

Computing Angel Names in Jewish Magic

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Introduction

Magic texts from most cultural traditions mention supernatural entities, often referred to as angels and demons. Jewish magical literature (Bohak 2019) also abounds in references to such beings. The angels among them are often named and addressed directly. They are beseeched or adjured to assist in achieving the aim of the magical act. Angel names can be found in magic rituals for a broad variety of aims, ranging from healing, protection from evil, or economic success to aggressive aims, such as causing the downfall of one's enemies. While Jewish angelology has been explored from a variety of perspectives (e.g., Olyan 1993; Reed 2020), angels in Jewish magic have received less attention. This paper applies computational methods to explore angelic nomenclature and function in a corpus of Jewish magical texts derived from the Cairo Genizah.

The Cairo Genizah preserved over 2,500 magical and mystical manuscript fragments, ranging in date from Late Antiquity to the modern period, and forms an ideal corpus for exploring angels in Jewish magic. The corpus consists of instruction manuals and recipes for performing magic rituals, as well as textual amulets that are the products of these rituals (Saar 2019). Cairo Genizah texts comprise Hebrew, Aramaic and Judaeo-Arabic (Arabic written with Hebrew script), and often a combination of the three. Almost all the texts employ the Hebrew script (א ב ג). Arabic text written in the Arabic script (ا ب ج) is also found, but rarely.

Project aims

Over a thousand supernatural entities that can be defined as angels are named in Genizah magical texts, yet no database exists that assembles them all (see elyonimvetachtonim.project.u-j.edu.pl/ for other corpora). Furthermore, no systematic analysis has been carried out on the nomenclature of angels in Jewish magic, neither within nor outside the Genizah corpus. This paper is a first step directed towards modifying this state of affairs.

Employing computational methods, we have mined a corpus of Jewish magic texts from the Cairo Genizah, extracting from it contextualised information on angel names. We have the following research aims in mind:

1. Establishing a database of angel names found in Jewish magic texts from the Cairo Genizah;
2. Determining the relations between specific angels or angelic groups;

3. Determining whether consistent connections exist between the aims of a magic ritual and the angels that are involved in it.

Method

Establishing a database using an automated workflow involves a number of challenges, which we have met by employing proven, off-the-shelf digital methods and libraries (Eijnatten/Huijnen 2021). Our code is written primarily in Python script.

1. Transforming ancient texts, transcribed manually in an MS Word document format with inconsistent layouts, into machine readable language (based on docx2txt).
2. Dealing with right-to-left script (using the text direction feature in the IDE PyCharm).
3. Generating word lists to identify angel names (employing n-grams, based on existing libraries: pandas, nltk, hebrew-tokenizer, etc).
4. Working with transcriptions resulting from incomplete or illegible manuscripts, including lacunae marked by square brackets [] and other special characters (adding search features to the code based on re (regular expressions)).
5. Identifying individual magic recipes using consistent start + end indicators in the texts themselves – consistency (adding simple customised search features to the script, again using regular expressions).
6. Automatically identifying the aims of magic recipes (using classification techniques / machine learning based on among others spaCy, sklearn and TensorFlow).

Initial results

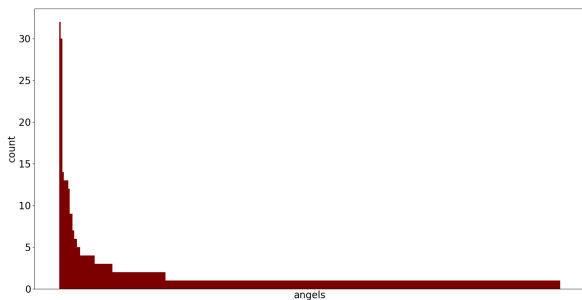
The analysis consists of two steps, one based on a test/training set of 184 manually controlled documents, the other on the full dataset of 2,500+ documents. The code for the automated workflow to meet each of the seven challenges mentioned above has been completed; the bulk of the transcribed corpus, stemming from a pre-digital era, has been uniformized, allowing us to perform the full analysis over the coming months. The results of the large-scale analysis using the complete extant corpus will be presented at the conference.

Our analysis of the test/training set already yielded a total of 335 different angel names (Graph 1). The findings show that angels tend to make a single appearance, suggesting that most angel names in the Genizah magical literature were created ad-hoc. Also, the vast majority of angel names do not seem to display a clear-cut connection to the aim of the magic ritual in which they are mentioned (Graph 2). For example, the angel Yofiel (from יפוי, meaning beauty) could be adjured to make an individual beloved by all, but also to repel crickets from the house. In terms of the digital history methods outlined above, and based on our analysis thus far, we expect that both classic methods (e.g. raw frequencies, n-gram, collocation) and more complex clustering and classification techniques will allow us to answer each of our three research questions.

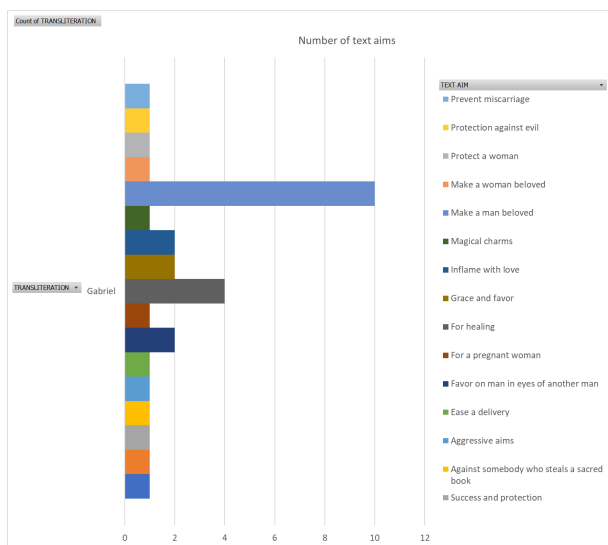
This paper is part of a larger project, in which we employ computational methods for a broad-scale survey and analysis of angels in Jewish magic and the magic of related cultures. As the results above indicate, our proposed methodology is well applicable for the study of magical texts in different languages and states of preservation. We expect our computational exploration of angel na-

mes, functions and interconnections to provide a useful tool for scholars of magic, mysticism and religion in different cultural traditions.

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Graph 1. The seamless bar graph shows a count of all angels in a test dataset of 184 manuscripts. The six highest scores are Gabriel (32), Michael (30), Ḥasdiel (14), and Raphael, Šuriel and Meṭatron (13). In this series, N is 335, the mode is 1, the median 1 and the mean 1.74.



Graph 2. A rough indication of the differences in purpose fulfilled in adjurations by the most popular angel Gabriel, based on a manually controlled test dataset of 184 manuscripts. This seems to show that there is no clear relation between angel and specific incantations.

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