COMMUNICATIVE CONTEXT AND THE EVOLUTION OF LANGUAGE: CHANGE OVER TIME IN THE RHETORICAL STRUCTURE OF BRITISH PATENT SPECIFICATIONS, 1711 – 2011

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There is a relatively long tradition of applying generalized evolutionary theoretical models to the study of language change (e.g. Croft 2000), but this research has generally investigated languages as a whole. Studies of register, genre and stylistic variation (e.g. Biber & Conrad 2019), however, have demonstrated that language varies systematically depending on the communicative contexts in which it is used. This insight is clearly relevant to evolutionary models of language change: in many ways, these communicative contexts are the cultural environments within which language evolves, much like the physical environments within which species evolve. The communicative context shapes the language used in those contexts in non-arbitrary ways, making language more suitable over time for the expression of meaning in that particular cultural domain. In this study we focus on one very specific genre – the patent specification – and offer an evolutionary account of how texts in this genre changed over time in response to cultural pressures.

Patenting is the branch of intellectual property law relating to innovations in industrial technology, and the patent specification genre lies at the heart of the entire patenting process. It is the genre in which a prospective patentee describes their invention in detail and explains why they believe it is worthy of intellectual property protection. Once it has been submitted for inspection, the specification then becomes the main focus of the patent officer's technical assessment of the inventor's claims; and if the patent application is successful, the specification finally becomes the means by which the inventor's knowledge is made available to the public, both during the period of patent protection and in perpetuity after the expiry of the patent itself.

The data for this study consist of a diachronic corpus of British patent specification texts ranging from the publication of the world's first specification in 1711 to the present day, with one patent selected at random per year. We identified systematic changes in the rhetorical structure of patent specifications

over this 300-year period using the methodology of move structure analysis (Swales 1990; Biber et al 2007; Samraj 2014). In this approach, a text is seen as a sequence of 'moves', which are parts of the text that have distinct communicative functions. By conducting a move analysis for a sample of texts drawn from a given genre, it is possible to make generalisations about what types of rhetorical structures are typical of that genre, including which moves are obligatory, which are optional, and how they tend to be ordered.

We coded each of the patents in our corpus for rhetorical moves, identified through a manual analysis with inter-rater reliability testing. These moves fulfil a wide range of functions and include "filing information", "declaration of invention", and "statement of claims", for example. In this way each patent text was reduced to a sequence of moves, with each move being representing by a single orthographic character. Next, we used string edit distance techniques (Navarro 2001) to measure the dissimilarity between each temporally adjacent pair of move sequences (e.g. 1734 vs. 1735, 1735 vs. 1736). String edit distance is a relatively simple way of measuring how dissimilar two strings are from each other by counting how many changes are necessary to convert one string into another. By applying this technique to strings representing rhetorical move sequences, we were able to quantify change in the rhetorical structure in our corpus. We then plotted these string edit distances over time, thereby allowing us to visualize and identify changes in the rhetorical structure of patents (see Fig. 1). Finally, we interpreted these observed rhetorical changes from a cultural evolutionary perspective (Mesoudi 2011; Richerson & Christiansen 2013).

Our initial expectation was that the changes revealed by our data would conform either to the classic Darwinian 'phyletic gradualist' model of evolutionary change, or to the alternative 'punctuated equilibrium' model proposed by Eldredge & Gould (1972). In practice, however, our results do not fit comfortably into either of these two models, but rather combine aspects of both. Specifically, we find that the rhetorical structure of the patent specification genre is subject to constant and gradual change throughout its existence, but also that this contour of constant and gradual change is punctuated by four abrupt and dramatic shifts at key historical points in time. Accordingly, we argue that the evolution of the patent specification genre is best described, following Malmgren et al (1984), as an instance of 'punctuated gradualism'. We conclude by discussing the necessity of integrating the concept of communicative context into evolutionary theories of language change.

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