Chapter IV
Predictive Models of Cultural Information Transmission

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ABSTRACT

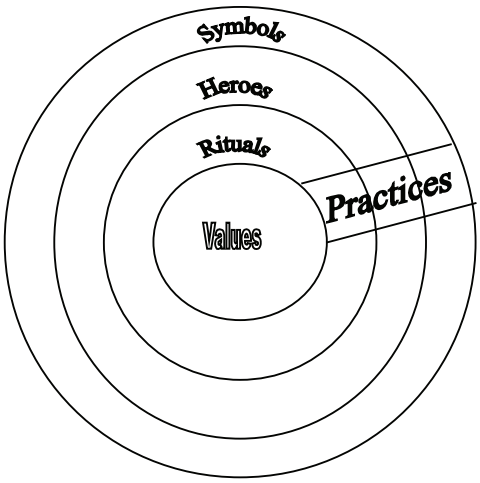
This chapter will critically review existing approaches to the modeling transmission of cultural information and advocate a new approach based on a new generation of agent-based social simulation systems. It will outline how such systems can be useful for studying the formation of patterns of widely shared cultural beliefs.

INTRODUCTION

Intuitively, most people seem to understand the term **'culture'** as it is used in everyday conversation[1]; however, it remains a notoriously difficult concept to pin down precisely. A 1952 review identified 164 definitions of **culture** (Kroeber & Kluckhohn, 1952) and the situation has not improved since. Modern cultural scientists often resort to metaphors such as an onion or an iceberg to define **culture**. The idea is that culture is a hierarchy consisting of multiple layers, many of which are hidden from view. For instance, Hofstede's cultural onion (Figure 1) consists of publicly observable symbols–gestures, pictures, words/jargon, hairstyles, and flags–as the outermost layer. Heroes–idealized people, dead or alive, seen as possessing highly prized characteristics–form the next layer. Rituals–group activities seen as essential by the group but superfluous to the achievement of the actual goal, carried out for their own sake–form the third layer. The core of a culture consists of shared beliefs about how things should be.

Each of the layers can be further deconstructed into multiple sublayers. For instance, the privately-held widely-shared beliefs of a cultural group can be further divided into beliefs about the social world, beliefs about the physical world, and beliefs about other groups, etc. Another source of complexity is the fact that aspects at any level and sublevel are related to aspects at other levels and sublev-

Figure 1. Hofstede's cultural onion



els. Elaborating this view, Bloch (2000), argues that "**culture**s form consistent wholes … every element–wherever it came from–was moulded to fit in with the others because of a psychological need for integration which led to an organically patterned 'world view'" (p. 197).

Despite the complexity, understanding **culture** has been important for several disciplines including anthropology, sociology, and social and cross-cultural psychology. The work in these fields has contributed to our understanding of certain aspects of culture, for instance, we have several quantitative measures of cultural differences among a variety of nations (Hofstede 1994). However, this work has been criticized for failing to develop computationally predictive models of culture that would allow us to explain the macro-level cultural patterns in terms of individual level cognitive tendencies and make testable predictions about the future direction of a society (Gilbert & Conte 1995; Laland & Odling-Smee 2000). The challenge then is to design models that can not only account for multiple layers of culture and the rich connections between these layers, without abstracting away the complexity, but are also computationally predictive at the same time.

A complete theory of culture may also be able to satisfactorily explain how cultural layers come to be formed. Historically, we know that cultural patterns seem to pass like waves on the shores of time with each new wave rearranging the lines made by the previous waves. For instance, last few centuries of Western European art history is a story of dynamism with one trend of cultural innovation following another. Any two waves that are temporally contiguous in history appear to have a paradoxical relationship with each other. The new trend is both defined in opposition to the old one and as a continuation and improvement of the old trend. Visual arts are certainly not the only aspect of culture to exhibit this pattern. Other cultural trends including religious doctrines, pop cultural trends, and patterns of political thought also appear to evolve similarly. Thus Lutheranism builds on Catholicism while it also reforms it and seems to stand in opposition to it. Postmodernist art builds on Modernist art while at the same time redefining it. Explaining these pattern of stability and change in the evolution of cultural trends is a question of central importance for the social sciences.

Several critics of traditional cultural theory have offered alternatives to the standard verbal and/or mathematical modeling approaches. The alternatives include: ***memetics* and *agent-based social simulation***. Next, I critically examine these alternatives and suggest a new promising approach based on a multi-agent architecture specifically designed to lead to a computational model of cultural **information transmission**.