How to Study Morality Online

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Abstract

Social researchers interested in lay morality have at their disposal a variety of traditional research methods, from large-scale surveys to ethnographic interviews and experiments. But these offline methods are not optimized for studying discourse in the social media environments where public discussions are increasingly held, and they do not take advantage of newly available software and accessible programming languages. In this paper I review state-of-the-art research methods for studying moral discourses and deliberations in online environments including online surveys, virtual ethnography, and text analysis. These qualitative and mixed method techniques are evolving rapidly, but have to this point been underutilized by social researchers interested in morality. I review exemplary studies that make use each of these online methods, and consider the advantages and drawbacks of each as well as their long-term potential to generate new knowledge about communities' values, beliefs, and moral deliberations.

I. Introduction

Big data is suddenly everywhere. In our daily lives we constantly generate data that is collected, analyzed, repackaged, and bought and sold by corporations, governments, and university researchers. We generate data each time we use a search engine, visit a website, interact with family and friends on social media, or read or write a tweet, blog, or comment on an online article. Big data is generated by our phones, tablets, wristwatches, personal computers, eyeglasses, clothing, shoes, cars, and home appliances. As the sources of big data have increased in number and the costs of collecting, storing, and accessing it have decreased, researchers have begun to develop new ways of acquiring and analyzing these new data streams. Slowly at first, but with gathering intensity, these new sources of data are transforming how research is conducted in the social sciences.

Largely because of information communication technologies and the vast sources of textual data the Internet makes available, new generations of social researchers face a different range of possibilities and opportunities in their careers than do most researchers working today. Social media platforms and other types of Internet-related communication technologies (IRCTs) generate massive volumes of natural language data that are often readily available for social research. Researchers from academia and the private sector are collecting and analyzing massive quantities of this data and using it to gain insights into social trends, political discourses, online social interactions and relationships, public attitudes, consumer behaviors, and other important social phenomena.

In this paper I review Internet-based research methods that can be applied in the study of moral discourses and deliberations in online environments. I review state-of-the-art research methods for studying moral discussions in online environments, including online surveys, virtual ethnography, opinion mining, and text analysis. These qualitative, mixed-method, and quantitative techniques are evolving quickly, but have to this point arguably been underutilized by social researchers interested in morality. I review exemplary studies that make use each of these online methods, and consider the advantages and drawbacks of each method as well as the long-term potential of each to generate new knowledge about communities' values, beliefs, and moral deliberations (if not necessarily their offline behavior). While morality is arguably an element of all social research (see Hitlin and Vaisey 2010; Gorski 2012), there are qualities of moral discourses and deliberations that make them more amenable to some research methodologies than others. The goal of this paper then is to provide a practical guide to the contemporary landscape of online and machine-assisted research methodologies that are suitable for research on lay morality.

Before reviewing methodologies I should note that while new technologies can potentially make resolvable previously intractable problems and bottlenecks, in thinking about technological innovation in social research, it is important to steer a path between a number of different positions. One of these is naive enthusiasm for the latest technological trends, whereby the sheer novelty of a method can lead to unthinking application and distancing of users from the craft aspects of a particular methodology (see Hine 2005). My goal here is to methodically assess what is gained and lost with new technologies for analyzing moral discourses and deliberations and to provide an assessment of these newly available methodologies that is "sober enough to undermine exaggerated claims, but open-minded enough to spot potentiality where it exists" (Lee, Fielding and Blank 2008: 6). I should also note that due to time and space constraints I must skirt a number of important philosophical and ethical issues that attend using big data and IRCTs to learn about social behavior.

II. Online Surveys

Sociologists interested in lay morality have been working with paper-and-pencil surveys for some time, and social scientists have been working with online versions of surveys since the 1990s. Traditional telephone and paper surveys tend to be costly, even when using relatively small samples, and the costs of a large-scale survey using mailed questionnaires can be enormous. Although the costs of online survey creation software and web survey services vary widely, by eliminating the need for paper, postage, and data entry costs, online surveys are generally less expensive than their paper- and telephone-based equivalents (Couper 2000; Ilieva et al. 2002; Yun and Trumbo 2000). Online surveys can also save researchers time by allowing them to quickly reach thousands of people despite possibly being separated by great geographic distances (Garton et al. 2003). With an online survey a researcher can quickly gain access to large populations by posting invitations to participate in the survey to newsgroups, chat rooms, and message boards. In addition to their cost and time savings

and overall convenience, another advantage of online surveys is that they exploit the ability of the Internet to provide access to groups and individuals who would be difficult, if not impossible, to reach otherwise (Garton, Haythornthwaite, and Wellman 1997).

While online surveys have significant advantages over paper- and phone-based surveys, they bring with them new challenges in terms of applying traditional survey research methods to the study of online behavior. Online survey researchers often encounter problems regarding sampling, because relatively little may be known about the characteristics of people in online communities aside from some basic demographic variables, and even this information may be questionable (Walejko 2009). While attractive, features of online surveys themselves, such as multimedia, and of online survey services, such as use of company email lists to generate samples, can affect the quality of the data they produce in a variety of ways. Yet despite these challenges, online surveys appear to be an underutilized method for researchers interested in moral attitudes.

III. Virtual Ethnography

Anthropologists and sociologists have used ethnographic methods to study everyday moral deliberations and practices for decades (e.g. Parish 1994). Such ethnographic research has two parts. The first is fieldwork, which involves participating as a temporary member of a social group in order to study their practices, meanings, and objects. The second part is the construction of textual and visual representations of the group based on the fieldwork conducted. Ethnography is grounded in knowledge of the local and the particular; its aim is less to generalize than to gain what has come to be known as "grounded knowledge" (Glaser and Strauss 1967). Because ethnography requires researchers to observe and participate within groups, it is "more visibly affected by researcher interests and skills than most other types of research" (Kozinets 2002: 62). Ethnographic methods

such as interviews, participant observation, and the taking of field notes are flexible and eclectic (Hooley et al. 2012: 76), and their flexibility has allowed them to be refashioned to study the behaviors of social groups in every corner of the world.

In the 1990s researchers began to adapt ethnographic methods designed to study geographically situated communities to online environments which are characterized by relationships that are technologically mediated rather than immediate (Salmons 2014). The result is "virtual ethnography" (Hine 2000) or "netnography" (Kozinets 2009), which is the ethnographic study of people interacting in a wide range of online environments. Kozinets (2002) argues that successful netnography requires researchers to acknowledge the unique characteristics of these environments, and to effect a "radical shift" from offline ethnography, which observes people, to a mode of analysis that involves recontextualizing conversational acts (Kozinets 2002: 64). Because netnography provides more limited access to fixed demographic markers than does ethnography, the identities of discussants are much more difficult to discern. Yet netnographers must learn as much as possible about the forums, groups, and individuals they seek to understand. Unlike in traditional ethnographies, in the identification of relevant communities, online search engines have proven invaluable to the task of learning about research populations (Kozinets 2002: 63).

Just as the quality of social survey research depends on sampling, netnography requires careful case selection. Netnographers must begin with specific research questions and then identify online forums appropriate to these questions. Kozinets suggests that sites appropriate for nethnography should ideally be *relevant* to the research questions, *active*, *interactive*, *substantial*, *heterogeneous* and *data-rich* (2009: 89).

Sharlene Shwartz's ethnographic studies of the moral identities of post-Apartheid South African youths (Shwartz 2009) demonstrate that ethnographic methods can be applied to theoretical investigations of lay morality. But like online surveys, netnography appears to be a somewhat underutilized methodology in research on morality. A few pertinent studies have been published in consumer and marketing research (for an overview see Medberg and Heinonen 2014). For instance, Kozinets and Handelman (1998) used netnography to study the moral identities of people participating in boycotts of consumer products, and Kurikko and Tuominen (2012) studied a community of Lego builders.

for netnography to be successful, researchers must acknowledge the unique characteristics of online environments, recognize the importance of developing and explaining their data selection strategy, and learn as much as they possibly can about their populations of interest.

V. Text Mining and Analysis

Text mining and analysis methods involve collecting large volumes of textual data and analyzing it with interpretive, mixed, or quantitative methods. Although text mining and analysis methods date back to the work of sociologists and political scientists in the 1930s-40s, or arguably to the 17th century (Krippendorf), the Internet and big data have revolutionized these methods, which today take a number of forms, including narrative analysis, metaphor analysis, opinion mining, and topic modeling.

A. Narrative Analysis

Narrative analysis first emerged as a discipline in the early 20th century, and spurred by the post-1960s qualitative movement in the social sciences, interest in the field surged in the late 20th

century. Other factors contributing to the renewed interest in narrative included the 'memoir boom' in literature and popular culture (Smith and Watson 2010), identity politics in the United States, and the turn to explorations of personal life in therapies of various kinds (Illouz 2008).

Today narrative analysis refers to a family of approaches in the humanities and social sciences to texts that take a narrative form. Narrative analysts study all sorts of texts, from interview transcripts to newspaper articles, speeches, plays, and works of literature. The main elements that give such texts narrative form are *sequences* and *consequences* of events by which narratives organize, connect, and evaluate events as *meaningful* for particular audiences. With these elements storytellers interpret the social world and experience for their audiences, often creating *moral stories* about how that world should be.

Narratives are characterized by *transformation* (change over time) of *action* and *characters* that are brought together in a *plot line*. Stories bring together many plot elements, including digressions and sub-plots, in what is known as a process of *emplotment* (White 1978). Narratives must have a point, which often takes the form of a moral message.

Although scholars in diverse disciplines have developed many different ways of analyzing narratives, three of the most influential approaches are *structural*, *functional*, and *sociological* approaches. The focus of structural narrative analysis is what is known as a *story grammar*. An early theorist of story grammars, Propp (1968) argued that the *fairytale* has a narrative form that is central to all story-telling. The fairytale is structured not by the nature of the characters in it but by the function they play in the plot, and the number of possible functions is fairly small. In his influential structural approach to narrative, Labov (1972) defined narrative as "one method of recapitulating past

experience by matching a verbal sequence of clauses to the sequence of events which (it is inferred) actually occurred" (Labov 1972: 359-60; see also Labov and Waletzky 1967: 20). For Labov a "minimal narrative" is "a sequence of two clauses which are temporally ordered." The skeleton of a narrative thus consists of a series of temporally ordered clauses called *narrative clauses* (1972: 360-61). While narratives require narrative clauses, not all clauses found in narrative are narrative clauses.

The functional approach to narrative was pioneered by the psychologist Jerome Bruner (1990), who argued that humans' ordering of experience occurs in two modes. The first is the paradigmatic or *logico-scientific mode* which attempts to fulfill the ideal of a formal, mathematical system of description and explanation. This mode is typical of argumentation in the physical sciences and philosophy. In contrast, in the *narrative mode* of ordering experience it is events' particularity and specificity, and people's involvement, accountability, and responsibility in bringing about specific events, that are centrally important.

Functionalist analysis of narrative differs from structuralist analysis in that it focuses on what particular stories *do* in people's everyday lives. For Bruner, the functions of narrative include mainly *solving problems*, *reducing tension*, and *resolving dilemmas*. Narratives allow people to deal with and explain mismatches between the exceptional and the ordinary. Narratives are not required when events occur that are perceived as ordinary, but are needed to allow people to recast unfamiliar or chaotic experiences into causal stories in order to make sense of such experiences and to render them familiar and safe. The functionalist approach to narrative has been especially influential in the "life story tradition" in psychology (e.g. Rosenwald and Ochberg 1992).

Sociological approaches to narrative focus on the cultural, historical, and political contexts in which particular stories are, or can be, told by particular narrators to particular audiences. For example the British sociologist Ken Plummer's *Telling Sexual Stories* (1995) is a sociological approach focused on "coming out stories" and other rites of sexual story-telling cultures, and the changing social conditions that have given rise to such cultures.

Mixed Methods

In addition to the purely interpretive approaches to narrative analysis covered above, sociologists, psychologists and other social researchers have developed mixed methods that integrate interpretive methods into sophisticated research designs that allow for statistical analysis of patterns of words in narratives. For example, based on a structuralist theory of narrative, Roberto Franzosi and his colleagues have developed mixed methods for analyzing narrative grammars that attempt to quantify a basic structural element of what Bruner termed the "narrative mode" of ordering experience. For Franzosi that element is a social cognitive process whereby people interpret situations of all kinds in terms of basic social relations of actors, actions, and objects of action. Franzosi's term for these sequential structures is the "semantic triplet" or "S-A-O triplet." His method of analyzing texts' semantic sequences involves teams of manual coders coding collections of historical texts, such as newspaper archives (1987), line-by-line for S-A-O triplets.

Several research projects have applied narrative grammar analysis to explore moral discourses. Franzosi and his collaborators have applied this method in studies of newspaper accounts of lynchings (Franzosi, De Fazio and Vicari 2012) and of the rise of fascism (Franzosi 2010), while Karen Cerulo has used it in her studies of "victim" and "perpetrator" sequences in newspaper

headlines (Cerulo 1998) and Ignatow (2004) analyzed narrative grammars using in a multi-method quantitative study of transcripts of shipyard union leaders' meetings.

Automating Narrative Analysis

Qualitative and mixed methods narrative research are ultimately reliant on human interpretation and coding of texts. Such coding is time-intensive, and the time required for training and coding has thus far limited researchers' ability to scale up narrative analysis for use with big data. But today this situation is changing, as at least one interdisciplinary research team is developing computer-assisted methods for automatically detecting narrative patterns in large text collections. Sudhahar, Franzosi, and Cristianini have developed a working system for large-scale quantitative narrative analysis of news corpora. Their system identifies the key actors in a body of news and the actions they perform by analyzing their position in the overall network of actors and actions, analyzing the time series associated with some of the actors' properties, generating scatter plots describing the subject/object bias of each actor, and investigating the types of actions associated with each actor. Applying their automated system to 100,000 *New York Times* articles about crime published between 1987 and 2007, they found that men were most commonly responsible for crimes against the person, while women and children were most often crime victims.

B. Metaphor Analysis

Whether taking the form of metaphor, analogy, simile, or synecdoche, metaphorical language involves a figure of speech that makes an implicit comparison in which a word or phrase ordinarily used in one domain is applied in another. While metaphor has long been a topic of literary scholarship, it was only in 1980 with the publication of George Lakoff and Mark Johnson's *Metaphors We Live By* that metaphor came to be an object of social science research. Lakoff and

Johnson's theory of metaphor has come to be known as Cognitive Metaphor Theory, and has provided the conceptual foundation for the field of cognitive linguistics (Lakoff and Johnson 1999; Sweetser 1990; Fernandez 1991; Gibbs 1994).

The basic claim of Cognitive Metaphor Theory is that metaphor is a central and indispensable structure of language and thought. All natural language is characterized by the presence of conventional metaphorical expressions organized around prototypical metaphors, which Lakoff and Johnson refer to as *conceptual metaphors*. These are linguistic expressions of the conventional pattern of thought of a social group or society (Kovecses 2002). For instance, Lakoff and Johnson argue that in many cultures people conceptualize *argument* in terms of a *battle*. This prototypical conceptual metaphor influences the way people talk about the act of arguing, for instance when they use phrases such as "attack a position," "indefensible," "strategy," "new line of attack," "win," and "gain ground" (Lakoff and Johnson 1980).

According to Cognitive Metaphor Theory metaphors originate in a process of "phenomenological embodiment" (Lakoff and Johnson 1999: 46). They are formed when perceptual and sensory experiences from an embodied *source domain*, such as pushing, pulling, supporting, balance, straight-curved, near-far, front-back, and high-low, are used to represent abstract entities in a *target domain* (Lakoff 1987; Boroditsky 2000; Richardson et al. 2003).

Cognitive Metaphor Theory is capable of explaining universal aspects of language and culture as well as cultural variation (Kovecses 2002). While languages' phenomenological foundations are universal, societies and social groups differ in terms of the associations they make between conceptual metaphors and abstract target domains. In other words, different societies and groups use different

sets of metaphors to construct and interpret social reality in different ways. An implication of Cognitive Metaphor Theory for social research is that studying the distribution of metaphor in natural language can reveal how common sense is constructed and negotiated within social groups.

Cognitive linguists themselves have studied metaphors used in social groups' natural language. For instance Lakoff (1996) analyzed moral metaphors that he argued structure the political discourses of American conservative and liberal politicians and advocates. Chilton (1996) studied metaphors related to security used in political discourse. Charteris-Black (2009, 2012, 2013) has developed a rhetorically based approach to metaphor known as Critical Metaphor Analysis that draws on methodologies and perspectives developed in corpus linguistics, critical linguistics and cognitive semantics. He has used the approach to examine metaphors from the domains of political rhetoric, press reporting, religion and the communication of a wide range of western and non-western political leaders. He has also worked jointly with sociologists on the relationship between gender, language and illness narratives. And Goatly (2007) investigated how conceptual metaphor shapes thought and behavior in fields including architecture, engineering, education, genetics, ecology, economics, politics, industrial time-management, medicine, immigration, race, and sex. He argues that the ideologies of early capitalism used metaphor themes historically traceable through Hobbes, Hume, Smith, Malthus and Darwin. These metaphorical concepts support neo-Darwinian and neo-conservative ideologies up to the present day. Hart (2010) has advocated for a cognitive linguistic approach to Critical Discourse Analysis. His approach involves a semantic analysis of particular linguistic (lexical, grammatical, pragmatic) features found in political and media discourse. More narrowly, it investigates the conceptual structures that are associated with different language usages or linguistic 'constructions' and the ideological or (de)legitimating functions that such structures may

serve in specific discursive contexts. He has applied this framework primarily in the context of anti-immigration discourse (Hart 2010).

While the critical natural language studies of metaphor by Chilton, Charteris-Black, Goatly, Hart and Lakoff are innovative and important contributions, their impact has been mainly felt in linguistics rather than in the social sciences. But social researchers working in the fields of anthropology, education, management, political science, psychology, sociology and other fields have used cognitive metaphor theory in text mining and analysis projects of their own.

There is a huge anthropological literature on metaphor, although most anthropological studies use ethnographic rather than text mining and analysis methods. James Fernandez's 1991 edited collection *Beyond Metaphor* provides a good overview of early ethnographic work in this area, and cognitive anthropologists Dorothy Holland and Naomi Quinn's 1987 classic *Cultural Models in Language and Thought* was a breakthrough in terms of connecting anthropology to cognitive linguistics and Cognitive Metaphor Theory.

Educational researchers have used Cognitive Metaphor Theory to analyze teaching and learning within classrooms (Cameron 2003; Deignan 2005). In a qualitative and inductive study Rees, Knight and Wilkinson (2007) analyzed metaphors in strategically collected transcripts of patients', medical students', and doctors' discussions of doctor-patient interactions. Their data were from multiple document collections: eight focus group discussions with 19 patients, 13 medical students and 15 medical educators. Their analysis revealed six prototypical metaphors associated with the target domain of student/doctor–patient relationships: the relationship as War, Hierarchy, Doctor-

centeredness, Market, Machine, and Theater. All of the metaphors except the theater metaphor emphasized the oppositional quality of student/doctor–patient relationships.

Clinical psychologists have analyzed metaphors used by subjects in psychoanalytic therapy (Bucholz 1993, 1995; Roderburg 1998), and cognitive and experimental psychologists have studied metaphors as examples of mental models (Johnson-Laird 1983, 1989). But within psychology only Schmitt (2000, 2005) has developed a qualitative method of text analysis centered on metaphor. The goal of Schmitt's method of systematic metaphor analysis is to "discover sub-cultural thinking patterns" (2005: 365), and his method achieves this in several steps. The first step is for the researcher to choose a topic of analysis. Schmitt gives the example of abstinence from his own empirical work on metaphors for abstinence and alcoholism. The next step is to assemble a "broad-based collection of background metaphors" (2005: 370) for the topic. These metaphors can be collected from sources such as encyclopedias, journals, and specialist and generalist books. In Schmitt's own work, background metaphors include metaphors for the effects of drinking alcohol such as being more "open" versus "fencing off" from others. The third step is to analyze the metaphors used in the verbal expressions of a sub-group. This involves creating the second document collection, identifying metaphors in that collection, and then reconstructing metaphorical concepts from those metaphors. The fourth and final step is to compare the metaphorical concepts from the two document collections in order to learn about the culture and psychology of the sub-group in comparison to the culture and psychology of the general population.

Similar to the work of the linguist Christopher Hart, in *Brown Tide Rising* (2002) the sociologist Otto Santa Ana combined critical discourse analysis and metaphor analysis. Santa Ana analyzed newspapers' representations of Latinos in the United States. More recently the sociologists Schuster,

Beune, and Stronks (2011) have studied metaphorical constructions of hypertension among ethnic groups in the Netherlands.

Mixed Methods

Social researchers have developed a number of mixed methods strategies for metaphor analysis. Generally these involve human coding of metaphors in combination with statistical tests for both inter-rater reliability and for differences in rates of metaphor use across multiple document collections (typically produced by social groups with different social or cultural backgrounds). Where qualitative metaphor analysis (e.g. Santa Ana 2002; Schmitt 2005) is mostly inductive, mixed methods research is mostly deductive, although it often involves abductive inference as well.

Management researchers Gibson and Zellmer-Bruhn (2001) used a mixed method of metaphor analysis to study concepts of teamwork across national organizational cultures. This study's goal was to test a well-known theory of the influence of national culture on employees' attitudes (Hofstede 1980). Gibson and Zellmer-Bruhn tested this theory with a research design that included *strategic selection* of four nations (France, the US, the Philippines, and Puerto Rico) and four organizations (p. 281) based on Hofsted's theory. The researchers conducted interviews which they transcribed to form their document collections, which they analyzed using QSRNudist (Qualitative Solutions and Research 1997) and TACT (Popping 1997). These software packages were used to organize the qualitative coding of five frequently used teamwork metaphors, which were then used to create dependent variables for hypothesis testing using multinomial logit and logistic regression.

The social psychologist Karin Moser (2000) has developed metaphor-based methods of text analysis which she has applied in her research on the psychology of work and organizations. Moser's mixed

methods approach involves categorizing metaphors for the self during transitions from school to work. The self concept is highly complex and abstract, and is thus often represented with metaphors. The subjects Moser studied were Swiss German students who participated in a questionnaire study about their anticipated transition from university to work. A subsample of twelve students was included in the study and interviewed about their experiences with success and relationship quality and their expectations and wishes for the future. The transcribed interviews were analyzed thematically and for self metaphors and other aspects of the students' self concepts. Her quantitative analysis of this data revealed statistically significant relationships between themes and metaphors and between metaphors and self-concepts. There was a general preference for scientific and technological metaphors, followed by container, path, visual, balance, war and economic metaphors. Metaphor use is also significantly influenced by social variables such as the general orientation towards the future, the field of study and, to a smaller extent, gender.

The sociologist Ignatow has developed mixed metaphor analysis methods in natural language studies of high-tech jargon (2003), shipyard workers (2004), and online self-help groups (2009). His mixed method approach is nomothetic and based on deductive inference, operates at a sociological level of analysis, and involves both strategic selection of and statistical sampling from multiple document collections. He uses metaphor analysis in combination with other text analysis methods to test theories related to culture and to the work of the sociologist Pierre Bourdieu.

Automated Metaphor Analysis

Both qualitative and mixed methods metaphor research are ultimately reliant on human interpretation and coding of metaphors in texts. Such coding is time-intensive, and the time required for training and coding has thus far limited researchers' ability to scale up metaphor analysis for use

with big data. But today the situation is changing rapidly, as several research teams in computer science and related fields are developing computer-assisted methods for automatically detecting metaphors in texts.

Early attempts by Fass (1991) and more recent work by Mason (2004) have relied on predefined semantic and domain knowledge to attempt to identify metaphor in texts. Birke and Sarkar (2006) approached the problem of metaphor identification by considering literal and nonliteral usages to be different sense of a single word. Hardie and his colleagues (2007) repurposed semantic annotation tools in order to extract possibly metaphoric phrases from texts. Turney et al. (2011) identified metaphorical phrases by assuming that these phrases consist of both a more concrete and a more abstract term. They derived an algorithm to define the abstractness of a term and then used this algorithm to contrast the abstractness of adjective-noun phrases. Phrases were labeled as metaphorical when the difference between the abstractness of the noun and the abstractness of the adjective passed a predetermined threshold.

Recently Gandy, Neuman and their colleagues (Gandy et al. 2013; Neuman et al. 2013) have developed a number of interrelated algorithms that have proven able to identify metaphorical language in texts with a high level of accuracy. Their work is based on Turney et al.'s (2011) key insight that a metaphor usually involves a mapping from a concrete domain to a more abstract domain. The algorithms are thus based on a target noun's abstractness and its accompanying adjective's number of dictionary definitions (if there is only one the adjective cannot be part of a metaphor). If none of the most common concrete nouns that are commonly associated with the adjective are present, the target noun is coded as metaphorical.

Software used

The achievements of these efforts by computational linguists to automate metaphor extraction suggest that there is great potential for automated methods of metaphor analysis to be used in social science text mining and analysis applications in the near future.

C. Opinion Mining

Sentiment analysis (also referred to as opinion mining, sentiment mining, opinion extraction, subjectivity analysis, or emotion analysis) is the field of study that analyzes people's sentiments, feelings, and appraisals of entities, events, properties and topics as expressed in large document collections. This is a relatively new field, as little large-scale text-based research had been done on people's sentiments and opinions before 2000 (Liu 2010: 1). Sentiment analysis generally uses standard lexicons of positive and negative sentiment terms, although it is widely recognized that the meaning of sentiment terms depends on many factors, such as the immediate context and the author's use of irony, humor, sarcasm, and quotations.

Sentiment analysis analyzes the tone of texts using frequency counts of positive and negative sentiment terms. Analysis of sentiment terms can be performed at the document level, where a whole opinion document can be classified as expressing either overall positive or negative sentiment. It can be performed at the sentence level, where each sentence in a document is classified as positive, negative, or neutral. Sentiment analysis can also be performed at the aspect (or feature) level, a finer-grained approach which analyzes what specific entities people are talking about, and whether they associate positive, negative, or neutral sentiment terms with those entities (specifically, with targeted words or clauses within a text).

Although emotions have been shown to be central to moral deliberation (Haidt 2001), to our knowledge sentiment analysis (opinion mining) has not yet been used in research on lay morality.

D. Topic Modeling

Another text analysis methodology, known as "topic modeling," has recently caught on with a wide range of researchers in the humanities and social sciences. In a nutshell, topic modeling involves automated procedures for coding collections of documents into sets of meaningful categories which represent the main topics being discussed in the texts. Because algorithms can do this coding with a minimum of human intervention, topic modeling is more inductive than most other approaches to text analysis. Instead of starting with predefined codes or categories derived from theory, researchers using topic models begin by specifying the number of topics they wish the algorithm to find. Software then identifies the specified number of topics, returns the probabilities of words being used in a topic, and provides an accounting of the distribution of those topics across the collection of documents.

Topic models assume that meanings are relational (Saussure 1959), and that the meanings associated with a topic of conversation can be understood as a set of word clusters. Topic models treat documents as what linguists call a "bag of words," capturing word co-occurrences regardless of syntax, narrative, or location within a document. A topic can be thought of as the cluster of words that tend to come up in a discussion, and therefore to co-occur more frequently than they otherwise would, whenever the topic is being discussed.

Topic modeling is an instance of probabilistic modeling. The most widely used probabilistic model for topic modeling is Latent Dirichlet Allocation (LDA), which is a statistical model of language

introduced by Blei and his colleagues (2003). LDA is based on the idea that every document within a document collection is akin to a bag of words produced according to a mixture of topics (or themes) that the author intended to discuss. Each topic is a distribution over all observed words in the document collection such that words that are strongly associated with the document's dominant topics have a higher chance of being included within the document's bag of words. Based on these distributions, authorship is conceptualized as an author repeatedly picking a topic and then a word and placing them in the bag until the document is complete. The objective of topic modeling is to find the parameters of the LDA process that has generated the final document or document collection, a process referred to as "inference" in the LDA literature. Among the outputs of the inference is a set of per-word topic distributions associating a probability with every topic-word pair and a similar set of per-topic document distributions describing the probability of choosing a particular topic for every specific document.

The use of topic models within social research projects brings with it a number of challenges. Researchers need to be able to make sense of the topic word clusters that are produced by the algorithm and to recognize when topics derived from algorithms are worthless or misleading. It may often be the case that there are no well defined topics within a document collection, or the topics specified by the researcher may not match the actual number of topics in the document collection. Ideally, the topics and word clusters will make sense to a subject area specialist or well informed observer.

Topic models require interpretive work on the part of researchers, but unlike most social science research methods, in topic modeling interpretive work occurs mainly *after* data is collected and analyzed. Topic models "shift the locus of subjectivity within the methodological program —

interpretation is still required, but from the perspective of the actual modeling of the data, the more subjective moment of the procedure has been shifted over to the post-modeling phase of the analysis" (Mohr and Bogdanov 2013).

Despite the challenges involved in modeling topics in large text collections and integrating this modeling process into research designs, today topic models are being used by researchers in the humanities, political science, and sociology, often working collaboratively with computational linguists and other computer scientists. However, to my knowledge topic models have not yet been used in research on lay morality.

IV. Conclusions

Social researchers interested in lay morality have at their disposal a variety of offline research methods, from surveys to ethnographic interviews and content analysis techniques. But these offline methods are not optimized for studying discourse in the social media environments where public discussions are increasingly held, and they do not take advantage of newly available software, programming languages, or Internet-based data sets. In this paper I have reviewed state-of-the-art research methods for studying moral discourses and deliberations in online environments including online surveys, virtual ethnography, and text analysis techniques. While analog versions of many of these methods have proven their value in research on lay morality, the digital versions have been relatively underutilized. For researchers searching for innovative online tools to help them learn about moral attitudes, beliefs, discourses, deliberations, and practices, it is my hope that this paper has provided some guidance in terms of choosing the most powerful and apt methods to address their specific research questions.

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