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# CULTURAL MODELS AND BELIEF SYSTEMS: DETECTION AND QUANTITATIVE ASSESSMENT OF THE THRESHOLD OF SHARED COLLECTIVE KNOWLEDGE

*Researching collectively shared belief systems is one of the central tasks of social science. The goal of this article is to outline the quantitative options available to researchers of cultural models [14] and, more generally, those options that can be used for measuring sharing due to culture. I begin by laying out major characteristics of cultural models and stress their definitive features that can guide the researchers in their selection of fitting measurement techniques and analytic procedures. Then I briefly discuss the intellectual history of the cultural models theoretical framework relevant to the emergence of the existing methodological diversity in this research niche. I consequently consider the internal properties of cultural models and review the corresponding methodologies currently in use for their elicitation and ethnographic interpretation. I evaluate their respective advantages and comment on usefulness of various quantitative options (both as an end product and as a stage in more complex integrative designs) in research on shared collective knowledge.*

**Keywords:** cultural models theory, culture consensus, cultural beliefs, cultural worldview, measurement.

## Belief systems and cultural worldviews: The emergence of culture consensus

Individual behavior unfolds in social settings presupposing intersubjective cultural sharing [8]. Group membership typically entails formation of coherent culture-specific sets of ideas, attitudes, norms and social axioms enforced in individuals since the early age via enculturative routines. Enculturated individuals are capable of coordinating their actions because they have a common understanding of their purpose and make sense of it in similar (mutually understood) meaningful ways. This mutual understanding is facilitated by shared cultural ideas that legitimize and justify actions and that individuals possess due to their shared socialization experiences in a more or less uniform fashion. It concerns both simple things, such as inferring motivations or emotions, and logically compound things, such as worldviews. These constitute the basic premises of the cognitive theory of culture, presupposing that (1) culture is an information pool available to the members of a cultural group, (2) a substantial portion of cultural knowledge is shared across individuals creating measurable consensus within a group, and (3) individuals vary in terms of the content (what they know) and the degree of their cultural competence, all of which can be empirically assessed.

## Organization and measurement shared collective knowledge

Cultural ideas do not exist in isolation in people's minds. Instead they are organized in ways that link them to other ideas (values, norms, attitudes, social axioms etc.) within cultural schemas of varying complexity [14]. The inter-linkages between these schemas give rise to larger agglomerations of culturally organized shared knowledge that guide the sense-making process typical for the cultural group. By so doing they become instrumental in interpreting individual daily experiences, endowing specific events with particular meaning and helping individuals make culturally-logical connections between the causes and the consequences of the social world they inhabit. Explaining the logic of these connections is one of the challenges the ethnographers face and one of the difficulties in cognitive and psychological measurement of cultural knowledge.

Furthermore, cultural knowledge is not perfectly homogenous but relying on a number of variants circulating within a group. Some individuals know more about a cultural domain, others know less. There are also cultural experts who have invested time and effort into acquisition of this knowledge (and possibly, skills) and individuals who are more culturally naïve. For instance, sociology graduates are typically expected to know "more sociology"

than the first years just declaring their major. So, one source of the existing intra-cultural variation in knowledge is simply the amount of knowledge (termed "expertise" or "competence") one possesses about the domain. But to understand the social distribution of the collective (cultural) knowledge, one has to allow an observation that there are important distinctions not only in the *amount* of information, but also in the variation in its *content* as well as *organization*. The internal organization of variation in shared knowledge within a group is further affected by various social factors such as age, gender, social class etc. [1] What is important is that these variables tend to group individuals together based on the criterion of sharedness of what they know and, by implication, serve as watermarks separating different knowledge pools different social groups and social categories have access to. In this respect, the distinctive differences in knowledge may relate not so much to *how much* an individual knows, but *what* she knows about the domain. For example, seasoned fishermen know more about fishing than novices, and fishing experts have different ways of classifying fish than novice fishermen ([14] for a classic illustration).

To continue this analogy, let's turn to what people know about the social world [7]. Different social groups can hold quite distinct worldviews which are complex organizations of intersubjectively shared and deeply held ideas, the logical connections among which are consensually understood on the basis of the underlying cultural assumptions. They direct and orientate their behavior in the society as well as their mental habits, and have bearing on life outcomes (cf. [30–32]). For example, middle class young adults have been shown to have a better idea of how the institutions like universities work than the working class students, and usually manage to secure the help they require from the administrative staff and get things done more effectively compared to the students with working class background who, in contrast, tend to avoid contact with administration [33]. This brings us to the applied meaning invested in the notion of cultural models.

Cultural models (further CMs) embody an important instance of organization of collectively shared knowledge. Being characterized by both sharedness within a socio-cultural community where it circulates and a degree of inter-personal

variability due to uneven distribution of domain-specific knowledge among different members of a society, CMs represent an integral aspect of social living ([62] on similarities of social landscape, pp. 22, 56). Research on CMs has instigated not only a quest for better understanding of how members of different social groups imagine the world works, but also an inquiry into the social determinants of such views of the world and its dynamic and applied aspects (cf. [33]). I begin my examination by laying out major characteristics of cultural models. I subsequently turn to discussing the intellectual background of what has come to be known as the CM framework. I consider the internal properties of CMs and discuss the ensuing methodological implications for their extraction. I then transition to reviewing the methodologies currently in use for elicitation and ethnographic interpretation of CMs. I subsequently evaluate their advantages and comment on usefulness of quantitative options (both as an end product and as a stage in more complex integrative designs) in research on shared collective knowledge.

## What Are Cultural Models?

CMs are conceptualized as collectively shared (cultural) knowledge that the natives use to make sense of the world. A CM can be defined as the "presupposed, taken-for-granted knowledge shared within a society" [50, p. 4], a social group or a particular subculture. A defining characteristic of CMs is their structural organization that, because it follows the contours of the existing social structures, allows a CM to be used by a cultural group/social category as a cognitive map of the mental landscape inhabited by the group members. Relying on inductive techniques of elicitation and attending to culture-specific patterns in organization of information, CMs proved a useful methodological tool to the students of culture and cognition [48]. Over the years social scientists have accumulated considerable skill and extensive knowledge as to how we can reliably measure cultural sharing, inter-informant agreement, and individual cultural competence reflecting CMs' coherence. The published accounts of empirical work also take note that CMs are informed by values, norms, and cultural attitudes that are dynamic, emotionally charged, and often deeply internalized, and therefore best accessed in interviews and other forms of observation that allow open-ended accounts for habits of thought and patterns in behavior. All in all, research on CMs has produced a broad and interesting literature. Although

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[1] Although no two individuals can have identical knowledge, the persons who belong to the same social group do have a greater chance of having more overlapping or similar knowledge structures due to the ideas, norm perceptions and other elements of their collective world-view that they are likely to share (e.g., due to culture consensus). Both individual competence and the degree of the inter-personal overlap in knowledge can be assessed quantitatively [52; 53].

monolithic theoretically, this line of inquiry remains to this day methodologically diverse [6; 49].

## Cultural Models Theory: The Intellectual History and Methodological Agenda

CM theory has originated in cognitive anthropology in the 1980s. The rise of this framework is contextualized within the increased interest in "more ideational, mental, and cognitive concerns – the study of ideas, beliefs, values and cosmologies" brought about by the cognitive revolution – first in psychology and linguistics and then in social sciences in mid 20th century [11, p. 12]. This 'paradigm shift' characterized by a departure from behaviorism has lead to a number of intellectual developments and has had further theoretical outgrowths in several different disciplines [2] [49]. Its effects are still profound and wide-ranging in the cognitive sciences, although the subfield is now more diversified along the disciplinary lines (see Trends in Cognitive Science (2012) volume 4 issue 3 and the ensuing responses).

Moving from the 'word-based' theory of cultural meaning that was regnant during the prevalence of ethnoscience research agenda in the USA in the 1960s–70s, the new tendency embraced working out the ways in which cultural knowledge was organized into 'scripts', 'scenes' [18, p. 373], 'routinized, highly stereotyped cultural productions' and 'culture grammars' [9]. Exploring the 'content of culture' [22] understood as propositions, beliefs, heuristics, values, rules, routines and customs, and system of customs (and not just words/categories) became a new agenda [50, p. 33].

Making use of the notion of cultural schema and the connectionist model, within a few decades a new theoretical frame has emerged that was focusing on cultural beliefs systems based on shared or overlapping experiences. This theory was became later known as CM theory, and its premises have been explicated in a series of books edited by Roy D'Andrade, Naomi Quinn, Claudia Strauss and Dorothy Holland ([3] for book overviews). CM theory is built on the assumption of the degree of sharedness of cultural knowledge within the cultural community and deals expressly with the native meaning construction process. A detailed overview of the chronological and conceptual development of CM school has been admirably done by one of its central figures, Naomi Quinn [50]. Here my aim is confined to the

presentation of the differences in designs and methods that employ properties of CMs.

The goal of CM research is ambitious in that it is relating what is there to know about how humans think to the ethnographically modified descriptions of the structures of knowledge circulating within a society. Ben Blount [3] describes the wide array of applications of CM research which he aptly summarizes into 'discourse-internal' and 'discourse-external' classes of analyses [3, p. 21]. He identifies the former as the work done by Quinn and her associates and students who further and refine the methodology of 'finding culture in talk' and seek to indentify very specific and detailed models within discourse. The latter is associated with the kind of work done by applied and medical anthropologists, and in this line of research CMs serve more as a means than an end. This approach aims to mine discourse for shared knowledge within specific domains [3, p. 21]. The utility of CMs as a methodological tool has been productively used for a number of [17], Horowitz [28], Gatewood & Cameron [21] to name just a few.

Evidently, CMs of different domains may vary in their internal organization and complexity. Correspondingly, social scientists used a number of different techniques to extract, analyze and describe CMs. Due to the volume of information involved in the complex organization of knowledge constituting a CM, their extraction at least at the beginning typically requires a substantial amount of in-depth interviewing to establish its constitutive elements and outline the structuring logical connections that bind them into meaningful units of one integral whole. However, these logical connections that are "cultural signatures" in the internal organization of a CM can be operationalized as a set of unidimensional entities and accessed by means of quantitative methods (for example, by constructing multi-item scales). This type of methodology allows for direct reliability and validity testing, thereby addressing concerns about validity and data quality (cf. [26; 24]). Both types of research methodologies have been employed to study CMs. The following rubric outlines some of the major junctures in the area of CM methodologies.

## Extant Methodologies for Cultural Models Extraction

*Traditional qualitative approach to cultural models and transition to quantification*

Present day CM research is a broad, innovative and fast growing branch of research in social sciences. Highly diverse thematically, it also tends

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[2] The emergence of ethnopsychology and the formulation of culture consensus theory developed by Kim Romney and his associates are two prominent examples cited by Naomi Quinn [50, p. 32].

to be heterogeneous in terms of types of data and elicitation techniques used in different social disciplines. Admittedly, much of the earlier research on CMs is done on the analysis of textual data and by means of qualitative techniques. One illustrative example of this qualitative analysis is that of the American political culture by Claudia Strauss [58]; another is Shimizu's [56] work involving an insightful comparison of American and Japanese concepts of self and learning/teaching. Either could serve as an example of this methodological strategy and its strengths in cognitive anthropology and cross-cultural psychology, respectively. Naomi Quinn's work on marriage in the United States further exemplifies a cognitive ethnographic perspective on institutions [47]. In family studies this approach was used by Sara Harkness and Charles Super in their extensive cross-cultural project on beliefs about parenting strategies (e.g., [27]).

Although much of the published work on CMs can be described as qualitative and traditionally has been largely based on discourse analysis, more recently the researchers of CMs came to resort to various forms of quantification as well as integrative (mixed methods) techniques. For example, Roy D'Andrade's study of honor culture in the American South [12] collected scalable data and used correlation analysis and ANOVA to evaluate the consistency and local variation of beliefs about honor in different parts of the United States (New York, California, Tennessee and Alabama). D'Andrade's results suggest that despite the popularity of the explanation based on the widely held idea involving the notion of 'honor culture' in the American South, there is better evidence for a more general *pan-American* CM rather than a distinctive *southern* CM with regard to anger, disrespect and honor.

More recently published *A Companion to Cognitive Anthropology* [2] offers an assemblage of methodologically diverse quantitative studies focusing on CMs. More aligned with linguistics and using an intricate set of research procedures, Giovanni Bennardo [1] applied metaphor analysis and social network analysis to research social relationships in Polynesia. In a similar domain of interpersonal relationships, Victor de Munck [15] took yet another research route to explore CMs of romantic love in Lithuania. In his study he used similarity data from pile-sorting procedure and multidimensional scaling method to present the organization of features in the domain of romantic attachments. In yet another research design involving quantitative methods Schrauf and Iris [55] collected

binary data and used consensus analysis with cross-sectional data to extract CMs of Alzheimer's disease prevalent in Mexican, African American, and post-Soviet immigrant samples.

## Data reduction techniques

Data reduction methods provide an alternative way of researching CMs quantitatively. Principal components analysis and factor analysis are typically used in this instance. Traditionally quite popular with psychometricians, these techniques are sometimes used by anthropologists, sociologists and psychologists to detect and measure the presence of cultural sharing in cognitive data (beliefs, norms etc.) [26]. In principal components analysis, condensation of a dimension is achieved by reconstructing the relationships between variables and presenting them as a set of new latent variables summarizing variation present in the matrix (data reduction). This procedure is suitable for studying cultural organization of ideas as it can accommodate the material of considerable overall complexity and allows tracking sources of consensus due to culture [60]. Furthermore, it does not assume the existence of one consensual center (i.e. the method does not presume a unidimensional consensus) which would indicate the presence of one single prevalent CM, thus allowing exploring the variation in the CMs across the informants, including the possibility of plurality of CMs circulating within the social group. It also directly and explicitly tests the cohesiveness of the dimension rather than assuming sharing of a model by the informants [10; 13; 43]. Finally, it is fitting to use the analysis of dimensionality to describe CMs' internal structure, as the theory of CMs first appeared specifically to address the organization of cultural information in complex dimensions that was missing from the research agenda of ethnoscience in the 1960s to 1970s [50].

Thus data reduction techniques achieve both the representation of a "big picture" and the snapshot of the internal organization of compound abstract entities such as CMs – a capacity that is often made use of in applied and theoretical research. One illustrative example is provided by Packard, Weeks, Paolisson, and Srinivasan [45] who used principal components analysis in their work on land conservation to access cognitions associated with knowledge of land use and to extract CM of land conservation among their informants in Texas and Maryland. This technique was also used by Suizzo [59] to describe the CM of child rearing and parental beliefs in France, and by Milbrath, Ohlson,

and Eyre [41] to distill CMs from adolescent accounts of romantic relationships. All three studies can be described as quantitatively driven but combining the quantitative and qualitative techniques in their designs [cf. 51]. The researchers identified the range of cultural beliefs held by the informants in the course of the interviews and, based on this qualitative data, developed structured instruments to collect quantitative data and to elicit CMs embedded in the data by applying principal components analysis. Associations with demographic variables were then confirmed in regressions analyses. Similar design was used in Olenchenko and Maltseva [44] to compare shared cultural beliefs about success that circulate within different age cohorts of Kiev city dwellers.

**Using metric scaling and analysis of scales**

Using metric scaling is yet another quantitative option to research CMs and similar mental aggregates, and as such it confers additional advantages. While principal components analysis is a suitable tool to describe the structure of underlying dimensions (which is useful for the purposes of the research on CMs), it lacks an effective visual representation appropriate for describing CMs in terms of shared knowledge and attesting to their collective nature. Definitions of CMs often liken them to maps due to their ability to organize culturally salient information in particular ways. CMs allow anchoring beliefs about a cultural domain/worldviews of various social categories (i.e., particular groups of informants) within a broader mental landscape shared by members of the society. Methodologically, an optimal visual representation of the variation within or across CMs would allow linking the different social categories of informants with their respective worldviews on the graph, and comparing them in terms of meaningful similarities and differences. Therefore, a method permitting to co-plot both attributes (columns) and informants (rows) in a two-dimensional space would be more advantageous. As following such procedure the nature of the research construct would approximate reality with more accuracy, this research tool would yield a picture that would be closer to the nature of CM (see Messick [40] regarding the importance of structural fidelity of assessment tools).

Considering the above characteristics, correspondence analysis is one such method. It has been typically used by the researchers to take advantage of this quality, contextualizing particular demographics within social attitudes/cultural traits

they collectively endorse [5; 24]. One of the widely cited applications of correspondence analysis in social science is exemplified in Bourdieu's assumptions about different lifestyles co-occurring with socioeconomic distinctions discussed in *La Distinction* [5; cf. [24, p. 25].

Correspondence analysis can be run on individual items or on scales. Correspondence analysis of multi-item scales permits treating multiple cultural dimensions (i.e., without assuming unidimensional structure of the data) and demographic categories simultaneously, to explore inter-item structure reflected in the data. Scales also offer a more robust way of measuring dimensionality and exploring inter-item and inter-informant variation [10; 39].

Scale construction is premised on finding the groups of intercorrelated variables that together measure a meaningful, interpretable dimension. The technique of scale construction grew out of many years of factor-analyzing groups of self-report inventory items and is widely known among psychometricians [10; 43]. In the sphere of measuring cultural ideas the technique of scales was effectively used by Roy D'Andrade in his analysis of American, Vietnamese, and Japanese values [13]. This study illustrates the wealth of analytical possibilities that the scales method can afford, both in terms of sophistication of research design and with respect to high-quality reliability measures. Correspondence analysis of scales was also used to explore the distribution of prosocial values and norms in Swedish society and their links to social support available to individuals [35; 37; 38], and to better understand the socialization factors that affect the degree of replication of parental values system in families [36].

Due to these advantageous features, correspondence analysis [3] of scales is a particularly strong option for researchers working with collectively distributed cultural knowledge and its structure. Compared to other quantitative options, applying this technique to scales would solve the often cited problem of simplification and loss of nuance that is entailed in the process of data reduction [42]. As each scale, by definition, consists of multiple intercorrelated variables measuring individual variation along the dimension associated

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[3] It should be mentioned here that although there are different traditions in understanding the mechanics of correspondence analysis, the advantages of using scales are not disputed. Correspondence analysis reveals the structure of the data and provides a scaled model of that structure, summarizing complex relationships among many subjects and many sets of variables simultaneously [61]. It is therefore a suitable method to explore CMs that represent structurally organized information that is shared within a larger cultural community but can vary locally.

with the scale, working with scales better preserves complexity and inter-informant variation present in the data. Therefore, using correspondence analysis of scales yields an output that is substantially richer than that of principal components analysis (or similar techniques) and hence more useful to an ethnographer working in the field. Equally important, using metric scaling techniques such as correspondence analysis is particularly helpful for addressing generalizability concerns typically voiced for research on CMs: how can we produce evidence that the model is shared by an entire population and is not specific to a particular social category? By treating rows and columns data simultaneously, correspondence analysis allows making explicit connections between the elements of CM and demographic variables, and visually represents the patterns of association in multidimensional graphics [23]. These features of correspondence analysis of scales offer the advantage of reliably measuring and comparing complex, context-rich dimensions more extensively and more in-depth, combining the strengths of the two methodologies typically kept apart within qualitative and quantitative modes [25; 29].

## Conclusions and Future Directions

Cultural models and their theorized properties remain one of the most actively discussed topics in cognitive sociology and anthropology, all the while provoking a great deal of interdisciplinary thought [16; 46]. Furthermore, the engagement in a theoretical debate fuels an ensuing methodological discussion which one hopes will bring about some new solutions.

To paraphrase the Cartesian idea that famously bears many of the signatures of the European scientific tradition: *if something exists, it exists in some amount, and if it exists in some amount, it can be measured.* Cultural knowledge and its organization within a society into CMs is one of the important instances of measurement in social sciences. As the breadth of selection of quantitative techniques currently available for assessment of cultural sharing is truly bewildering, it is most useful to teach this array of techniques to the young social scientists to equip them with more research tools. Research on CMs offers ample opportunities for methodological innovation, involving combined use of different techniques, integration of multimodal research options (such as classical ethnography and quantitative surveys) and development of new instruments based on the analysis of textual data. Having multiple routes to choose from is always an advantage for a researcher, and the ability to select and combine what is best for one's research question is always a favorable quality when it comes to the implementation of one's research plan.

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## КУЛЬТУРНІ МОДЕЛІ ТА СИСТЕМИ УЯВЛЕНЬ: ВИЯВЛЕННЯ ТА КІЛЬКІСНЕ ВИМІРЮВАННЯ СПІЛЬНОГО КОЛЕКТИВНОГО ЗНАННЯ

*Дослідження систем уявлень, що колективно поділяються всередині групи, є одним із центральних завдань соціальної науки. Мета цієї статті полягає в окресленні кількісних методологічних опцій, що можуть бути використані для досліджень культурних моделей [14] та, більш широко, для дослідження спільностей культурного походження. Спочатку викладено основні характеристики культурних моделей та наголошено їхні визначальні риси, що можуть скеровувати вибір дослідників щодо відповідних технік вимірювання та аналітичних процедур, сумірних із природою культурних моделей. Потім подано короткий огляд інтелектуальної історії теоретичної концепції культурних моделей, що є дотичною до постання теперішнього методологічного розмаїття в цій дослідницькій ніші. Також розглянуто властивості культурних моделей та відповідні методології, що нині використовуються для їх виокремлення в дослідженнях та етнографічних інтерпретацій. Зрештою робота звертає увагу на конкретні сильні сторони та відзначає корисність різних кількісних методологічних опцій (і у формі простих, і у формі більш складних інтегрованих дизайнів) для досліджень спільного колективного знання.*

*Культурні моделі втілюють важливу форму організації спільного колективного знання. Оскільки їм властиві водночас і поширеність у межах певної соціокультурної спільноти, всередині якої вони функціонують, і певний ступінь варіативності між індивідами через нерівномірний розподіл відповідного знання між членами суспільства, культурні моделі є інтегральним аспектом соціального життя. Дослідження культурних моделей згуртовує навколо себе не тільки пошуки кращого розуміння того, як різні соціальні групи уявляють собі, як влаштовано світ, але й дослідження соціальних детермінант таких світоглядних систем та їх динамічні та прикладні аспекти.*

*Оскільки асортимент кількісних технік, доступних нині для вимірювання культурної спільності, дійсно вражає широким вибором, було б практично корисним передати цей набір технік молодим соціальним науковцям і дати їм у руки більше дослідницьких інструментів. Дослідження культурних моделей відкриває численні можливості для інновацій, включаючи комбіноване використання різних технік, інтеграцію мультимодальних дослідницьких опцій (як-от класична етнографія та кількісні опитування) та розробки нових інструментів на основі аналізу текстових даних. Мати кілька шляхів на вибір завжди є плюсом для дослідника, і можливість обирати та комбінувати те, що є оптимальним для дослідницького питання, завжди є бажаною в процесі реалізації дослідницького плану.*