

# The Prototype of Privacy: Analyzing Privacy Discourse through its Features

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## ABSTRACT

In this paper we outline our ongoing research program towards creating an automated privacy dictionary. Previous research applied prototype theory, a classic linguistic approach, to develop a new definition of the concept of privacy. Building on these findings, we will employ an integrated top-down and data-driven linguistic analysis to an existing dataset of qualitative interviews in different contexts, in order to identify privacy specific markers. Apart from its theoretical contribution, this work aims at providing a novel methodological tool to assist researchers in detecting privacy relevant discourse.

## Categories and Subject Descriptors

H.3.1 [Information Systems]: Information Storage and Retrieval – *content analysis and indexing, dictionaries, linguistic processing, thesauruses*; J.4 [Computer Applications]: Social and Behavioral Sciences – *psychology*; J.5 [Computer Applications]: Arts and Humanities – *linguistics*; K.4.1 [Computing Milieux]: Computers and Society – Public Policy Issues – *privacy*.

## General Terms

Measurement, Human Factors, Languages.

## Keywords

Privacy, prototype analysis, privacy dictionary, linguistics.

## 1. INTRODUCTION

While the use of ICT (information communication technologies) is recognized as playing a beneficial role in our lives, its increasing ubiquity has been met with some concern. One area that is persistently raised as such is that of privacy. Despite the popular and academic recognition of the importance of privacy in relation to the dissemination and adoption of ICT, theoretical disputes on what ‘criteria’ belong to the concept of privacy have hampered this field of research. For example, some researchers consider privacy to be a human right located at a socio-political level, while others believe it should be studied as an interest

motivated by an individual’s goals [5]. Moreover, although privacy involves the regulation of access to others, there is no agreement on whether it is achieved through the condition of being alone [5]. In order to manage this ambiguity, researchers often end up espousing theoretical perspectives on privacy that limit their scope of study [3].

These theoretical challenges are further impeded by methodological requirements; a widely cited problem in conducting privacy research is the use of direct references to privacy, which may inadvertently increase and thus manipulate privacy perceptions altering the course of the discussion [3]. The tradeoff that researchers face in avoiding direct questions about privacy is the highly subjective nature of subsequent coding and interpretive analyses. Taken together the lack of a clear definition or consensus on privacy, along with the need to avoid priming questions, suggests that without methodological tools that help capture a nuanced and broad perspective on privacy, privacy-related content may end up being ignored in favor of more easily coded themes.

In the next section we summarize our previous work, which has developed a wider and more inclusive definition of privacy. On the basis of this research we propose to build a privacy dictionary that will help researchers who face these theoretical and methodological challenges to automatically detect privacy relevant discourse.

## 2. A NEW DEFINITION OF PRIVACY

Recently, we have argued that the lack of a unifying account of privacy can be explained by theorists’ impetus to define privacy on the basis of a limited set of criteria (e.g. control over information) [6]. This classic approach to concept definition sets out to identify sufficient and inclusive criteria. Many natural language categories do not, however, share a common set of defining features. For example, card-games, board-games and playing tennis bear a ‘family resemblance’ structure. Members characterized by more features of the family are better exemplars, thus making membership a matter of degree [7]. Prototype theory evolved from Wittgenstein’s family resemblance and proposes that concepts are organized through prototypes that represent the average member of a concept. When new stimuli are perceived, we evaluate their similarity against the prototype to determine whether they belong to the concept and whether they are good or poor exemplars [4].

In respect to social concepts, three steps are required to determine if they are organized around a prototype [2]. First, participants are asked to list features of the concept. If the concept is organized by

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Conference’10, Month 1–2, 2010, City, State, Country.

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a prototype, then participants should report a wide range of features, none of which will be shared across all reports. Second, it is determined whether participants can reliably rate the features' importance or centrality with regards to the concept. Once it is shown that features of the concept vary in their degree of centrality, exemplars of the concept can be directly derived from the features. A third and final step establishes whether situations described by more central than peripheral features of the concept are recognized as better exemplars.

Our previous work applied the above procedure to the concept of privacy and showed that it met the criteria of prototype theory [6]. 146 participants reported an average of 6.6 features, a process that yielded a total of 82 privacy features. Next, using a 9-point scale (9-extremely good feature, 1-extremely poor feature), 118 participants reliably rated the features' centrality. Finally, 62 participants evaluated vignettes described by central privacy features as better exemplars of privacy compared to vignettes containing peripheral features. Appendix 1 presents the list of 82 features.

Our findings can be seen as an answer to some of the theoretical disagreements cited in the field of privacy; privacy is a multifaceted concept whose meaning cannot be captured by a crisp and narrow definition and as such, future research should be grounded in a more flexible theoretical framework. In addition to highlighting the multivariate nature of privacy, through the development of a centrality measure this study revealed some of the most important features in laypeople's conceptualizations of privacy; for instance, having control is more central than isolation.

### 3. A LINGUISTIC APPROACH TO PRIVACY

Besides the theoretical contribution of the privacy prototype noted above we believe that the privacy features offer new directions for the analysis of privacy discourse. The 82 features of privacy provide a very inclusive conceptualization of privacy that can maximize the richness and breadth of qualitative analysis. We hypothesize that top-down linguistic analysis, driven by the 82 features, can help identify the language people use when they talk about privacy. Moreover, automated linguistic methods can be data-driven and thus open up new opportunities for theoretical insights about the language of privacy. In our work, this method ensures that other structural or linguistic markers, not represented through the prototype features, can also be captured. Using these two approaches in concert our aim is to create a dictionary that will assist qualitative researchers to detect privacy relevant discourse. We note here that these methods have been successfully applied in the analysis of other social phenomena (e.g., personality [8]; for further details, see [8]).

The next section talks about the four steps we have identified for completing our research program. To summarize, we have created a dataset of interview transcripts on which we will perform the linguistic analysis. Next, we have used the 82 privacy features as 'seed' words with which to build a list of feature synonyms that will drive the top-down linguistic analysis. Taking an integrated top-down and data-driven approach we plan to compare privacy-relevant to non-privacy-relevant discourse. Finally, using the linguistic markers found to be specific to privacy discourse, we will build a privacy dictionary whose accuracy we will evaluate.

## 4. PRIVACY DICTIONARY – WORK IN PROGRESS

**Step 1 – Dataset.** To build a dataset of interview transcripts on the basis of which we can derive the linguistic features of privacy, we first identified seven diverse offline and online privacy-sensitive contexts. A pair of researchers analyzed each context. One of the researchers surveyed the entire panel of transcripts available and identified a maximum of 5 interviews that expressed privacy issues. Focusing on one transcript at a time, the same researcher identified the segments of text in which participants were talking about privacy. These were then examined by a second researcher who raised any disagreements concerning the inclusion of a given privacy segment. Disagreements were resolved through discussion.

**Table 1: Summary of the data we have gathered and its source.**

Project title	N	Source
Co-operation or Contest? Inter-Agency Relationships in Police Custody Areas	5	ESDS Database
United Kingdom Children Go Online	5	ESDS Database
Delivering Financial Services in the Home	3	ESDS Database
Cultural Context of Youth Suicide: Identity, Gender and Sexuality	5	ESDS Database
Social Network Sites and Group Identity	2	With permission of primary investigator, Sofia Christidi
Technology and Natural Death: a Study of Older People	5	ESDS Database
Health and Experiences with Illness	5	With permission from Health Experiences Research Group (University of Oxford)

**Step 2 – Seed words.** To create a list of seed words that will drive the top-down analysis one of the researchers in our team revisited each of the privacy features. If a feature contained more than one word, an effort was made to break it down into smaller units. For example, securing personal information was divided into three seed words 'securing', 'personal' and 'information'. The synonyms and antonyms of each seed word were identified using Webster's Thesaurus and the online version of Wordnet (wordnet.princeton.edu). This process yielded a total of 511 words.

**Step 3 – Linguistic analysis.** Our approach will be to compare the segments of the interviews identified in Step 1 that talk about privacy, i.e. privacy discourse, with the remainder of the interview, i.e. non-privacy discourse. We will look for occurrences of specific seed words, and also use them to explore their relative semantic similarity to the text segments (cf. [10]). Finally, we will adopt data-driven approaches. For example, we will use a number of existing content and linguistic analysis tools, such as LIWC, Coh-Metrix, and Wmatrix to examine linguistic differences between the privacy and non-privacy discourse, at word, content, syntax and semantic levels.

**Step 4 – Tool and evaluation.** A privacy dictionary will be built and integrated into LIWC based on the findings from Step 3. We will evaluate this tool by using it to discriminate privacy discourse on new data. The same data will be coded and compared to a human rater’s judgments.

The program of research described in this position paper is still ongoing and we would welcome the feedback of workshop participants. We should also note that although this position paper is motivated by the need to provide researchers with a *practical* tool for qualitative analysis, there is a reciprocal relationship between methodology and theory. Although prototype theory launched us into this new direction, by combining analysis driven by both privacy features, and also more general linguistic features at a variety of levels, future work can use the same methodologies to build a more comprehensive picture of what topics within the privacy debate are particularly important to individuals, and also how such concerns vary across discussion contexts.

## 5. ACKNOWLEDGMENTS

This work is funded partly by the Engineering and Physical Sciences Research Council through the Privacy Value Networks project (EP/G002606/1). We would like to thank the members of the PVNETS consortium for their insights on this work.

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## 7. APPENDIX 1: PROTOTYPE FEATURE LIST

Securing personal information	Personal data (stored on computers)
Confidential	With people you feel close to
One's private life	Allows one to self-reflect
Private	Giving or asking for permission
Having control over one's information	Having choice
Personal information	Respect
Protecting personal information	Body
Limiting access to a physical space by closing or locking the door	Being alone/without company
Medical information	Seclusion
No one else's business	Intimacy
Kept out of the public domain	Ownership
Personal space	Independence
Security	Without others' knowledge
Concealing embarrassing details	Allows one to concentrate
Not being disturbed	Solitude
Limiting access	Helps avoid scrutiny or judgment

Protected by the law	Hiding
An individual's thoughts	Family
Sensitivity of disclosure	Concealing emotions from others
Attending to bodily functions	Not sharing
Anonymity	Closed
Financial information	Safety
Separation of public and private life	Excluding people
Having control	Freedom
No intrusion	Involves a group of people and no one else
Physical private property	Quiet
Using passwords	An individual's actions
Not being observed	Presenting different façades in everyday interactions
Sexual life	Threatened by the government
A right or entitlement	Subject to invasion
Keeping to oneself	Subject to violation
Personal	Isolated
Setting boundaries	Sharing information
Shared with a limited audience	Threatened on the Internet
A human need	Fear of adverse outcomes
At home	Threatened by the media
Time for one's thoughts	Sharing
Secrets	Shy
Protection	Conducting illegal activities
Showing discretion	Anti-social
Not sharing information	Time to oneself