

Personlig Integritet: A Comparative Study of Perceptions of Privacy in Public Places in Sweden and the United States

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ABSTRACT

In this paper we report on a cross-cultural study of people’s judgments about privacy in public places. Replicating and extending a previously published study conducted in the US, 350 surveys and 30 interviews were conducted on a university campus in a major city in Sweden. Participants were recruited on campus while walking through a major public thoroughfare which was being captured by a video camera and displayed in real-time in a room in a campus building overlooking the area. We analyze the Swedish data alone and also report comparative analyses with the previously published US data. Results showed in general Swedes are substantially more concerned about privacy in public places than their counterparts in the US. In both countries, women generally expressed more concern than men, but this gender gap was greater in the US than Sweden. Discussion focuses on cross-cultural perspectives on privacy in public and implications for interaction design.

Categories and Subject Descriptors

K.4.1 [Computers and Society]: Public Policy Issues

General Terms

Human Factors, Legal Aspects.

Keywords

Privacy, Value Sensitive Design, human values, informed consent, indirect stakeholders, public place, user conceptions.

1. INTRODUCTION

900+ = Number of applications for new video surveillance cameras in public places in Sweden in 2006 [1].

1,000+ = Estimated number of public schools in Sweden with video cameras at the end of 2007 [2].

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3,000+ = Number of video cameras predicted to be in downtown Manhattan by the end of 2010 [14].

100,000,000+ = Number of dollars the United States Department of Homeland Security has provided to local governments in the United States for video camera networks since 2003 [16].

While perhaps surprising when seen in black and white figures on a page, such numbers and the ubiquitous presence of video cameras in public places are increasingly the norm in many Western societies. To ride in a taxi cab in Seattle Washington in the United States is to agree to having one’s image captured, recorded and stored for a limited period of time in a remote location. To drive the city streets of New York, similarly carries with it an implicit agreement to have one’s image and vehicle captured, recorded and stored by a digital camera at various intersections and for such images to be used as evidence for traffic violations.

On the surface, the pervasive presence of cameras in public places suggests that overall members of society are comfortable with their existence and have shared expectations for their use. Yet such homogeneity may not be the case. A recent report by ABC News indicated that 71% of Americans favor the increased use of surveillance cameras for safety purposes [14]. However, that data also implies that nearly a third of Americans surveyed do not. Beyond safety and security, cameras are more and more frequently pointed toward public places for health, communication or entertainment purposes [4, 8, 13]. Here, too, we do not find homogeneity of expectations or perspectives. For example, Friedman and her colleagues [7] investigated people’s reactions to a video camera pointed toward a public place that was used to provide “outside views” to workers in inside offices. They reported pervasive gender differences, with women more than men troubled by the video camera installation. That study also examined people’s reasons for their perspectives, revealing differences in social expectations around cameras in public places as well as divergent sensitivities to privacy and other potential harms.

The human-computer interaction community has longstanding interest in such concerns. As a community, HCI researchers and designers regularly contribute technology, interaction designs, and research to support the widespread distribution of computing

throughout public space. However, widespread distribution without exploring the possibility for different perceptions of privacy across public spaces risks cultural and societal biases as well as outright product rejection [11]. A first step toward designing for privacy entails understanding what privacy means to those who will use and be affected by the use of the technology [5, 10]. As we shall see from the studies presented here, while sharing fundamental constructs, privacy takes on different emphases in different cultures – even when those cultures exist within the Western world. We recognize that interactive technologies are built all over the world today. Following from the interactional stance of value sensitive design [7], the values in those different societies influence how those technologies are built; in turn, those technologies influence how people will perceive and experience their options for privacy.

To explore cross-cultural understandings of privacy in public as well as related issues concerning the design of interactive systems in public spaces, we replicated and extended the Friedman et al. study with Swedish participants. We conducted the comparison between the US and Sweden for two reasons, one theoretical and one pragmatic. Theoretically, we expected the two cultures to have a good deal in common. After all, though Sweden may be a more collectivist culture with strong social democratic values than the US, both belong to a western philosophical tradition. Differences between participants from the two countries would need to be explained on the level of differences in legislation, discourse in the media, and technology deployment within the region (in this case, video surveillance equipment). We were also curious to see how the countries' political values might influence people's perspectives on privacy in public. Our second reason was largely pragmatic: We wished to engage in a collaboration that would position us to drill deeply into our own understanding of our respective cultures. Importantly, researchers from both countries were able to participate in the project. As we shall see below, this aspect became crucial to how we set up the study and interpreted our results.

Within this larger context, our goals were three-fold: (1) To investigate Swedish perspectives on privacy in public. This investigation entailed collecting new survey (Study 1) and interview (Study 2) data from Swedish participants that would be comparable to and extend the data previously reported for US participants. The survey method (with a large sample size) positions us to identify general patterns in participants' judgments about privacy in public; in turn, the interview method (with a smaller number of participants) positions us to better understand why Swedes hold the views they do. (2) To conduct comparative analyses between that new Swedish data and the previously published US data. These analyses position us to consider the questions: Are the views and values we find unique to Swedish participants? Or do they reflect on some dimensions more widespread judgments? And (3) to chronicle lessons learned from conducting cross-cultural research about privacy, particularly as it affects people's experience of privacy in public.

The paper is organized as follows: First we discuss our preparations for conducting cross-cultural research. Next we report on Study 1: The Survey Study, including the Swedish survey results followed by a comparative analysis with the US survey data. Then we report on Study 2: The Interview Study. Similarly we report the Swedish interview results followed by a comparative analysis with the US interview data. We then reflect on our cross-cultural research process and lessons learned. We conclude with contributions and directions for future work.

2. PREPARING FOR CROSS-CULTURAL RESEARCH

A first step in conducting this research was to construct a cross-cultural research team comprised of Swedish and US researchers. The cross-cultural research team positioned us to have native Swedish speakers collect and code the Swedish data; similarly, the US data had been previously collected and coded by native English speakers.

From our initial conversations, we were alerted to potential differences in the Swedish and US definitions of and expectations for privacy. For example, the Swedish word for privacy, *personlig integritet*, means both controlling information flow and maintaining the quality (accuracy) of that information. In the US, the word privacy usually refers to the former concept but does not address the quality of the information. In addition, given a perception that women in Sweden feel reasonably safe in public places, our Swedish team members suspected gender differences in Sweden might not be as strong as those found among the US participants. Thus, we expected to find different patterns of gender difference on key questions in the survey between Swedish and US participants.

As we developed, refined, and translated the survey and interview questions into Swedish, other potential differences between Swedish and US world views came to the fore. In particular, at the time of our data collection Swedish and US law differed about cameras mounted in public places, including when such cameras might be mounted, where, and what might happen with the images that were collected [15]. Such differences in legislation might affect participants' views about having their images captured by a camera in a public place. We anticipated the interviews might reveal some of these differences. Our on-going discussions also highlighted that there may be a tendency among Swedes to place a relatively high degree of trust in their government. Thus, we became interested in the extent to which Swedish participants would trust their government with protecting the privacy of their personal information. Because of this interest, we included a new question in the Swedish interview to assess participants' degree of trust in government authorities, private companies, and individuals.

3. RESEARCH SETTINGS AND INSTALLATIONS

The Swedish data were collected on a university campus in a major Swedish city. A video camera from inside a university building captured the images of people as they walked through a major thoroughfare of the university alongside the Södra Huset building (see Figure 1). Participants were solicited by Swedish research staff sitting at a table in that area.

Similarly, the US data had been collected on a university campus in a major US city. A video camera mounted outside a university building captured people's images as they walked through a public plaza (see Figure 2). Participants were similarly solicited by US research staff sitting at a table in the public plaza.

4. STUDY 1: THE SURVEY STUDY

4.1 Swedish Participants and Methods

4.1.1 Participants

350 individuals participated in the Swedish survey study (176 females, 174 males; age ranges: 18-25, 51%; 26+, 49%).



Figure 1. View of “the watched” on a Swedish university campus. [Visible individuals are demonstrators.]



Figure 2. View of “the watched” on a US university campus. [Visible individuals are demonstrators.]

4.1.2 Methods

Participants completed a brief paper and pencil survey. The survey questions (reported here in English) were translated into and conducted in Swedish.

On the written survey, participants were informed that there was a camera inside the Södra Huset that was pointed towards the area where they were standing, and that the images were being displayed live in a room in the building. The first set of questions (1a and 1b) was designed to get at participants’ evaluations of the camera installation prior to introducing the term “privacy”. Question 1a asked, “Are you surprised to learn that your live image is being displayed in a room in Södra Huset?” Question 1b then asked participants how they felt about this happening and provided equal numbers of responses that were *positive* (“that’s cool”, “delighted”, “glamorous”, “excited”), *neutral* (“so what?”, “curious”, “surprised”, “doesn’t hurt anyone”), and *negative* (“shocked”, “embarrassed”, “worried”, “violated”). The next question (Question 2) focused directly on participants’ evaluation of the installation in terms of a privacy violation (“Do you think this violates your privacy?”). Then we offered participants two equally balanced reasons for judging the installation either as “no problem” or as “troubling” (Question 3), and asked which of the two ideas they tended to agree with:

Idea 1: Some people say it’s OK to have a camera pointed toward [this area] and display the live image in a windowless room inside Södra Huset. After all, this is a public place. Anyone can see you. There’s really no problem.

Idea 2: Other people find it troubling to think that when they walk through [this area], their image is being collected by a video camera and displayed in a windowless room inside Södra Huset. After all they can’t see the person. They don’t know who is seeing them. They don’t even know that their image is being collected.

Finally, we posed a series of context-of-use questions (4a-g) which asked participants whether it was “all right” or “not all right” to display the live video in seven different contexts (listed in Table 1) with varying location (where the image is displayed) and

magnitude (the number of people viewing the image). At the end of the survey, we asked the gender and age category of the participant.

4.2 Swedish Survey Results and Discussion

Table 1 reports the results by gender from the Swedish survey data alongside the relevant results from the previously published US survey data. We first describe the Swedish results then turn to the comparative analysis.

The first set of questions tapped participants’ initial reactions to the camera installation. Based on Question 1a, a majority (72%, binomial test, $p < .0005$) of the Swedish participants were surprised to learn about the camera and display. Overall, 80% of participants selected at least one of the neutral responses on Question 1b, while 36% selected at least one negative response and only 3% selected at least one positive response.

When asked explicitly about the installation in terms of privacy (Question 2), roughly half (46%) of the participants judged the display of real-time video from the through fare to be a privacy violation. When presented with two reasons to judge the installation as “no problem” or “troubling” (Question 3), half (50%) selected “no problem”, while significantly less than half (32%, binomial test, $p < .0005$) selected “troubling” and the other 18% could not decide.

In response to the context-of-use questions which varied the location and magnitude of the displays (4a-g), roughly one-quarter (23%) of the participants said that all seven of the contexts were “not all right”, while 11% said that all seven contexts were “all right”. However, the majority of participants (67%, binomial test, $p < .0005$) expressed more nuanced views, indicating that the installation would be “all right” in some contexts but not in others.

Based on Cochran’s Q test, there were very strong differences in acceptability among the seven context-of-use ($Q = 685.8, 6 \text{ df}, p < .0005$). This test was followed by conducting McNemar tests for all pairwise comparisons among the seven questions (a total of 21 pairwise tests) and adjusting for multiple comparisons using Holm’s sequential Bonferroni method with $\alpha = .05$ family significance level.

Question	Response	Sweden			United States		
		F N=176	M N=174	All N=350	F N=140	M N=110	All N=250
1a. Are you surprised...?	Yes	81% [†]	63% [†]	72%*	42% [†]	56% [†]	48%*
1b. How do you feel about this happening? (Circle as many as apply)	At least 1 positive	2	5	3*	9	14	11*
	At least 1 neutral	82	78	80	83	87	85
	At least 1 negative	35	38	36	29	25	27
2. Do you think this violates your privacy?	Yes	47	44	46*	26 [†]	11 [†]	19*
3. Two ideas	Idea 1 (no problem)	48	53	50*	58 [†]	72 [†]	64*
	Idea 2 (troubling)	34	29	32*	30 [†]	13 [†]	23*
	Can't decide	18	18	18	12	15	13
4. The camera displays live video in...							
a. ...an office with an outside window.	Not all right	31	39	35*	29 [†]	19 [†]	24*
b. ...an inside office with no windows.	Not all right	35	44	39*	36 [†]	17 [†]	28*
c. ...a local apartment.	Not all right	92 [†]	77 [†]	85*	59 [†]	35 [†]	49*
d. ...an apartment in Tokyo.	Not all right	88 [†]	71 [†]	80*	58 [†]	35 [†]	48*
e. ...thousands of local homes.	Not all right	88 [†]	80 [†]	84*	54 [†]	32 [†]	44*
f. ...thousands of homes in Tokyo.	Not all right	85 [†]	73 [†]	79*	55 [†]	32 [†]	45*
g. ...millions of homes across the globe.	Not all right	88 [†]	76 [†]	82*	55 [†]	31 [†]	44*

Table 1: Swedish and United States Survey Responses by Gender and Country
 * indicates statistically significant overall differences between countries ($p < .05$)
 † indicates statistically significant gender differences (within country) ($p < .05$)

The strongest difference among the seven contexts of use was that participants were much more likely to indicate that it was not all right to display the image in a remote off-campus location (4c-g, 79%-85% “not all right”) than in a room in a nearby building on the university campus (4a-b, 35-59% “not all right”), with p -values smaller than .0005 for all pairwise comparisons between either of Questions 4a-b and any of Questions 4c-g. There was no significant difference ($p = .215$) in participants’ views of displaying the image in a room with an outside window in Södra Huset (4a, 31% “not all right”) vs. in an interior room in the same building with no window (4b, 35% “not all right”). Thus displaying the image in a room in the nearby building was generally acceptable to most participants, whether or not the room has a window. Displaying the image in any other remote location was far less acceptable.

The patterns of acceptability in the five remote context-of-use (4c-g) were much more subtle. McNemar tests indicate significant differences in four of the ten pairwise comparisons among the remote locations. Specifically, displaying the image in thousands of homes in Tokyo was significantly more acceptable (4f, 79% “not all right”) than displaying the image in a single apartment in the local city (4c, 85% “not all right”, $p = .005$), thousands of homes in the local city (4e, 84% “not all right”, $p = .001$), or millions of homes across the globe (4g, 82% “not all right”, $p = .002$). A single apartment in Tokyo (4d, 80% “not all right”) was also deemed more acceptable than a single apartment in the local city (4c, 85% “not all right”, $p = .004$). Thus it seems that the location of the display matters to a significant portion of the participants, who generally view displays in the local city as less acceptable than displays in a very remote location such as Tokyo. The magnitude of the display seems to be less important to participants, with no significant difference in the levels of acceptability between a single apartment in the local city and thousands of homes in the local city (4c vs. 4e, $p = .845$) as well as no difference between a single apartment in Tokyo and thousands of homes in Tokyo (4d vs. 4f, $p = .804$).

To test for gender differences, we used Fisher’s exact test for all questions. Results showed significant gender differences on Question 1a and Questions 4c-g. In particular, more females (81%) expressed surprise than males (63%) ($p = .001$). Also, females were more likely than males to say that it was “not all right” to display the live video in a local apartment (4c, 92% of females vs. 77% of males, $p < .0005$), in an apartment in Tokyo (4d, 88% females, 71% males, $p < .0005$), in thousands of local homes (4e, 88% females, 80% males, $p = .027$), in thousands of homes in Tokyo (4f, 85% females, 73% males, $p = .007$), or in millions of homes around the globe (4g, 88% females, 76% males, $p = .003$). Thus females expressed more concern than males about any hypothetical scenario involving the display of the live video in a remote location. However, there were no significant differences between males and females in responses to Questions 2, 3, 4a, or 4b, all of which dealt with concerns about the actual installation, which displayed live video in a neighboring building with actual window views of the area being filmed.

4.3 Comparative Analysis with United States Survey Data

We turn now to report on a comparative analysis that we conducted between the Swedish survey results (above) and those from the previously published study of US participants [7].

This comparative analysis involved the same 350 individuals who participated in the Swedish survey study (176 females, 174 males; age ranges: 18-25, 51%; 26+, 49%) along with 250 participants from the US (110 males, 140 females; age ranges: 18-25, 53%; 26+, 47%)¹. Besides the translation from English to Swedish, the

¹ In the US study, three different versions of the survey were administered to 250 participants each. One version specified that the video was recorded, another that the video was not recorded, and a third version was ambiguous about whether or not it was recorded. In Sweden, only the ambiguous version was

wording of the two surveys was essentially identical other than the names of nearby locations identified in the survey. Table 1 provides descriptive results from both the Swedish and US surveys by country and gender.

For each question on the survey, binary logistic regression was used to model the probability of a particular response as a function of country, gender, and an interaction term between country and gender. The interaction term allows us to detect situations where, for example, there was a significant gender difference in one country but not in the other. We tested for significance of variables in the model using likelihood ratio tests at the $\alpha = .05$ significance level. Questions with statistically significant overall differences between the two countries are flagged in Table 1 with an *, and questions with significant gender differences are flagged in Table 1 with a †. For some questions, gender differences are only flagged for one country due to significant interaction effects.

In terms of an initial reaction to the installation, the logistic regression model for Question 1a (“Are you surprised...?”) yielded a significant interaction effect ($\chi^2 = 15.454$, 1 df, $p < .0005$) between country and gender. Swedes (72%) overall were much more likely than Americans (48%) to express surprise. This difference was driven primarily by females, with Swedish females (81%) much more likely than American females (42%) to express surprise, while there was not a significant difference between Swedish males (63%) and American males (56%). On Question 1b, logistic regression models yielded no significant gender or country differences in the percentage of participants who selected at least one negative response ($\chi^2 = 6.984$, 3 df, $p = .072$) or at least one neutral response ($\chi^2 = 4.515$, 3 df, $p = .212$). Americans (11%), however, were significantly more likely than Swedes (3%) to select at least one positive response ($\chi^2 = 14.041$, 1 df, $p = .001$).

Questions 2, 3, 4a, and 4b each address concerns about one’s image being displayed on a screen in an office in a neighboring building on the university campus. The details of the four questions vary (for example, Question 2 is ambiguous about whether or not the office has a window, while Questions 3 and 4b specify that the image is displayed in an inside office with no window, and Question 4a specifies that the video is displayed in an office with a window overlooking the same area displayed in the video). The results of the logistic regression models are quite similar for all four of these questions. On each question, there is a significant interaction between country and gender with (i) Swedes more likely overall than Americans to express concerns about displaying the image in an office on campus ($p \leq .003$ in each case), (ii) no gender differences among Swedes, and (iii) significant gender differences among Americans, with females consistently more likely than males to express concerns. On all of these questions, males in the US stand out as being significantly less concerned than any of the other groups.

In terms of off-campus locations, Questions 4c-g address concerns about displaying the image in various remote locations. Once again, Swedes are consistently more likely than Americans to express concerns about displaying the image in any remote location (approximately 80-85% of Swedes on all questions vs. only 45-50% of Americans, $p < .0005$ in all cases). However, in

administered. To facilitate clear comparisons between the two countries, our analyses here include only the 250 ambiguous surveys from the US and the 350 from Sweden.

contrast to the questions regarding on-campus displays of the video, the interaction effect is not significant for any of Questions 4c-g. Instead, within both countries females are significantly more likely than males ($p < .0005$ in all cases) to express concerns about displaying the image in any off-campus location.

4.4 Stepping Back: Key Findings Summarized

For clarity, we recap the key survey findings here. The majority of the Swedes interviewed were surprised by the installation, and about half of them felt that it violated their privacy. Yet only about one-third of them found the installation to be “troubling” or felt that it was not all right to display the live image in a nearby campus building. However, when presented with hypothetical scenarios of remotely displaying the video in other locations, an overwhelming majority (particularly among females) expressed concerns.

From the comparative analyses we learn that by and large Swedes are more concerned about privacy in public than their US counterparts. Furthermore, US males are largely responsible for this difference, expressing far less concern than all other groups in almost all contexts. In the US, a significant gender gap was found on virtually every question, with males more likely than females to be surprised by the camera installation and consistently less likely than females to express concerns about the installation across all contexts. In Sweden, this gender gap disappears for questions about the actual installation (displaying the live image in a building on campus), but continues to hold for hypothetical questions about remotely displaying the live image in private residences.

Still questions remain: What views lie behind Swedish and US participants’ judgments about the camera installation? To what extent do the differences in survey results between countries reflect differences in conceptions of privacy?

5. STUDY 2: THE INTERVIEW STUDY

In order to begin to answer these questions, in the context of the same installation we conducted an in-depth interview study. We report those results in this section.

5.1 Swedish Participants and Methods

5.1.1 Participants

30 individuals participated in the Swedish interview study (15 females, 15 males; age ranges: 18-25, 40%; 26+, 60%).

5.1.2 Methods

Participants were told that the video data was not recorded. In the Swedish interviews, participants were asked the same questions as those in the written survey plus eight additional questions – five about the privacy of common objects or activities (e.g., a hand written diary, a hand written diary posted on a personal web site; a whispered conversation in a café, a cell phone conversation on a bus, and a text message on a bus) and three about the degree to which participants trust various entities (e.g., government authorities, private companies, and individuals) to properly handle collected data and protect privacy rights. In addition, in the interview format we asked participants to discuss their reasons for the views they held, thereby providing an opportunity for in-depth exploration of participants’ perspectives.

5.1.3 Coding

We followed well-established methods in the social-cognitive literature to develop a coding manual and systematically code the

qualitative data [3, 12, 17]. The coding manual for the Swedish interview data was based on that developed for coding the US interviews [6]. All of the original coding categories were retained. In addition, 10 Swedish interviews (33%) were translated into English by a professional translator and used to extend the original coding manual by a team of Swedish and US researchers. When questions of interpretation arose, the original interviews in Swedish were re-examined for clarification. In some cases, existing categories were elaborated and in other cases new categories were created. Then a Swedish researcher trained in the use of the extended coding manual coded all of the Swedish interviews in Swedish.

5.1.4 Reliability

Interviews from 7 participants (23% of the data) were randomly selected and recoded by a second Swedish researcher trained in use of the coding manual. Intercoder reliability was assessed through testing Cohen’s kappa at the $\alpha = .05$ significance level. All tests were statistically significant. For evaluations, $k = .92$ ($Z = 13.87$), for content data, $k = .95$ ($Z = 17.83$), and for justifications, $k = .78$ ($Z = 49.06$). Reliability for justifications was established on the subcategory level as reported in Table 2.

5.2 Swedish Interview Results and Discussion

The majority of the evaluation questions asked in the interviews matched questions asked on the surveys (Study 1). Descriptively the patterns of responses in the interviews were similar to the patterns reported for Study 1 above, but with a much smaller sample size, so we do not report the details here. Instead, since the purpose of the interview study was to better understand the reasoning behind these patterns, we focus here on participants’ justifications.

That said, before turning to the qualitative data, we report briefly on the questions that were unique to the interviews. The first set of questions help to establish the existence of shared privacy norms and social expectations among Swedes for common objects and activities. In particular, 97% of the Swedes interviewed said that a handwritten diary is private, while none (0%) said that the same diary would be private if put on a personal web site. Most (80%) indicated that a whispered conversation in a café is private, but few (17%) thought that a cell phone conversation on a bus was private. Most felt that a cell phone text message was private (87%), even if it was on a bus (90%).

When asked whether they trusted government authorities, private companies, and private individuals to properly handle collected data and protect privacy rights, 70% agreed or strongly agreed that they trusted government authorities, while only 23% agreed or strongly agreed for private companies, and none (0%) agreed or strongly agreed for private individuals. Wilcoxon signed rank tests indicate significantly greater trust of government authorities than private companies ($p < .0005$), and in turn greater trust of private companies than private individuals ($p = .005$). This general trust of government and lack of trust of private individuals may help to explain why most Swedish participants in our survey study seemed to accept the display of the video in a building on a public university campus (questions 4a-b), but most did not accept its remote display in homes of private individuals (4c-g).

The interview data provides a rich description of people’s views and values about privacy in public. Through careful systematic

Table 2. Percentage of Justification Use (Averaged Across the 7 Context-of-Use Questions) for Interview Responses by Country and Evaluation.

Justification	Sweden		United States	
	All Right	Not All Right	All Right	Not All Right
1. Personal Interest	10	12	31	8
1.1 Unelaborated	3	10	1	2
1.2 Indifference	1	0	10	0
1.3 Connection through Info.	0	0	11	1
1.4 Personal Enjoyment	6	2	3	5
1.5 Aesthetics of View	0	0	8	1
1.6 Personal Financial/Material	0	0	--	--
2. External Sanction	9	2	4	0
2.1 Unelaborated	0	0	0	0
2.2 Punishment Avoidance	0	0	0	0
2.3 Social Condemnation	1	1	4	0
2.4 Rules and Laws	7	1	0	0
3. Functionality	30	6	41	25
3.1 Biology	5	0	8	2
3.2 Tech. Isomorphism	25	1	19	2
3.3 Tech. Augmentation	0	5	19	22
4. Social Expectation	24	4	22	31
4.1 Unelaborated	2	1	2	9
4.2 Socio-Tech. Isomorphism	2	0	4	0
4.3 Biological Capabilities	0	0	1	0
4.4 Place	13	1	14	5
4.5 Current Tech. Practice	7	0	2	0
4.6 Work Practice	0	2	1	18
4.7 Emerging Trends	0	0	--	--
4.8 Upstanding Practices	0	0	--	--
5. Welfare	0	9	9	27
5.1 Unelaborated	0	3	1	2
5.2 Physical	0	1	3	5
5.3 Material	0	0	2	10
5.4 Psychological	0	5	1	15
5.5 Educational	0	0	1	0
6. Privacy	2	1	1	27
6.1 Unelaborated	0	1	0	10
6.2 Private Content	0	0	0	0
6.3 Legitimate Use	0	0	0	10
6.4 Maintain Anonymity	2	0	1	3
6.5 Control	0	1	0	3
7. Property	0	0	0	0
8. Informed Consent	0	26	0	27
8.1 Informed	0	23	0	13
8.2 Consent	0	2	0	4
8.3 Informed Consent	0	0	0	10
9. Fairness	0	6	1	3
10. Non-issue	15	0	3	0
10.1 No Harm	9	0	1	0
10.2 No Privacy	4	0	0	0
10.3 Implied Consent	2	0	2	0

Notes. (1) The number of the participants by country and evaluation (each column) who provided justifications for each of the questions is as follows. Sweden: All Right Evaluations 57; Not All right Evaluations 139. United States: All Right Evaluations 132 Not All right Evaluations 72. (2) Coding categories 1.6, 4.7, and 4.8 were included in the Swedish but not the US coding manual. (3) Percentages of subcategories may not equal those of overarching categories due to (a) rounding and (b) collapsing multiple justifications.

qualitative analyses of the Swedish interviews (and building on the prior qualitative analyses of the US interviews), we generated a hierarchical typology of reasoning about privacy in public. Here we first describe each category, then discuss usage patterns for the seven context-of-use questions, and finally highlight passages we found particularly interesting. As appropriate we quote directly from the interviews.

To begin, 12 overarching coding categories were identified. The first 10 categories accounted for participants' reasoning in all but the three questions about trusting various entities to handle personal information properly; Categories 11 and 12 were added to account for these responses. A description of each category follows:

1. Personal Interest. Personal Interest refers to an appeal based on individual likes and dislikes, including indifference, biological naturalism, convenience, connection through information, personal enjoyment, aesthetics, and personal financial or material interest.

2. External Sanction. External sanction refers to an appeal based on consequences, rules, and norms established by others, including punishment avoidance, social condemnation, rules and laws, and knowledge of the law.

3. Functionality. Functionality refers to an appeal based on how the technology mimics or augments human biology, the physical world, or other technology without an explicit statement of social expectations.

4. Social Expectation. Social expectation refers to an appeal based on current and expected practices in socially-situated contexts, including technological isomorphism, biological capabilities, place, time, current technological practice, and work practice.

5. Welfare. Welfare refers to an appeal based on physical, material, psychological or educational welfare.

6. Privacy. Privacy refers to an appeal based on a claim, an entitlement, or a right of an individual to determine what information about himself or herself is communicated to others, including private content, legitimate use of information, anonymity, and control.

7. Property. Property refers to an appeal based on a concept of tangible or intangible property.

8. Informed Consent. Informed consent refers to an appeal based on being informed of the risks and benefits of an activity, and the opportunity to choose to participate, including being informed, consent, and informed consent.

9. Fairness. Fairness refers to an appeal based on freedom from misrepresentation and on reciprocity.

10. Nonissue. Nonissue refers to an appeal based on a belief that the issue under discussion is irrelevant or does not occur, including no harm, no privacy violation, and implied consent.

11. Goodwill. Goodwill refers to an appeal based on the goodwill of others (or lack of) to have positive discretionary practices.

12. Past Performance. Past performance refers to an appeal based on reputation or expected behavior inferred from previous experience.

With these categories in hand, we turn now to consider the reasons that Swedish participants provided for their evaluations. For purposes of identifying overall usage patterns, we focus on the

seven context-of-use questions which varied the location and number of displays. Table 2 summarizes the coding categories (Categories 1 – 10, as noted earlier) and reports their usage averaged across these seven questions by country and evaluation.

Most Swedish participants said that most of the contexts of use were “not all right”. The most commonly used justification for this response was something relating to informed consent (on average, 26% for each of the seven questions). However, it should be noted that when Swedes raised “informed consent”, they focused almost entirely on being “informed” and almost never raised the issue of consent. For example, one participant said “It isn’t OK, since I didn’t even know about it. And I think a lot of other people don’t know about it either. They should inform people first in cases like this.” Similarly, another participant said, “Because when I’m walking out there, I don’t know I’m being observed.” The next most commonly used justification category was “personal interest”, generally unelaborated. For example, one participant said it’s not all right “Because there can be many different motivations behind what people want to do with the pictures.” All other categories were used on average less than 10% of the time. It is interesting to note that although most Swedes viewed the installation as a privacy violation, they did not draw on privacy per se as a reason for their judgments in the context-of-use questions.

In contrast, those Swedish participants who viewed the context-of-use questions as all right provided largely a different set of reasons for their views. When Swedes did say that a particular context of use was “all right”, they were most likely to cite “functionality” (30% on average, most often using the subcategory “tech. isomorphism”) (e.g., “There’s really no difference [then looking out a window]), “social expectation” (24% on average), or “non-issue” (15%) (e.g., “It’s for the same reason as that it is OK that someone sitting in another room in Södra Huset [can see me]. I have still decided to be there, so I’ve got to be able to handle that someone sees me, regardless of where that person is”).

In addition, throughout the interviews participants expressed compelling ideas about their experience of privacy in public. While not necessarily representing widely held views, we nonetheless found them insightful and wish to highlight a few of them here.

One participant spoke eloquently to the topic of the incremental erosion of privacy, almost camera by camera, saying: “It feels like society today, we’re building up some kind of tolerance to having our personal space and integrity violated.” Embedded in this participant’s perspective is a view of human beings adapting – indeed “building up tolerance” to something that violates their sense of person. This participant continued to object to the installation, concerned with the movement of society from indifference to the development of new norms, saying: “we become indifferent to it... It can’t be that bad, it’s daytime, we are all students. But the actual thought that this is normal, that we should be under surveillance by someone we don’t know for some reason we don’t know.”

Another participant called attention to the cumulative impact of cameras in public places such that a person can no longer find a route that is not captured. Similar to a monopoly, once a critical mass of cameras is in place, the option to walk in public away from the camera’s eye no longer exists. This participant said: “I don’t have many alternatives to walking that very way. If I had alternatives to walking that way to get to the library or the commons, for example, then it would be another story. The lack

of alternatives, that's what I think is wrong with camera surveillance." Thus, it is not having one's image captured per se that is the problem but that one no longer has the choice to walk in public without doing so.

Lastly, recall the survey finding that the display location mattered to a significant portion of the participants, who generally viewed displays in the local city as less acceptable than displays in a very remote location such as Tokyo. The interviews provide some insight into why this might be the case. Highlighting the impersonality of people in Tokyo viewing people on the campus in Sweden, one participant said, "They [the people in Tokyo] are so far away that we have no relationship with them anyway. These here are people you live among." Yet another participant weighed in on the benefits for physical safety when the "watcher" is in a far away place, saying: "I feel safer if people are looking at it in Tokyo than if they are looking at it in [my city in Sweden]."

5.3 Comparative Analysis with United States Interview Data

Having characterized the reasoning of our Swedish participants, we turn now to examine similarities and differences with the reasoning of the US participants. As with the Swedish participants, 30 individuals (15 females, 15 males; age ranges: 18-25, 83%; 26+, 17%) from the United States had been interviewed with the same set of questions (except that the questions about text messages and the degree to which participants trust various entities with their personal information were not asked).

In terms of the qualitative analyses, we expected to uncover cross-cultural differences in two ways: (1) by the need to introduce new categories to the coding manual developed from the United States data, and (2) second, by different patterns of justification usage between the two groups, Swedish and United States. Table 2 shows the justification categories and usage data.

In order to account fully for the Swedish data, the coding manual was extended as needed. For questions asked of both the Swedish and US participants, no changes were required at the highest level of the coding system (as reported in Table 2). At the sub-category level, five changes were required as follows: Under category 1. Personal Interest, a new sub-category for financial and material interests; under category 4. Social Expectation, two new sub-categories one for emerging trends and one for upstanding practices; and under category 9 Fairness, two new sub-categories, one for social contract and one for accountability/personal responsibility. The relatively few extensions to the coding manual and the fact that no new overarching categories were required suggest a good deal of similarity in how Swedes and US participants conceptualized privacy in public for this setting.

We turn now to examine the usage patterns and make the following brief observations.

- Recall that the interviews allowed for wide ranging discussion. Multiple justifications were coded when they were present in participants' discussion. Thus, with the same set of questions, some individuals provided more reasons for their views than others. Overall, Swedish participants provided fewer different reasons for their views than their US counterparts. The difference in interview length may reflect a cultural difference with Swedish participants being more taciturn than US participants. Or the difference might reflect differences in interviewing styles of the Swedish and US researchers.

- Swedish participants were much more likely than US participants to respond that any of the contexts were "not all right". Swedish participants who judged the camera as "not all right" primarily drew on Informed Consent (26%) and Personal Interest (12%). In contrast, US participants who judged the camera as "not all right" drew on a wider range of reasons including not only like the Swedes Informed Consent (27%) but also Social Expectation (31%), Welfare (27%), Privacy (27%), and Functionality (25%).
- Swedish participants almost never drew on Privacy (1%) when they judged the display to be "not all right", while the concept of Privacy was commonly used by US participants (27%).
- In objecting to the display, Swedish (26%) and US (27%) participants referred to Informed Consent approximately equally often, but Swedish participants focused almost exclusively on being Informed alone (23%) and almost never mentioned Consent (2%). US participants, on the other hand, frequently mentioned Consent (14%).

The usage patterns suggest a fair amount of divergence between the Swedish and US participants.

Taking together minimal changes to the coding categories and the differences among the usage patterns, an interesting interpretation emerges. The fundamental conceptions about privacy in public seem to hold across the two groups (they drew on the same overarching categories); that said the emphasis differs (which categories participants from each group tended to draw on for a particular instance). This is an important result as it suggests that the difference between the two societies does not lie in how they fundamentally conceptualize privacy in public but rather in the emphasis placed on different factors that determine whether or not and in what ways a person feels intruded upon. Moreover, this result is in line with our theoretical expectations in which the fundamental constructs of privacy are present in both societies but differences in particularities exist due, in part, to differences in laws, norms, and technology deployment.

6. LESSONS LEARNED ON CONDUCTING CROSS-CULTURAL RESEARCH

We provide three reflections on the cross-cultural aspects of our work.

Insider's Perspectives. Early in the collaboration the Swedish team suggested a line of questioning concerning trust of different entities with one's personal information. The US researchers were hesitant to add questions to the original interview schedule. The team reached consensus by deferring to the "insider's perspective" of the Swedish researchers. We discovered that the added questions enabled the team to tap important dimensions that otherwise would have been lost.

Context Sensitivity. In Sweden it is legislated that all offices have access to natural light. Thus, asking Swedish respondents about an application designed for an inside, windowless office did not make good sense. We modified the application description to involve the display of a live image in a "windowless room inside Södra Huset".

Moving Between Languages. Issues that develop because of small differences in language become pronounced in a written survey in which clarification over meaning is not possible. Based on our experiences and as a check against introducing errors, we

recommend having a second native speaker retranslate text back into the original language.

7. CONTRIBUTIONS AND FUTURE WORK

The key contributions of our work are five-fold:

- Some scholars have argued that privacy no longer exists, or, if it does, it is quickly disappearing with the advent of new technologies that increasingly make people's activities public [9]. This study extends the results of [7] by providing cross-cultural evidence that people still have strong concerns for their privacy, even while walking in a public place.
- Our study also shows that the gender differences found in the original US study, with women expressing significantly more privacy concerns than men, continue to hold cross-culturally in Sweden, though the gender gap in Sweden was smaller and more context-dependent than in the US.
- On the one hand, this study provides evidence (i.e., the overarching coding categories developed from US data that accounted as well for the new Swedish data) for foundational constructs of privacy in public that cross cultural boundaries. On the other hand, this study also has established that there are important cultural differences, even between countries within the Western world, when it comes to privacy concerns. Specifically, even when the same kinds of concerns show up in both countries (e.g., the overarching categories) different emphases are given to them (e.g., the usage data).
- We have also started to shed some light on how those differences are related to on-going discourse, rules and regulations, and conceptual beliefs about the role of technology in the different countries. For example, Swedes tend to trust authorities to protect their personal information and expect to be informed of practices; while US participants desire active consent.
- Overall, the study validated the coding system for reasoning about privacy in public [6]. We expect with minimal culture-specific adaptations, the coding manual could be reused in other cross-cultural studies.

Future work entails developing additional methods that help to uncover tacit cultural norms. Moreover, as one of the participants alluded to during an interview, norms and concepts can change over time as technology becomes pervasive in society and individuals adapt to new technological circumstances. Methods will need to account for this type of change.

We believe that privacy is a central concern in many design processes, including those where cameras are involved – not only for surveillance but for leisure purposes, health, video communication, in mobile phones, to name a few. Still, within the human-computer interaction literature, privacy is often treated as a unitary construct with a clear definition and shared understandings irrespective of culture. This study shows that on the one hand fundamental conceptions of privacy in public cross cultures; and on the other hand, in some ways understandings of privacy in public differ even within countries in the western world. Moreover, privacy in public has complex relationships to how societies are constructed, including how technology is developed and deployed within a given society.

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9. REFERENCES

- [1] Camera surveillance has doubled in recent years. Swedish Radio International. Sweden (June 11, 2006). <http://www.sr.se/cgi-bin/International/nyhetssidor/artikel.asp?nyheter=1&ProgramID=2054&artikel=1020921>.
- [2] CCTV avalanche sweeps Norrbottman schools. Swedish Radio International. Sweden (October 23, 2006). <http://www.sr.se/cgi-bin/euroarctic/artikel.asp?artikel=978495>
- [3] Damon, W. 1977. *The Social World of the Child*. Jossey-Bass Publishers.
- [4] Dourish, P., and Bly, S. 1992. Portholes: Supporting awareness in a distributed work group. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. CHI '92. ACM Press, New York, NY, 541-547.
- [5] Friedman, B. 1997. Social judgments and technological innovation: Adolescents' conceptions of computer property, privacy, and electronic information. *Computers in Human Behavior* 13, 3 (1997), 327-351.
- [6] Friedman, B., Kahn, P. H., Jr., Hagman, J., and Severson, R. L. 2005. Coding Manual for "The Watcher and The Watched: Social Judgments about Privacy in a Public Place". UW, Information School Technical Report, IS-TR-2005-07-01 Seattle, WA. <http://hdl.handle.net/1773/2074>.
- [7] Friedman, B., Kahn, P. H., Jr., Hagman, J., Severson, R. L., and Gill, B. 2006. The Watcher and the Watched: Social judgments about privacy in a public place. *Human-Computer Interaction* 21, 2 (2006), 235-272.
- [8] Goldberg, K. 2007. Demonstrate project. Accessed on September 17, 2007. <http://demonstrate.berkeley.edu>.
- [9] Gotlieb, C. C. 1996. Privacy: A concept whose time has come and gone. In *Computers, Surveillance, and Privacy*, D. Lyon and E. Zurek Eds., University of Minnesota Press, Minneapolis, MN, 156-171.
- [10] Hakansson, M. 2007. Identity, Self-expression, and Sharing: A Pilot Study to Guide Design of Mobile 2.0 Services. Experience Lab, Sony Ericsson, Lund, Sweden.
- [11] Jancke, G., Venolia, G. D., Grudin, J., Cadiz, J., and Gupta, A. 2001. Linking public spaces: Technical and social issues. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. CHI '01. ACM Press, New York, NY, 530-537.
- [12] Kahn, P. H., Jr. 1999. *The Human Relationship with Nature: Development and Culture*. MIT Press.
- [13] Lai, J., Levas, A., Chous, P., Pinhanez, C., and Viveros, M. 2002. BlueSpace: Personalizing workspace through awareness and adaptability. *International Journal of Human-Computer Studies* 57 (2002), 415-428.
- [14] Lirtzman, M. 2007. Surveillance cameras win broad support: Majority of Americans favor extra safety factor of cameras. Accessed on September 18, 2007. <http://abcnews.go.com/US/story?id=3422372&page=1>.

- [15] Rotenberg, M., Laurant, C., Galster, U., and Pereda, K. R. 2005. Privacy and Human rights 2005: An International Survey of Privacy Laws and Developments. EPIC and PI. <http://www.privacyinternational.org>.
- [16] Savage, C. 2007. US doles out millions for street cameras: Local efforts raise privacy alarms. Boston Globe (August 12, 2007). http://www.boston.com/news/nation/washington/articles/2007/08/12/us_doles_out_millions_for_street_camera
- [17] Turiel, E. 1983. Development of Social Knowledge: Morality and Convention. Cambridge University Press.