected her multiple identities. She avoided using sites that did this.

*I think the threat for me is mostly that Google would accidentally associate my two accounts. (#16)*

Our findings suggest we should institute higher standards for telling people what use others are making of their data and what information is actually disclosed to others when they try to hide their identity via pseudonyms or other means (see [19, 21]). Interviewees noted the absence of user-friendly tools for achieving anonymity. Some complained that existing proxy servers were too slow or difficult to use. Others did not know how to use anonymity tools at all. If we want to support anonymity as an option online, then we must improve the usability of tools for achieving anonymity.

Online communities will sometimes want to offer anonymity for some or all members. Such communities will probably need to develop strong norms and moderation or sanctioning processes to support prosocial behavior and prevent destructive behavior [15]. Online pseudonyms allow users to build reputations inside single communities or websites such as eBay while keeping their real identities hidden. However, our interviewees sometimes wanted to build reputations across different online platforms. We suggest that new mechanisms might provide better solutions for users attempting to balance their safety concerns with their desire for widespread recognition.

## LIMITATIONS AND FUTURE WORK

Although the diverse demographic and technical skills of our sample provided us with a snapshot of anonymous Internet use in different cultures, government policy areas, and knowledge contexts, our sample was not a representative sample of the population of Internet users. Limited by our interview approach, we were also unable to examine how users' strategies align with their actual anonymity levels. Further research will require a more representative sample and a more fine-grained approach to find out how Internet users in general define and seek anonymity.

Our sample and the study design did not allow us to distinguish political from cultural factors in motivations for anonymity. People in countries whose governments censor the Internet say they execute self-censorship and may avoid seeking anonymity explicitly so as not to cast suspicion on

themselves [28], but cultural factors, such as a cultural belief in respect for authority, could be at work as well. In our study, Chinese interviewees weighed relational factors especially heavily when choosing to hide their identity. They also were more suspicious than other interviewees about information being used against them by officials, vendors, and strangers, and many did not register on websites when they avoid doing so. Our finding echoes other work suggesting that Chinese users are particularly likely to falsify their identity on online social network sites [36]. This behavior could be due to political or cultural beliefs, or to biases in our sampling. In our future work we plan to investigate this question further.

## ACKNOWLEDGMENTS

Support for this work was provided by NSF grants CNS1040801 and CNS1221006.

## REFERENCES

1. Ackerman, M.S., Cranor, L.F., and Reagle, J. Privacy in e-commerce: examining user scenarios and privacy preferences. *Proc. of the 1st ACM conference on Electronic commerce*, (1999), 1–8.
2. Albrechtsen, E. A qualitative study of users' view on information security. *Computers & Security* 26, 4 (2007), 276–289.
3. Bargh, J.A., McKenna, K.Y.A., and Fitzsimons, G.M. Can You See the Real Me? Activation and Expression of the "True Self" on the Internet. *Journal of social issues* 58, 1 (2002), 33–48.
4. Berendt, B. Privacy in e-commerce: Stated preferences vs. actual behavior. *Communications of the ACM* 48, 4 (2005), 101–106.
5. Bernstein, M.S., Monroy-Hernández, A., Harry, D., André, P., Panovich, K., and Vargas, G. 4chan and/b: An Analysis of Anonymity and Ephemerality in a Large Online Community. *Proc. of ICWSM 2011*, AAAI Press (2011), 50–57.
6. Chen, K. and Rea, A. Protecting personal information online: A survey of user privacy concerns and control techniques. *Journal of Computer Information Systems* 44, 4 (2004), 85–92.
7. Christopherson, K.M. The positive and negative implications of anonymity in Internet social interactions. *Computers in Human Behavior* 23, 6(2007), 3038–3056.
8. Coleman, E.G. and Golub, A. Hacker practice. *Anthropological Theory* 8, 3 (2008), 255–277.
9. Conti, G. and Sobiesk, E. An honest man has nothing to fear: user perceptions on web-based information disclosure. *SOUPS*, (2007), 112–121.
10. Corbin, J.M. and Strauss, A.L. *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Sage Publications, Inc, 2008.

11. Edmonson, A.C., and McManus, S. E. Methodological fit in management field research. *Academy of Management*, 32, (2007), 1155-1179.

12. Greenberger, D.B., Miceli, M.P., and Cohen, D.J. Oppositionists and group norms: The reciprocal influence of whistle-blowers and co-workers. *Journal of Business Ethics* 6, 7 (1987), 527-542.

13. Hernan, S., Lambert, S., Ostwald, T., and Shostack, A. Uncover Security Design Flaws Using The STRIDE Approach. <http://msdn.microsoft.com/en-us/magazine/cc163519.aspx>.

14. Hofstede, G. Dimensions of national cultures in fifty countries and three regions. In J.Deregowski, S. Dzurawiec and R. Annis, eds., *Explications in Cross-Cultural Psychology*. 1983.

15. Jensen, C. and Potts, C. Privacy practices of Internet users: self-reports versus observed behavior. *International Journal of Human-Computer Studies* 63, 1 (2005), 203-227.

16. Kraut, R.E. and Resnick, P. *Building Successful Online Communities: Evidence-Based Social Design*. The MIT Press, Cambridge, Massachusetts 2011.

17. Krishnamurthy, B. and Wills, C.E. Characterizing privacy in online social networks. *Proc. of the first workshop on Online social networks*, (2008), 37-42.

18. Marx, G.T. What's in a Name? Some Reflections on the Sociology of Anonymity. *The Information Society* 15, 2 (1999), 99-112.

19. Mazurek, M.L., Arsenault, J.P., Bressee, J., et al. Access Control for Home Data Sharing: Attitudes, Needs and Practices. *Proc. of CHI 2010*, ACM (2010), 645-654.

20. McKenna, K.Y.A. and Bargh, J.A. Plan 9 From Cyberspace: The Implications of the Internet for Personality and Social Psychology. *Personality and Social Psychology Review* 4, 1 (2000), 57-75.

21. Odom, W., Sellen, A., Harper, R., and Thereska, E. Lost in translation: understanding the possession of digital things in the cloud. *Proc. of CHI 2012*, ACM (2012), 781-790.

22. Patton, M.Q. *Qualitative research and evaluation methods*. Sage Publications, Inc, 2002.

23. Pew Internet Project. Reputation management and social media: Our digital footprints. 2010. <http://www.pewinternet.org/Infographics/2010/Reputation-Management.aspx>.

24. Pfitzmann, A. and Köhntopp, M. Anonymity, Unobservability, and Pseudonymity – A Proposal for Terminology. *Designing privacy enhancing technologies*, (2001), 1-9.

25. Poole, E.S., Chetty, M., Grinter, R.E., and Edwards, W.K. More than meets the eye: transforming the user experience of home network management. *Proc. DIS 2008*, ACM Press (2008), 455-464.

26. Preece, J., Nonnecke, B., and Andrews, D. The top five reasons for lurking: improving community experiences for everyone. *Computers in Human Behavior* 20, 2 (2004), 201-223.

27. Señor, I.C., Fernández-Alemán, J.L., and Toval, A. Are Personal Health Records Safe? A Review of Free Web-Accessible Personal Health Record Privacy Policies. *Journal of Medical Internet Research* 14, 4(2012), e114.

28. Shklovski, I. and Kotamraju, N. Online contribution practices in countries that engage in internet blocking and censorship. *Proc. of CHI 2011*, ACM (2011), 1109-1118.

29. Stuart, H.C., Dabbish, L., Kiesler, S., Kinnaird, P., and Kang, R. Social transparency in networked information exchange: a theoretical framework. *Proc. of CSCW 2012*, ACM (2012), 451-460.

30. Suler, J. The online disinhibition effect. *Cyberpsychology & behavior* 7, 3 (2004), 321-326.

31. Teich, A., Frankel, M.S., Kling, R., and Lee, Y. Anonymous communication policies for the Internet: Results and recommendations of the AAAS conference. *The Information Society* 15, 2 (1999), 71-77.

32. Tufekci, Z. Can You See Me Now? Audience and Disclosure Regulation in Online Social Network Sites. *Bulletin of Science, Technology & Society* 28, 1 (2007), 20-36.

33. Turner, E. and Dasgupta, S. Privacy on the Web: An examination of user concerns, technology, and implications for business organizations and individuals. *Information Systems Management*, (2003), 8-19.

34. Westin, A. and Harris Louis & Associates. *Harris-Equifax Consumer Privacy Survey Technical Report*. 1991.

35. Wang, F.Y., Zeng, D., et al. A study of the human flesh search engine: crowd-powered expansion of online knowledge. *Computer* 43, 8 (2010), 45-53.

36. Wang, Y., Norice, G., and Cranor, L. Who Is Concerned about What? A Study of American, Chinese and Indian Users' Privacy Concerns on Social Network Sites. *Trust and Trustworthy Computing*, (2011), 146-153.

37. Yurchisin, J., Watchravesringkan, K., and McCabe, D.B. An Exploration of Identity Re-creation in the Context of Internet Dating. *Social Behavior and Personality: an international journal* 33, 8 (2005), 735-750.

38. Zhang, X. What do consumers really know about spyware? *Communications of the ACM* 48, 8 (2005), 44-48.