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Cultural Replication Theory and Law

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Abstract

Does law itself evolve? It has been widely suggested that culturally transmitted behavioral information exhibits a Darwinian evolutionary dynamic. The argument is straightforward. Darwinian evolution has three basic elements: (i) replicative descent with (ii) variation, subject to (iii) a form of selection. Bundles of cultural information as diverse as language, religious practices, and how to bake bread pass with imperfect fidelity from generation to generation. Some of the variants created by these imperfections are passed, non-randomly, to the next generation with greater frequency.

Cultural Replication Theory and Law: Proximate Mechanisms Make a Difference

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Introduction

Does law itself evolve? It has been widely suggested that culturally transmitted behavioral information exhibits a Darwinian evolutionary dynamic.¹ The argument is straightforward. Darwinian evolution has three basic elements: (i) replicative descent with (ii) variation, subject to (iii) a form of selection.² Bundles of cultural information as diverse as language, religious practices, and how to bake bread pass with imperfect fidelity from generation to generation. Some of the variants created by these imperfections are passed, non-randomly, to the next generation with greater frequency.

¹ See, e.g., ROBERT AUNGER (ED.), *DARWINIZING CULTURE: THE STATUS OF MEMETICS AS A SCIENCE* (2001); SUSAN BLACKMORE, *THE MEME MACHINE* (1999); R. BOYD AND PETER RICHESON, *CULTURE AND THE EVOLUTIONARY PROCESS* (1985); L.L. CAVALLI-SFORZA AND M.F. ELDREDGE, *CULTURAL TRANSMISSION AND EVOLUTION: A QUANTITATIVE APPROACH* (1981); RICHARD DAWKINS, *THE SELFISH GENE* (2nd edition) (1989) (original edition published 1976); Daniel C. Dennett, *The Evolution of Culture: The Charles Simonyi Lecture*, Oxford University, Feb 17, 1999, at http://www.edge.org/3rd_culture/dennett/dennett_p1.html; William H. Durham, *Advances in Evolutionary Culture Theory*, 19 *ANNUAL REVIEW OF ANTHROPOLOGY* 197 (1990); M.R. Flinn, *Culture and the Evolution of Social Learning*, 18 *EVOLUTION AND HUMAN BEHAVIOR* 23-67 (1997); Liane Gabora, *The Origin and Evolution of Culture and Creativity*, 1 *J. MEMETICS*, 1 (1997) at http://www.cpm.mmu.ac.uk/jom-emit/vol1/gabora_1.html; Oliver R. Goodenough and Richard Dawkins, *The St. Jude Mind Virus*, 371 *NATURE* 23-24 (1994); Oliver R. Goodenough, *Mind Viruses: Culture, Evolution and the Puzzle of Altruism*, 34 *SOCIAL SCIENCE INFORMATION* 287-320 (1995); Ward H. Goodenough, *Outline of a Framework for a Theory of Cultural Evolution*, 33 *CROSS-CULTURAL RESEARCH* 84 (1999).

² ROBERT WRIGHT, *THE MORAL ANIMAL* (1994) 23-26. See generally, CHARLES DARWIN, *THE ORIGIN OF SPECIES* (1859) (the first of a number of editions, many of which are variously reprinted).

Dawkins suggested the term “meme” for such cultural elements³, and a cluster of sub-disciplines applying evolutionary theory to human culture has come into being.⁴ One flavor - focusing on the evolution of the culture elements - is sometimes called “memetics.”⁵ Another major strand, perhaps a bit more “holistic” in approach, and often more rigorously presented, is called by some “gene-culture co-evolution.”⁶

But what about law? A growing - if still limited - number of authors have applied these kinds of approaches to legal systems.⁷ As E. Donald Elliott reminds us in his important 1985 survey *The Evolutionary Tradition in Jurisprudence*⁸ the history of fusing evolutionary thinking in the study of law is remarkably long. A great deal of that tradition has been at the level of metaphor. Some, however, attempted to use “formal

³Dawkins, *supra* note 1.

⁴ See generally, Flinn, *supra* note 1; K.N. LALAND AND G.R. BROWN, SENSE AND NONSENSE. EVOLUTIONARY PERSPECTIVES ON HUMAN BEHAVIOUR, (Forthcoming, 2002).

⁵Blackmore, *supra* note 1. See generally, the journal MEMETICS, available at <http://www.cpm.mmu.ac.uk/jom-emit/>.

⁶Laland and Brown, *supra* note 4.

⁷ See, e.g., Donald E. Elliott, et al., *Toward a Theory of Statutory Evolution: The Federalization of Environmental Law*, 1 J.L.E. CON. & ORG. 313 (1985); Michael Fried, *The Evolution of Legal Concepts: The Memetic Perspective*, 39 JURIMETRICS 291 (1999); Thomas E. Geu, *Chaos, Complexity, and Coevolution: The Web of Law, Management Theory, and Law Related Services at the Millennium*, 65 TENN. L.R. EV. 925 (1998); J.B. Ruhl, *Complexity Theory as a Paradigm for the Dynamical Law-and-Society System: A Wake-Up Call for Legal Reductionism and the Modern Administrative State*, 45 DUKE L.J. 849 (1996); J.B. Ruhl, *The Fitness of Law: Using Complexity Theory to Describe the Evolution of Law and Society and its Practical Meaning for Democracy*, 49 VANDERBILT L.R. EV. 1407 (1996); Jeffrey E. Stake, *Are We Buyers or Hosts? A Memetic Approach to the First Amendment*, 52 ALA. L.R. EV. 1213 (2001); Michael S. Fried, *The Evolution of Legal Concepts: The Memetic Perspective*, 39 JURIMETRICS J. 291 (1991); J.M. Balkin, *Ideology as Cultural Software*, 16 CARDOZO L.R. EV. 1221 (1995); Sam Vermont, *Politics and Literature: New Perspective: Memes and the Evolution of Intellectual Dishonesty in Law*, 22 LEGAL STUD. FORUM 655 (1998); Neal A. Gordon, *The Implications of Memetics for the Cultural Defense*, 50 DUKE L.J. 1809 (2001).

⁸E. Donald Elliott, *The Evolutionary Tradition in Jurisprudence*, 85 COLUM. L.R. EV. 38 (1985); see also, E. Donald Elliott, *Law and Biology: The New Synthesis?* 41 ST. LOUIS L.J. 595 (1997); E. Donald Elliott, *The Tragic-Comedy of the Commons: Evolutionary Biology, Economics and Environmental Law*, 20 VA. ENVTL. L.J. 17 (2001).

theories of law based on self-conscious analogies to evolutionary theory in biology.”⁹
 One of the most noted proponents in the United States tradition is Oliver Wendell
 Holmes, Jr. Evolutionary thinking is a strong theme in *THE COMMON LAW*,¹⁰ and an
 explicit one in *Law in Science and Science in Law*.¹¹ Unfortunately, Holmes’ work, like
 much of the early evolutionary thinking about society, shared in the flaws of Social
 Darwinism which helped lead to an eclipse of such approaches.¹²

There is a revival in the latter decades of the 20th Century of applying evolutionary
 analysis to cultural artifacts that has reinvigorated its use in the law. Some have continued at
 the level of metaphor,¹³ others have made explicit claims based in memetics,¹⁴ and still
 others have drawn on complexity theory as well as evolution.¹⁵

Many of the more general discussions of cultural evolution, and some of its
 specific applications to the law, have focused on the “downstream” consequences of this

⁹Elliott (1985), *supra* note 8.

¹⁰ OLIVER WENDELL HOLMES, JR., *THE COMMON LAW* (1881) (Various reprints. Available online at http://biotech.law.umkc.edu/Books/Holmes/claw_c.htm).

¹¹ Oliver Wendell Holmes, Jr., *Law in Science and Science in Law*, 12 HARV. L. REV. 443 (1899).

¹² See, e.g., *Buck v. Bell, Superintendent*, 274 U.S. 200 (1927). For a nuanced reappraisal of
 Holmes’ thought and the role of evolution in it, see ALBERT W. ALSCHULER, *LAW WITHOUT VALUES: THE
 LIFE, WORK, AND LEGACY OF JUSTICE HOLMES* (2000). See generally, Oliver R. Goodenough, *Biology,
 Behavior and the Criminal Law: Seeking a Responsible Approach to an Inevitable Interchange*, 22
 VERMONT L. REV. 263 (1997).

¹³ E.g., William H. Rodgers, Jr., *Where Environmental Law and Biology Meet: Of Pandas’
 Thumbs, Statutory Sleepers and Effective Law*, 65 U.C. DAVIS L. REV. 25 (1993).

¹⁴ Stake, *supra* note 7, Vermont, *supra* note 7, Fried, *supra* note 7, O.R. Goodenough (1995),
supra note 1.

¹⁵ J.B. Ruhl (1996b) (three references) *supra* note 7; J.B. Ruhl, *Thinking of Mediation as a Complex
 Adaptive System*, 1997 B.Y.U.L. REV. 777; J.B. Ruhl, *The Co-Evolution of Sustainable Development and
 Environmental Justice: Cooperation, Then Competition, Then Conflict*, 9 DUKE ENV. L. & POL’Y F. 161
 (1999); J.B. Ruhl, *The Coevolution of Administrative Law with Everything Else*, 28 FLA. STATE U.L. REV. 1
 (2000); J.B. Ruhl, *Thinking of Environmental Law as a Complex Adaptive System: How to Clean Up the
 Environment By Making a Mess of Environmental Law*, 34 HOUS. L. REV. 933 (1997); Geu, *supra* note 7.

approach -what could we expect an evolutionary system of culture to produce in the way of specific memes and behaviors? ¹⁶But, as the DNA revolution taught us, in order to get the downstream end right, it is critical to identify the specific dynamics of the “upstream” replicative process itself. Furthermore, the study of cultural evolution has been slowed by a tendency to fall back on explicitly biological proximate models. Recent studies have recognized the need both for a more general approach to evolutionary phenomena, of which cultural and biological processes can be seen as specific cases, as well as for better, sui generis descriptions of the proximate mechanisms through which cultural elements replicate, vary, and have differential replicative success. ¹⁷A better description of the proximate mechanisms of cultural transmission will provide a clearer understanding of cultural evolution, and of evolutionary approaches to the law itself.

One account of cultural evolution argues that human imitative processes - understood broadly - create the possibility of cultural transmission and therefore provide the starting point for this kind of a detailed picture of culture. ¹⁸I have previously suggested that cultural transmission occurs through the imitation of remembered actions, rather than of ideas, a process that leads to a significant bottleneck in what can be passed on culturally. ¹⁹This approach further classifies the transmission of actions into three modes - nonlinguistic transmission, stories, and formulas, a development that helps to circumvent the bottleneck. If correct, such a dynamic will have implications for the kinds of information that a cultural process such as the law can transmit. This paper will

¹⁶I have been as guilty of this as anyone. See, e.g., O.R. Goodenough (1995) *supra* note 1.

¹⁷ E.g., Blackmore, *supra* note 1; Gabora, *supra* note 1; Laland & Brown, *supra* note 1.

¹⁸ E.g., O.R. Goodenough (1995), *supra* note 1.

¹⁹ Oliver R. Goodenough, *Information Replication in Culture, Three Modes for the Transmission of Culture Elements Through Observed Action*, in PROCEEDINGS OF THE AISB 1999 SYMPOSIUM ON IMITATION IN ANIMALS AND ARTIFACTS 9-11 (1999); Oliver R. Goodenough, *Information Replication in Culture: Three Modes for the Transmission of Culture Elements through Observed Action*, in K. DAUTENHAHN AND C.L. NEHANIV, (EDS.), IMITATION IN ANIMALS AND ARTIFACTS (MIT Press, forthcoming, 2002). Significant portions of this essay are adapted from these two treatments.

describemy suggested approach in some detail. It will then turn more briefly to the law, sketching examples of the explanatory power – and limits – of my approach.

Replication in Culture Rests on the Imitation of Action

“Ideas” as such do not replicate – there is no direct brain-to-brain link that allows the transmission of the internalized information structure. Computers, of course, with the proper interconnection, can transfer data – directly to each other. Even my son’s relatively simple Game Boy came with a cable that could connect it directly to others, allowing, during the fad, for a machine –to– machine trade of the more exotic Pokemon characters. Humans have no such inter –cranial pipe. What we do observe, and can recreate, is action. An idea must become an action if it is to spread. Reflecting this necessity, Gatherer has suggested that the entire “thought contagion” metaphor should be abandoned for cultural evolution.²⁰

Of course, storage through mental modeling of the action in the brain of a human is also a critical link in the replicative chain. In this sense, the brain is part of the medium of copying, and this mental modeling, while not the focus of the model discussed in this paper, is an object of lively study in its own right.²¹ Furthermore, the presence of this modeling in our cognition can both effect our thinking more generally and lead to other actions, actions that can be non –replicative. Action –to– action imitation replication is not the sole realm of human cognitive functioning, nor is it the sole realm of learning. Nonetheless, cultural replication – the core of the memetic claim – occurs when an

²⁰Derek Gatherer, *Why the Thought Contagion Metaphor is Retarding the Progress of Memetics*, J.M. MEMETICS 135 (1998) at http://www.cpm.mmu.ac.uk/jom-emit/1998/vol2/gatherer_d.html.

²¹ See, e.g., Aaron Lynch, *Units, Events and Dynamics in Memetic Evolution*, 2 J.M. MEMETICS (1998), available at http://www.cpm.mmu.ac.uk/jom-emit/1998/vol2/lynch_a.html; K. Richards, *Hyperstructure in Brain and Cognition*, 10 PSYCOLOQUY (1999), available at <http://www.cogsci.soton.ac.uk/cgi/phyc/newpsi?10.031>.

action (or in some cases, a result from which the action can be inferred²²) is repeated by an observer and observed and repeated by others in their turn. Those aspects of culture that follow an evolutionary dynamic will necessarily reflect this pattern. The importance of action in the transmission of culture has been recognized by writers as diverse in time and subject matter as Jane Ellen Harrison²³ and Marvin Harris.²⁴

Role of Language in Avoiding a Bottleneck

In what looks like an “idea” transfer, actions can be linguistic – i.e. the repetition of a word or formula. As will be more fully discussed below, these linguistic actions can, as stories or formulas, carry imbedded behavioral and cognitive messages piggy-backed, as it were, on the linguistic action itself. But while a secondary meaning can be created through language, and modeled in it, if properly “decompressed” in the observer’s mind, the thing replicated from one person to the next is the linguistic action, and not the meaning itself. Indeed, the linguistic action can be learned and relearned by rote, perhaps as a matter of ritual, by a chain of people ignorant of the language in which it is phrased.

As a boy living for a year on a small, traditional island in Micronesia, where most of the residents did not speak any English, I was on there receiving a link in a chain. Shortly after my arrival several children approached me and rhythmically chanted “Gary Cooper is an actor.” The coded content of this short sentence meant literally nothing to the speakers, but they knew it was English, and they wanted to make me feel welcome.

This action-to-action step in the transmission process creates a very narrow

²²A. Whiten and R. Ham, *On the Nature and Evolution of Imitation in the Animal Kingdom: A Reappraisal of a Century of Research*, in *21 ADVANCES IN THE STUDY OF BEHAVIOR*, (1992).

²³JANE ELLEN HARRISON, *PROLEGOMENA TO THE STUDY OF RELIGION* (1903, reprinted 1991).

doorway through which human culture must pass, a true bottleneck. This kind of bottleneck has been described in the context of language²⁵. It will also constrain other aspects of cultural transmission. In the absence of some way to encode or compress information, what can be passed on culturally will be limited to action/context combinations *actually observed* in a context of direct experience, imposing significant limitations on both the quantity and the type of information that can be passed. Human language, together with two important modes of its use, have provided powerful tools for the coding, compression and preservation of behavioral information that would be difficult or impossible to transmit by non-linguistic means.

Three Modes

Action based transmission of cultural information between humans can be usefully classified into three general modes: non-linguistic (uncoded), stories (partially coded), and formulas (fully coded). Other modes are certainly theoretically possible, and may well exist in practice, but these modes appear widely encompassing for human behavior as it exists. The approach suggested provides explanations for such legally relevant phenomena as hypocrisy and the separation of law and morals, but it has not yet been tested in a systematic way.

Non-linguistic/Uncoded Transmission.

Non-linguistic, uncoded transmission depends upon the direct observation that forms the bottleneck described above. In its simplest form, an action by person A in a particular context is observed by person B. The action and the context for it are stored in the brain of B, waiting for the context to reoccur for B. When this contextual trigger happens, the behavior is reproduced, and, if observed by C, the context and behavior are stored again.

While the behavior rests in the brain in a modeled, or symbolized, form, and can be abstracted and generalized by the brain in connection with various thought processes, it is uncoded in the sense that the context/action pattern does not depend on language or

²⁴ MARVIN HARRIS, THEORIES OF CULTURE IN POSTMODERN TIMES (1998).

²⁵ See, e.g., S. Kirby, *Learning, Bottlenecks and Infinity: A Working Model of the Evolution of Syntactic Communication*, In *PROCEEDINGS OF THE AISB '99 SYMPOSIUM ON IMITATION IN ANIMALS AND ARTIFACTS*. THE SOCIETY FOR THE ARTIFICIAL INTELLIGENCE AND SIMULATION OF BEHAVIOR (1999).

some other form of coding to aid in its modeling or transmission. In this it is somewhat analogous to phenotypic transmission, something observed in traditional biology in RNA replication²⁶.

Language is not used directly in this mode, although it may be used secondarily to initiate a teaching session, to register approval and disapproval, and to make help make corrections. Notwithstanding the usefulness of language for facilitation, this mode of transmission exists without it. Indeed, this kind of simple imitative process, which can be assumed to be developmentally “programmed” in humans, could be how language comprehension gets constructed in the developing brain, at least in the early stages.

Stories/Partly Coded Transmission

Once language enters the human repertoire, it can be used to tell a story. Of course this is only one of the many possible uses of language, but one that can be recruited into the process of cultural transmission. When the linguistic message is understood in the brain, the action/context mix carried by the story is “observed” in a virtual world of the represented experience. From this “observation,” a non-linguistic behavioral model can be created, based on the implicit “moral of the story,” and this model can form the basis for an action in its turn. At the same time, a separate memory can be implanted of the story itself – it too becomes an item for replication; its telling is an action for separate imitation. The transmission can become non-linguistic again, when the action produced by the model derived from the story is observed by people who haven’t heard the story. Because the transmission is language-based but the behavioral model is not, this can be called partly coded transmission.

The story can be told and retold, and its imbedded behavioral message can be passed on across generations, in contexts where the imbedded behavior itself is never called upon to occur. Sometimes, the action becomes impossible or obsolete – and yet the story gets attached to a context in which it is retold ritually for its own sake. Many children’s stories, set in far off or even mythical contexts, have this characteristic. Nor must the “story” be a coherent narrative. Advertising jingles can work as partially coded transmissions. The overall point is this: there are often multiple streams of replication through stories – those relating to the action suggested by the story and those relating to the replication of the story itself. Different neural pathways and mechanisms may well be employed in the storage and recreation of the story, on the one hand, and of the behavioral lessons imbedded in the story, on the other.

Several benefits accrue from even this level of linguistic transmission. Since it is no longer necessary to be an actual observer of an action/context pairing to learn

²⁶G.F. Joyce and L.E. Orgel, *Prospects for Understanding the Origin of the RNA World*, in R.F. GESTELAND, AND J.F. ATKINS, EDS., *THE RNA WORLD* (1993).

transmitted behavior, some of the subject matter bottleneck limiting uncoded, non-linguistic transmission can be avoided. Stories can preserve infrequently needed information, as well as infrequently needed vocabulary. After all, we don't need stories to pass on behavior for frequently experienced contexts. In this light, the somewhat exotic or out of date settings of many children's stories can be seen as preserving behavioral information for a "rainy day." There is also a safety factor. Stories about dangerous or unpleasant circumstances can teach survival lessons without the hearer having to witness or experience problematic episodes in person.

The human appetite for stories, and the ability to remember and tell them, suggests that this mechanism, like language itself,²⁷ has had time to root itself in the genetic portion of human inheritance. For generations, people have paid good money, and a lot of it, to consume stories, in contexts from *People Magazine* and *The National Enquirer* to *Pride and Prejudice* and *The Odyssey*. One reason for the prevalent use of stories may be that they require relatively little additional cognitive power once language is in place. The events need to be described, "observed," and modeled, but their underlying behavioral message need not be abstracted in the language system. The decision about action can still be made through the non-linguistic pathways already established to direct conduct. Describing events in words probably has a long history in humans, involving highly developed neural structures. Generalizing, abstracting principles and making decisions about action through the language system, may simply be more demanding and may work through a less fully evolved piece of mental equipment. Drawing on the admittedly subjective observations of a number of years as a graduate law teacher, I suggest that for most of us, stories are interesting and easy; word-based formulas are dull and hard.

Formulas/Fully Coded Transmission

The third mode, "fully coded" transmission through linguistic formulas, uses language to transmit abstract behavioral information. Here the replication is of an explicit formula of context and action—a recipe, recommendation, or rule. The authority for these formulas for action can be varied—it might be legal, religious, parental or simply observational. When it is functioning well, fully coded transmission can greatly increase both the type and the quantity of behavioral information passed through the bottleneck. There are drawbacks, however.

The very creation of such a formula is a task of some mental complexity. Good generalization into language may well require significantly more cognitive innovation than does simple linguistic description. In light of this kind of difficulty, it is no surprise that human word-based analysis is so often flawed. Eventual and error correction is at best imperfect. Nor is up-front error the only source of inaccuracy. In such highly coded

²⁷ STEVEN PINKER, *THE LANGUAGE INSTINCT* (1994).

form, replication must be exact. Memory becomes crucial, particularly in a pre-literate society. Stories can often be passed on successfully with some latitude in their need for word-by-word exactness; they are informationally robust. Formulas, however, are more fragile. Their benefit is that they are much more compressed, but with such compression even a relatively small transmission error can turn into a disaster. In a pre-literate world, devices such as rhyme, rhythm, melody and labeling could help to prevent mistakes. Remembering and passing on the ten commandments is helped by the repetition of “thou shalt not” and by the fact that you need to come up with ten of them. “Red right returning,” the formula for buoy coloration in ocean navigation, relies on alliteration to defend its accuracy in transmission and recall. The development of writing, of course, greatly strengthened the ability to create and transmit durable recipes and rules of considerable length and complexity. Our formula-challenged brains are still struggling to catch up with this increase in stability.

The process by which a linguistic formula gets translated into its embedded action – requiring both decompression as to its sense and translation into motivation for the imbedded action – is also likely to involve complicated and relatively newly-evolved neural pathways. There is certainly no guarantee that this translation will occur. One frequently effective step involves rehearsal, where a series of practice recreations models the formula-inspired action in non-linguistic, uncoded pathways as well. As with stories, the formula can be transmitted as a linguistic artifact separate from any role it may actually have in determining action on the express “content” of the formula.

Non-Replicating Information, Clusters and Bundles

It is important to recall that many – perhaps even most – linguistic messages are *not* replicating elements of cultural transmission. Among the other things that language does is to help exchange current information on the state of the world: the weather, what’s for dinner tonight, where the predators are hiding right now. Occasionally when the message has itself the property of provoking its repetition by an observer, or is linked in a bundle that overall has such a property, will it enter the perpetuating culture stream. At the relatively raw end of this continuum, a “mind virus” like each letter can be as simple as a copying command and some kind of crude threat that creates a compulsion to obey.²⁸

The contents of bundles need not be drawn from a single mode. All three modes of replication can mix, cluster, and combine into more or less tightly bundled packages of differing elements.²⁹ Language itself, at least as learned in childhood by a native speaker, is largely a bundle of uncoded information, which does not use language to form

²⁸Goodenough & Dawkins, *supra* note 1.

²⁹W. Fontana, Personal communication, 1998; L. Gabora, *supra* note 1.

its mental model.³⁰ Some of the other elements in the cultural mix are best viewed as “junk memes” intertwined with more effective elements, unexpressed in action and along for the ride. Some linguistic actions may be excellent at their own replication as formulas or stories, but quite ineffective at producing any behavior other than the copying of the story or formula itself. There are many, many rules, laws, and commandments that are observed “in the breach,” rather than “to the letter,” and many, many stories that are told but not acted upon. The old adage “do as I say, not as I do” represents a memorable and deeply ironic attempt in the language system to combat this tendency. Hypocrisy may be as much a reflection of the strengths and weaknesses of people’s brain architecture as of the strengths and weaknesses of their character.

Indeed, the bundles themselves can carry inconsistent, even conflicting behavioral guides. In genetic replication, it should be remembered, the instructions of the different parts of the genome can be in direct conflict, a phenomenon sometimes linked to parental imprinting of the genes in question.³¹ Sourced differentiation may also be a factor in the behavioral expression of culturally transmitted information.

The coded formulas on certain subjects – including those rules encoded in the law – may or may not be congruent with the model passed through uncoded transmission for behavior in the same context.³² With this potential for discrepancy, it is almost inevitable that in some instances “the law is a ass, a idiot”³³. The law is not the only example of cross-modal description. Ethnography in cultural anthropology can be viewed as an attempt to map models from the uncoded or partly coded system of the culture under study into coded rules in the language of the ethnographer.³⁴

External Storage

Each of the modes of cultural replication are strengthened by the development of

³⁰O.R. Goodenough (1995), *supra* note 1; Oliver R. Goodenough, *Rethorizing Privacy and Publicity* 1 Intel. Prop. Q. 37-70 (1997).

³¹D. Haig, *Genetic Conflicts in Human Pregnancy*, 68 Q. R. EV. OF BIOLOGY 495 (1993); D. Haig and A. Grafen, *Genetic Scrambling as a Defence Against Meiotic Drive*, 153 J. OF THEORETICAL BIOLOGY, 531 (1991); Mochizuki, Y. Takeda, and Y. Iwasa, *The Evolution of Genomic Imprinting*, 144 GENETICS, 1283-1295 (1996).

³²Goodenough, *supra* note 30.

³³CHARLES DICKENS, *OLIVER TWIST* (Originally published in London in *Bentley’s Miscellany*, 1837-39; variously reprinted).

³⁴WARD H. G. GOODENOUGH, *DESCRIPTION AND COMPARISON IN CULTURAL ANTHROPOLOGY* (1970); Ward H. Goodenough, *Towards a Working Theory of Culture*, in R. Borofsky, ed. *ASSESSING CULTURAL ANTHROPOLOGY* (1994).

relatively high-fidelity methods of external storage. The brain is prone to error as a medium of replication. If the actions can be preserved in a decently accurate and durable external storage, the error rate will fall off considerably, and the breadth of preserved experience increased. External storage removes yet another aspect of the bottleneck. Of course, the action of making and accessing the external storage must be passed on at least partly through unstored processes.

Sculpture and pictorial representations, with a history stretching back through stained glass to cave paintings and beyond, provided direct, uncoded messages and can also promote and reinforce partially and fully coded transmission. Writing, by preserving language, has helped to transmit both stories and formulas. The difficulty of recreating infrequently practiced ritual in a pre-literate society acts as a limit on cultural processes.³⁵ Literate cultures faced with a similar problem can invoke the aid of prayer book or other written guide.

The effect of writing – particularly printed writing – on the preservation and transmission of recipes is striking, as anyone who has used a cook book to make an exotic dish will recognize. The effect of writing on rules is even more dramatic, as anyone who has waded through such laws as the United States Internal Revenue Code can attest. The availability of writing to strengthen the two linguistic modes has only recently been rivaled in the arena of direct transmission by the development of film, television, and other means of audiovisual preservation. The possibilities raised by the external storage and dissemination of non-word-based cultural elements are striking, and are likely to come at some expense to the word-based systems. The possibility of external storage strengthens and complicates the process of cultural replication in all three modes, but it does not change its basic foundation.

Variation and Selection

The focus of this paper so far has been on the proximate mechanisms for replication in human culture. A full description of cultural processes will also suggest mechanisms of variation and selection.³⁶ Although an extended treatment of these selection processes at work on human cultural elements is beyond the scope of this discussion, the means of replication suggested here may be helpful in such a context. After all, the ultimate selection criteria is a failure to replicate. In the context of the approach suggested here, the key to cultural transmission is provoking the imitation of action by

³⁵ See, e.g., F.E. WILLIAMS, *D RAMA OF OROKOLO; THE SOCIAL AND CEREMONIAL LIFE OF THE ELEMA* (1940).

³⁶ See, e.g., Blackmore, *supra* note 1; Dennett, *supra* note 1; Dawkins, *supra* note 1; A. Fog, *Cultural r/kS election*, 1 *J.M. METRICS – EVOLUTIONARY MODEL OF INFORMATION TRANSMISSION*, 1 (1997) at http://www.cpm.mmu.ac.uk/jom-emit/voll/fog_a.html; Gabora, *supra* note 1; O.R. Goodenough (1995), *supra* note 1.

others. In the same way that sexual selection, so critically tied to reproduction, can imbue otherwise non-adaptive traits in genes, so too will psychological selection on the replaying of factions be critical in the passing on of cultural elements. Success at some task, accuracy, truth, and such other seemingly important criteria of selection³⁷ can take a backseat to pure action-producing compulsion.

A few years ago, my elder son recently received a computer chain letter whose sole informative content was:

Five people actually got killed by not sending this piece of mail. The creator of this mail has a program that will track down everyone whose sent this mail and whoever that didn't send it will DIE because this program can actually track down your address. Send this to 15 people within the next 15 minutes or you will die die die die, what do you have to lose? Your life?

While the proposition is patently ludicrous, its replicative success appears high. A number of long-lived and robust human belief systems with little demonstrable benefit to their adherents are propagated by only slightly more sophisticated psychological goads. The saving grace is that the purported content of these systems is often ignored, while the coded recitation is faithfully handed on.

Reflections on Law

So - what can this approach tell us about law, and what can law tell us about this approach? The purpose of this essay is to put those questions on the table, rather than to answer them definitively - if at all. Nonetheless, if only by way of example, let me explore three specific legal topics in this light.

The Learned Hand Test

One of the most durable "memes" in the law is a purported test to be applied to decide if a particular action constitutes negligence - the famous "Learned Hand Test." This quasi-scientific formula was advanced by the wonderfully named Judge Learned Hand in his opinion in the 1947 case *United States v. Carroll Towing Co.*³⁸ Judge Hand proposed:

If the probability be called P; the injury, L; and the burden, B; liability [for negligence] depends upon whether B is less than L multiplied by P; i.e., whether

³⁷ E.g., Gabora, *supra* note 1.

³⁸ 159 F.2d 169 (2d Cir. 1947).

This is a little formula that has been taught to just about every law student in the generally required Torts class ever since. A computer search using the Shepard's service refers to 899 citing references to the *Carroll To wing* case as a whole ⁴⁰ - a pretty good rate of memetic replication. Yet the formula itself is certainly useless as a call to specific action. The factors in the test are essentially unmeasurable. To do Judge Hand justice, he himself offered it by way of a next example of a less exact idea: "Possibly it serves to bring this notion into relief to state it in algebraic terms." ⁴¹

The conclusion that the supposed content of a linguistically based rule need not be followed to make the rule durable in memetic terms helps us to understand the separation of the replicative health of this particular formula from any actual role it may have in determining the outcome of a case. Its brevity and faux precision make it perfect for teaching and citation - a kind of legal chain letter. It even has some usefulness as an explanatory tool for an underlying concept. The fact that it will never explain a result through actual application is not necessary for its repetitive imitation in the law.

Separation of Law and Morals

A recurring question in jurisprudence - and, indeed, much of philosophy - concerns the separation of law and morals. ⁴² I have previously argued that this distinction in all likelihood reflects different processing pathways in the human brain, and preliminary indications suggest that neurological experimentation will support this approach. ⁴⁴ The distinction may also reflect different transmission pathways at the

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³⁹ Id at 173.

⁴⁰ Per Shepard's search, Oct. 8, 2001.

⁴¹ *Supra* note 38, at 13.

⁴² In the philosophical tradition, see, e.g., IMMANUEL KANT, *THE METAPHYSICAL ELEMENTS OF JUSTICE* (1763); in jurisprudence, see, e.g., HANS KELSEN, *INTRODUCTION TO THE PROBLEMS OF LEGAL THEORY* (1934; translation, 1992); JOHN AUSTIN, *THE PROVINCE OF JURISPRUDENCE DETERMINED* (1832); H.L.A. HART, *THE CONCEPT OF LAW* (Clarendon Press, Oxford, 1961); L.L. WEINREB, *NATURAL LAW AND JUSTICE* (1987); Margaret Gruter, *An Ethological Perspective on Law and Biology*, in Rodger D. Masters & Margaret Gruter, Eds., *THE SENSE OF JUSTICE: BIOLOGICAL FOUNDATIONS OF LAW* (1992)

⁴³ See Oliver R. Goodenough, *Law and the Architecture of Human Intelligence*, in Haft, Fritjof et al. eds., *BAUSTEINE ZUEINER VERHALTUNGSTHEORIE DES RECHTS* (2001); Oliver R. Goodenough, *Mapping Cortical Areas Associated with Legal Reasoning and with Moral Intuition*, 42 *JURIMETRICS* __ (forthcoming, 2001).

⁴⁴ E.g. Raymond J. Dolan, *On the neurology of morals*, 2 *NATURE NEUROSCIENCE* 297 (1999).

cultural level. Our “moral” picture may be formed through direct observation and through stories, while law is explicitly formulaic, language based rules.⁴⁵ One of the strengths of the common law system may be across-fertilization between these two normative streams.

Cruel and Unusual Punishment and other Reasonableness Standards

The different modes of transmission and the possibility of cross-fertilization are put to use by the law in such formulations as the United States’ Constitution’s prohibition against “cruel and unusual punishments,”⁴⁶ or the “reasonable person” standards common in the law of Tort. These formulas, on their face, completely lack the kind of objective detail that could make themselves sufficient normative declarations. While some argue that one must go back into history to find the details for such formulations in some kind of retrospective snapshot,⁴⁷ I offer a counter-suggestion: these are explicit instructions in the language-based rule stream to go and consult the transmissions, and mental pathways, of the other information-replicating mechanisms. In this light, such an apparently deficient rule is a compressed and coded message, which must be decompressed and decoded by reference to the “subjective” information of non-linguistic and story-based modeling in the reader’s head.

Conclusions

Progress in understanding the evolution of culture, and applying it to law, will depend in large part on the elaboration of increasingly concrete and accurate understandings of the replicative mechanisms which make culture possible. Viewing cultural transmission as the replication of actions, rather than of ideas, focuses us on a key bottleneck. In humans, replicating actions can be broadly categorized into three modes: non-linguistic transmission, stories and formulas. Decoupling the transmission of language-based elements from their translation into action can help us to understand such human questions as hypocrisy and failures in the legal system, and suggest pathways for further application in the law.

See also, e.g. Antonio R. Damasio, *Neuropsychology: toward a neuropathology of emotion and mood*, 386 NATURE 769 (1997).

⁴⁵O.R. Goodenough (1995) *supra* note 1 at 299.

⁴⁶Amendment VII, Constitution of the United States.

⁴⁷See, e.g., Anton Scallia, *Common Law Courts in a Civil Law System: The Role of the United States Federal Courts in Interpreting the Constitution and Laws*, in AMATTER OF INTERPRETATION (1997) Rhenquist, C.J., dissenting in *Reaves v. Ernst & Young*, 494 U.S. 56 (1990).