



# Using thesauruses as a heuristics for mapping values

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Received 10 November 2015; received in revised form 10 February 2016; accepted 18 February 2016

Available online 19 March 2016

## Abstract

Value differences across cultures or social groups are usually framed in terms of different emphases a particular group puts on specific values. For example, Western cultures typically prioritize values like autonomy and freedom, whereas East-Asian cultures put more emphasis on harmony and community. We present an alternative approach for investigating such cultural differences based on thesaurus databases that reflect the use of value terms in everyday language. We present a methodology that integrates empirical value research with linguistics and novel computer visualization tools to map and visualize value spaces. The maps outline variations in the semantic neighborhood of value terms. Based on 460 value terms both for US-English and German, we created for each language a map of 78 value classes that were further validated in two surveys. The use of such maps could inform research in three ways: first, by allowing for a controlled variability in the usage of value terms when generating vignettes; second, by indicating potential difficulties when translating value terms that display considerable differences in their semantic neighborhood; and third, as heuristics for better understanding value plurality.

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**Keywords:** Cultural differences; Empirical value research; Semantics; Values; Value maps; Word similarity

## 1. Introduction

Values represent a prominent topic in many disciplines. Commonly understood as abstract and desirable standards, values are proposed to guide decision making and behavior. They are seen as crucial sources of conflicts within individuals or between groups and cultures (Huntington, 1993; Pearce & Littlejohn, 1997; Schwartz & Sagie, 2000). Another recurrent topic is whether there are universal values which should be upheld across cultures

(Hare, 1954; Taylor, 1978) or whether values are relative and culturally determined (Quintelier & Fessler, 2012; Shweder, 1993). However, an important topic is also how to assess the meaning and structure of values. In psychology, many measures have been developed to assess the relative priority or importance of values (e.g., Rokeach, 1973; Schwartz, 1992) or to identify “innate” values (Haidt & Joseph, 2007). A prominent model of empirical value research is Schwartz’s human value approach. Building on earlier models (e.g., Rokeach, 1973), Schwartz has developed two instruments to measure the importance of values, which have been widely tested and validated within and across cultures (e.g., Bilsky, Janik, & Schwartz, 2011; Schwartz, 1992, 2006). Based on a multidimensional scaling approach, he argues that values are organized in

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a circular structure, reflecting ten distinct value domains with conflicts and congruity among values (Davidov, Schmidt, & Schwartz, 2008).<sup>1</sup>

Our research aligns with the general aim of classifying and mapping values, but uses a different approach. We consider this study as an example on how a specific way of knowledge representation (Thesaurus databases), machine classification and human expertise can interact for providing a solution for value classification. Specifically, this study is designed to investigate differences in the semantics of value terms in different natural languages. Our method is based on language usage reflected in linguistic reference books, offering a potentially ecologically valid approach of value identification, and furthermore involves a novel data analysis and visualization method that is based on self-organization. The general framework of our methodology relies on the tradition of psycho-lexical analysis that dates back to Francis Galton's *Measurement of Character* (1884). The basic idea is that, all else being equal, a natural language is more likely to include a predicate for a property to the extent that the property is important to those who speak the language. Furthermore, the psycho-lexical approach proposes that the semantic structure of a language reflects to some extent the perceived structure of the phenomena described by the language. In personality psychology, this insight was famously used by Allport and Odbert (1936) to create a semantic taxonomy of thousands of personality-relevant terms, which they argued represents how people conceive of personality. We aim for a similar type of analysis for value-related terms.

Our analysis is based on the assumption that the practice of language is precipitated in dictionaries, lexica, and other wordbooks. Of particular interest is the thesaurus – a language reference book or database organized to help its users find words related to a concept but having slightly different shades of meaning or connotation. Thesaurus dictionaries have a long tradition, starting in the 17th century and cumulated in famous books like Roget's "Thesaurus", published in 1852 (Hüllen, 2004). Thesauruses reflect what people in their daily use of language – in particular when writing text – consider semantically similar to

a given term. They can be understood as expressions of "practical synonymy", which involves employing the principle of synonymy for semanticizing lexemes, i.e., basic units of lexical meaning that exists regardless of the number of inflectional endings it may have or the number of words it may contain (Hüllen, 2004).

Certainly, there is a rich theoretical tradition regarding the notion of synonymy in linguistics, philosophy of language and other fields. In a strict understanding, synonymy refers to the fact that there may be several different words for expressing exactly the same meaning – an understanding that is difficult to uphold, as Quine (1951) has observed. Within the emerging field of semantics, various notions of synonymy like semantic fields (Trier, 1931), the structuralist investigations of Harris (1973) or the pragmatic suggestion of Jones (1986) have been developed. In addition, sophisticated databases like, e.g., *WordNet* (see <http://wordnet.princeton.edu/>) that labels the semantic relations among words have been developed. However, today's thesaurus databases list synonyms in a broad sense, i.e., they employ some notion of "meaning similarity". The major aim of a thesaurus is not to find a replacement Y of a certain term X what has exactly the same meaning of X, but rather to find a term Y that has a slightly different facet in meaning for better expressing what the writer actually wants to express. Thus, a thesaurus is broader in capturing word relationships than synonymy in a strict sense – but it is still more specific than the mere co-occurrence statistics of terms in texts.

In what follows (Section 2), we will describe our methodology that involves both machine classification and expert opinion, while integrating classification algorithms and visualization tools. We start with a broad sample of value terms in two languages (460 terms each) that are then grouped into broader value groups using a two-step iteration procedure (see below, Fig. 1).

In Section 3 (Theory & Calculation), we present the application of a novel visualization tool such that experts can better deal with the high-dimensional data spaces that result from the large number of terms in our analysis

<sup>1</sup> The values theory of Schwartz defines ten broad value domains according to the motivation that underlies each of them: Self-Direction, Stimulation, Hedonism, Achievement, Power, Security, Conformity, Tradition; Benevolence, and Universalism. Those are considered to be universal because they are grounded in one or more of three universal requirements of human existence: needs of individuals as biological organisms, requisites of coordinated social interaction, and survival and welfare needs of groups. Schwartz proposes a circular arrangement of the values that represents a motivational continuum: The closer any two values in either direction around the circle, the more similar their underlying motivations; the more distant, the more antagonistic their motivations. For example, Achievement and Benevolence are opposite, meaning that former relies on self-centered satisfaction, whereas latter on devotion for peers. Conformity and Tradition are neighbors because they refer to the subordination of the self in favor of socially imposed expectations. A comprehensible introduction is provided by Schwartz (2012).

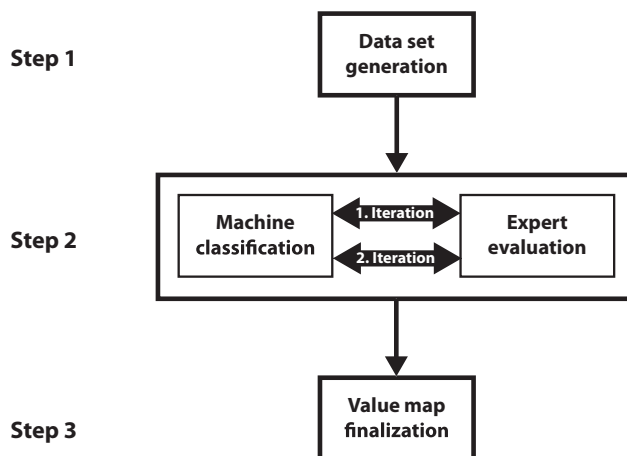


Fig. 1. Thesaurus value map generation procedure.

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