

On Attractiveness of Surprising Ideas: How Memory for Counterintuitive Ideas Drives Cultural Dynamics

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Abstract

The emerging field of cognition and culture has had some success in explaining the spread of counterintuitive religious concepts around the world. However, researchers have been reluctant to extend its findings to explain the widespread occurrence of counterintuitive ideas in general. This article suggests a way to generalize the minimal counterintuitive hypothesis, which argues that such ideas spread because they are more memorable, to form the outline of a model of cultural dynamism which can help explain why strange and novel ideas spread more quickly than ordinary seeming traditional ideas.

Keywords: ideology, shared beliefs, counterintuitiveness.

Introduction

Why do some aspects of group ideologies and cultural worldviews change over time while others stay unchanged for long periods of time? What explains the patterns of persistence and change in shared beliefs of social groups such as new religious movements and political parties? The cognition and culture researchers argue that any attempt to satisfactorily answer such questions must take the individual cognitive tendencies for communication, comprehension, and belief revision into account (Sperber, 1996). A key finding of this research has been the minimal counterintuitiveness hypothesis (Boyer, 1994, 2001) which suggests that the reason why minimally counterintuitive concepts, such as God and ghosts, dominate religious concepts is that people remember them better than intuitive and maximally counterintuitive ideas. This article first reviews the minimal counterintuitiveness hypothesis and then argues that it can be used to explain the spread of novel ideas in general and not just in the context of religious ideas.

The Minimal Counterintuitiveness (MC)

Hypothesis

The minimal counterintuitive (MC) hypothesis posits that:

1. Most of the widespread religious concepts around the globe are minimally counterintuitive.
2. The minimally counterintuitive (MCI) concepts that violate a small number of intuitive expectations (such as, a talking tree, a rock that eats, and an invisible cow) are more memorable than either intuitive concepts (such as, a green tree, a brown rock, and a good person) or maximally counterintuitive concepts that violate a larger number of intuitive expectations (such as, an invisible talking tree that does not occupy any space and a sad illuminant travelling rock).

While a number of subsequent empirical studies (Atran, 2004; J. Barrett & Nyhof, 2001; Boyer & Ramble, 2001; Gonce, Upal, Slone, & Tweney, 2006; Upal, 2005a; Upal, Gonce, Tweney, & Slone, 2007) have found some support for better memory for the MCI concepts, some cultural scientists (Bloch, 2005; Harris & Koenig, 2002; Keller, 2004) have argued that a number of widespread religious concepts such as Gods and ghosts are maximally counterintuitive and not minimally counterintuitive as implied by the minimal counterintuitiveness hypothesis. Some cognitive scientists of religion (J. L. Barrett, 1997, 1999; J. L. Barrett & Keil, 1996; Slone, 2004) have responded by suggesting that this is because believers hold two different (“theologically correct” and “intuitive”) conceptualizations of God and that only the intuitive conceptualizations enjoy the transmission advantages because they are the only ones that are minimally counterintuitive. Barrett (1997, Page 124) says:

God, and perhaps other religious objects and entities, are conceptualized on at least two different levels: the basic, everyday concept used in real-time processing of information, and the “T.C.” or theologically correct level used in theological discussion of God’s properties or activities outside of a real-time context. As was shown in above, these two levels of conceptualization may represent God in substantially different ways.

Thus, argue these cognitive scientists of religion, that the MC hypothesis “does not apply” to the theological conceptualizations of God or to any other cultural concepts that do not involve violating expectations of intuitive reflective thinking (J. L. Barrett, 1997) (Page 127). This includes ideas that have been learned through explicit training such as the socio-cultural and religious schemas, scripts, and scientific concepts (J. L. Barrett, 2008). Another hurdle in the applicability of the MC-hypothesis to the spread of the cultural beliefs in contemporary social groups is the often implicit assumption that the MC-hypothesis is only applicable to societies where oral transmission is the primary source of the transmission of cultural information. Since most of the modern cultural ideas are spread through pen, paper, and the internet the MC-hypothesis may not apply to them.

Previously (Upal, 2009a), I have argued against this narrow interpretation of the MC-hypothesis and suggested that memory advantages obtained by violating conceptual expectations should not be limited to “intuitive concepts”. Instead, I argued that ideas that violate cultural schemas,

scripts, and expert knowledge acquired through learning should also enjoy memorability advantages. While details of the context-based view of the MC effect has been specified elsewhere (Upal, 2005a, 2007a, 2007b, 2009a, 2009b; Upal, et al., 2007), here I review its salient points as they relate to the development of group ideologies.

The Minimal Counterintuitiveness Effect and the Distinctiveness Effect

One of the most robust findings in experimental psychology has been the so called *distinctiveness effect* which indicates that an item, that stands out as compared to other items in its context, is more likely to be remembered than those other items (Hunt & Worthen, 2006). For over a century, experimental psychologists working with a variety of stimuli have found support for this effect (Calkin, 1894, 1896; McDaniel, Dornburg, & Gynn, 2005; von Restorff, 1933). Thus unexpected events and entities in a story are recalled better than expected events and objects (Davidson, Larson, Luo, & Burden, 2000; Kintsch & Green, 1978; Upal, 2005a), bizarre images are recalled better than ordinary images (McDaniel, Einstein, DeLosh, & May, 1995), unexpected words in a list of words are recalled better than expected words (Atran, 2004; von Restorff, 1933), orthographically distinct words are recalled better than ordinary words, as are typographically distinct words (Hunt & Worthen, 2006). Cognitive scientists and evolutionary psychologists argue that the distinctiveness effect reveals the evolutionary pressures that guided the evolution of animal and human memory systems. They suggest that distinctiveness effect supports the view that the ability to predict relevant aspects of one's environment was the primary driver for the evolution of animal and human memory systems. People use the knowledge of their environment to generate expectations about other hitherto unobserved aspects of the environment (Schank, 1975, 1979, 1999; Schank & Abelson, 1977). If these expectations are not fulfilled, it indicates a gap in the agent's world model. Agents whose memory systems treat expectation-violations as learning opportunities to revise their world model to make them more accurate stand to gain evolutionary advantages in terms of being able to collect more food or find better mates.

In (Upal, 2005a), I argued that Schank's learning theory and findings in psycholinguistics (Graesser, Singer, & Trabasso, 1994; Kintsch, 1998) explain that minimally counterintuitive ideas are remembered better than intuitive ideas because they violate a reader's expectations. Psycholinguists argue that when reading a text people primarily ask why questions i.e., why did the author include this information in this text? The cognitive processes of readers accessing the knowledge structures in their long term memory to construct a justification for the inclusion of ideas in question result in establishment of strong memory links between counterintuitive ideas and thematic cues about the story. When these cues are presented to subjects, the strongly connected minimally counterintuitive concepts are

easily retrieved and recalled. I hypothesized that for the minimally counterintuitive ideas, readers are able to construct such justifications and create a coherent concept but that readers fail in their effort to construct a justification and create a coherent concept for maximally counterintuitive ideas. The *memorability hypothesis* (Upal, 2005a) suggests that memorability of a concept in a context is a function of the difference between its degree of expectation violation and its coherability as a new concept.

Besides explaining the past observations of why minimally counterintuitive ideas are better remembered than intuitive and maximally counterintuitive ideas, the memorability hypothesis makes a number of predictions. Since proposing this model (Upal, 2005a), I and others have conducted a number of empirical experiments and found that results generally support a context-based view of the minimal counterintuitiveness effect (Gonce, et al., 2006; Upal, 2007a, 2007b, 2009b; Upal, et al., 2007; Upal & Harmon-Vukic, 2010). It predicts that, on average, readers should spend more time to process counterintuitive concepts than they do in processing intuitive concepts. This is because counterintuitive concepts trigger cognitively taxing process of justification creation while intuitive concepts do not. A recent study has confirmed this finding (Upal & Harmon-Vukic, 2010).

The context-based model also posits that counterintuitiveness is a property of the context in which a concept appears as much as it is a property of the concept itself. The context includes the mental knowledge that the reader brings to the table as well as the prior parts of the text in which the concept is embedded. This means that the same concept may appear more unexpected in context A than in context B and that the same concept may be more memorable in one context and less memorable in another context. Since knowledge structures in people's memories change over time, the same concept may be more counterintuitive for a person at a time t_1 than at a time t_2 . A one-time exposure to an idea, however, does not guarantee that the idea will not seem counterintuitive in the future. In order for an idea to lose memorability advantages, the knowledge in long term memory that generated the expectation has to be revised so as to make the counterintuitive idea as the new expected and the old idea as the new unexpected (and therefore the new counterintuitive). Since knowledge structures in memory are richly connected with each other revising them requires significant cognitive resources to untangle old connections and establishing new ones. Thus it is not surprising that people are very conservative when it comes to revising their beliefs. People's expectations guide what they see leading them to sometimes miss the unexpected objects and events. When the evidence of expectation violations is too overwhelming to ignore, they prefer to generate elaborations that allow them to preserve as much of their old beliefs as possible. Even though observing a single instance of a counterintuitive object or event can (at least in principle) trigger belief change, this does not happen very often. For

instance, upon seeing an ostrich for the first time, one may no longer be surprised when one hears of, “a healthy adult bird that cannot fly” assuming one can create a justification that an ostrich is still a bird because it has feathers but is not able to fly because it is too heavy. Creation of justifications in response to seeing an unexpected object or event does not automatically lead to generation of different expectations in a similar future context. One may for instance assume that the expectation violation only happens in an overly restricted context, for instance, assume that ostriches do not fly on Tuesdays between 9 and 10 am or that the ostrich under observation is a mutant. Seeing a healthy adult ostrich at a different time in the future may still lead to the expectation that it will fly. It may take prolonged exposure to numerous observations of unexpected objects and events and significant cognitive effort for someone to revise enough knowledge structures in their long term memory for them to generate new expectations. Once all the relevant memory structures are revised and the old unexpected becomes the new expected, the once minimally counterintuitive idea should no longer be so. Thus the context-based model predicts that minimally counterintuitive ideas should lose their memorability advantages over time.

Since the context-based model does not support differential processing for mental knowledge acquired through intuitive and doctrinal modes of thinking, it predicts that violations of online intuitive cognition should not have a privileged status, at least when it comes to memorability. Thus, ideas that violate expectations generated by offline learned concepts such as cultural schemas and religious doctrine should also be better remembered than ideas that do not violate such expectations.

The context-based view emphasizes the role played by the knowledge that an individual possesses when processing a concept in making a concept a concept minimally counterintuitive. This means that a concept that is minimally counterintuitive for one person may not be minimally counterintuitive for another person whose mental knowledge differs from that of the first person. If counterintuitiveness is not the property of the concept alone, then a concept can only appear minimally counterintuitive to a population if individuals within the population share beliefs that are relevant to the concept i.e., if the concept violates the expectations raised by those shared beliefs and if the expectation violation can be justified using those shared beliefs. Thus contrary to the traditional view that ideas that violate cultural schemas should not have memorability advantages, the context-based view suggests that *they should*. I will refer to such ideas as *socially counterintuitive* and point out the role that they play in constantly reshaping the fabric of cultural beliefs.

Social Counterintuitiveness

I define an idea as *minimally socially counterintuitive* for a population if it violates a single expectation generated by beliefs shared by that population. Thus the notion of a

person remembering details of her past lives may be minimally counterintuitive to a western population that may have a passing familiarity with the idea of reincarnation but not to a Hindu population among whom the belief in reincarnation is intricately woven into the fabric of socially shared beliefs. Minimally counterintuitive social ideas have a memorability advantage over intuitive cultural ideas that do not violate any expectations generated by shared cultural beliefs. Thus the notion of a person who remembers her past life would have a memorability advantage in a western population that did not expect the idea but can use their passing knowledge to understand it. However, it will not enjoy memorability advantages due to counterintuitiveness in a Hindu population where it is already well entrenched.

Similar to the case with individual counterintuitiveness, socially counterintuitive ideas can also become socially intuitive overtime but the process is far more difficult and involved because it involves changes in shared beliefs of a large number of individuals. As advocates of social change would attest, getting a new idea to become widely accepted by a population is a long and painstaking process that requires years of effort by dedicated individuals. This is because, similar to ideas in individual memories, shared cultural ideas are like a well-knit fabric and once this fabric is ripped up by an expectation violating concept, a number of threads become exposed. All of these threads have to be stitched together in new and innovative ways to fully mend the fabric such that the new idea becomes culturally expected. This is why cultural conceptual change faces such daunting prospects requiring years, if not a lifetime, of effort by social leaders who dedicate their lives to the issue. Previously, I have referred to such social leaders as information entrepreneurs (IEs) (Upal, 2005b) because to successfully lead conceptual change, these leaders have to possess the following characteristics.

- They must have high social capital in the group whose shared beliefs they are trying to change. This is needed both to have the credibility needed to persuade others and also because they can afford to be seen as dissenting from group-think (Packer, 2008).
- They must have the marketing skills required to sell the conceptual change to their target audience. Like all good marketers, they are able to make their ideas seem as inevitable as ideas whose time has come.
- They must have the cognitive skills required to integrate the seemingly counterintuitive idea with the group’s traditional thinking and make it seem as if the new idea is intuitive and perfectly in line with the group’s original thinking.

In (Upal, 2005b), I argued that the IE view helps us understand that new religious movement leaders create seemingly counterintuitive ideas because they believe that these ideas are needed to solve problems being faced by the group. Upal (2005c) argued that revision in socially shared beliefs is driven by a belief among one or more of the strongly identified group members that the group’s shared beliefs are harmful to the long-term prosperity of the group.

I focused on social identity beliefs which include, “who belongs to the group and who does not, who is admitted to the group, and who is not? This is particularly clear for racist, ethnocentric, xenophobic or nationalist ideologies, according to which only ‘we, white Europeans’ belong in Europe, and others should not be admitted, at least not as (equal) citizens” (van Dijk, 1995) (Page 250). Anthropologists studying ethnic groups find that ethnocentric beliefs in “superiority of the ingroup’s culture combined with condemnation of the outgroup as immoral and inferior” are “commonplace (e.g., (LeVine & Cambell, 1972)). ‘Chosenness’ is a particularly prominent expression of this belief” (Page 6). Van Evera (1994) argues that such chauvinist myths are “hallmark of nationalism, practiced by nearly all nationalists to some degree” (Page 27). He provides a number of illustrative examples including Nazi myth of Aryan supremacy, British and American beliefs in rational and intellectual exceptionalism (Longley, 2003), and Russian belief in their extra-ordinary inventiveness. These could be complemented by Pakistani belief that one Pakistani Muslim soldier can dominate 10 Indian Hindu soldiers, American Indian belief that they are more spiritual than the more material “white man”, Israeli belief that they are more rational than crazy Arabs, Muslim belief that God chose to favor them as his final chosen people after Christians and Jews strayed from the prescribed path, and the Nation of Islam belief that an evil black scientist created the wicked white man. Group superiority myths are reflected in the literature and art of a group and feature prominently in its creation stories that form the master narrative of a group.

Social psychologists argue that such beliefs are necessary for people’s well being since people have a fundamental need to feel good about themselves and that people derive part of their identity from membership in social groups that they associate with (Tajfel & Turner, 1985). To achieve and maintain a positive self image, people view their group more positively than comparison outgroups on some valued dimensions (Hogg & Vaughan, 2002). This ingroup favoritism is an essential part of group identity and such beliefs arise even in minimal group settings. In a number of lab studies where subjects were arbitrarily assigned to groups (but told that they had something in common with other group members who they may never meet), participants gave more rewards to members of their group (Hogg & Vaughan, 2002). Group superiority beliefs permeate rumours, myths, and folktales of groups around the world.

Events that manifest a higher status of the out-groups along the dimensions of value to a group, violate group’s cultural expectations and may cause some highly identified group members to believe that the group myths are broken and need to be fixed. For instance, Christian conquest of Muslim lands in the 19th and 20th centuries, lead Muslims to ask the question, “what went wrong.” If we are the chosen people who have been promised dominance in the world then how come we are losing so many battles to the

Christian West? (Lewis, 2003). Such changes provide opportunities for information entrepreneurs to step up and offer their solution to the social problems. Groups have various mechanisms for rewarding those who are thought to be working for the group’s benefit especially at a personal cost to their own welfare such as soldiers. Upal (2005a) argued that those who pioneer change in group social beliefs stand to gain an increase their social status if they come to be credited with having successfully advocated for the betterment of their group.

Ratcheting Up Social Counterintuitiveness

Once the efforts of information entrepreneurs are successful and a counterintuitive idea becomes fully entrenched in a group, it no longer seems counterintuitive to most members of that group and therefore loses its memorability advantages. This resolves another paradox that critics of cognitive science of religion have often pointed out, namely, that while the counterintuitive beliefs such as religious belief in gods, and ghosts as well in popular culture beliefs about Draculas, vampires, Vulcans, djinns, chupacabras, and leprechauns are counterintuitive in the traditional cognitive science of religion sense, they do not appear to be counterintuitive to the people whose informational worlds are full of such creatures. Theists from a variety of traditions, for instance, routinely point out that they see God in everything such as people’s eyes, flower petals, grass blades, running streams, stars, and singing birds and that the concept of God appears no more counterintuitive to them than air, energy, and kinetic potential (Cook, 1883; Rasor, 2006). Cultural anthropologist routinely point out that while mythical cultural creatures such as djinns and ghosts seem counterintuitive to us, they do not seem counterintuitive to the people who believe in them (Bloch, 2005).

The answer I believe lies in acknowledging the criticism that minimally counterintuitive ideas do indeed lose their privileged status and do not have any memorability advantages once they become embedded as part of a culture. However, this does not mean that further cultural innovation stops. New ideas continue to be created and communicated to others and those ideas that have transmission advantages continue to spread. In order to have memorability advantages due to counterintuitiveness however, new ideas must violate people’s expectations in the new context and not the old context which is no longer relevant. This means, for instance, that once as a minimally counterintuitive idea such as the idea of a being who can see everyone becomes widely culturally accepted, it loses its memorability advantages because it no longer violates people’s expectations. In order for a concept to achieve memorability advantages and to spread in the new cultural context, an idea has to seem counterintuitive in the new context. One way to do that is to build on the counterintuitiveness. For instance, the concept of a being who can see *and hear* everyone would seem minimally counterintuitive in the new context. In light of the model we develop here, one should not be surprised to see maximally counterintuitive concepts to form

a significant part of religious beliefs. Indeed, it would be surprising if they did not!

This ratcheting-up of counterintuitiveness not only explains how seemingly maximally counterintuitive concepts such as Judeo-Christian-Islamic God and ghosts come to be widely distributed but it also predicts a continuous transmission advantage for unorthodox ideas that violate cultural expectations over traditional ideas. This explains continuing evolution of cultural beliefs among groups ranging from post-modern artists to new religious movements. As arts historians know, each artistic trend is both defined in opposition to the old one and also as a continuation and improvement of the old trend. At the core of each trend is a minimally counterintuitive idea that is advocated by a group of innovators and becomes widespread because it is unexpected according to socially shared beliefs. However, once it becomes widely accepted group it loses its memorability advantages making room for a new layer of innovation. Similarly, new religious movement scholars recognize (Bainbridge, 1985) that splitting of a new religious movement (NRM) from an existing movement often involves introducing an innovation into the doctrinal beliefs of the existing movement. NRM scholars Bainbridge and Stark (1979) provide a number of examples of new religious movement leaders who created the fundamental doctrine of new religious movements by modifying the beliefs of existing NRMs. Indeed they argue that tracing the history of such deviations, labeled “cultural genetics”, may be a useful way to study NRMs. Idea innovations leading to splits in NRMs are common. Bainbridge (1985) counts over half a dozen movements that split from Dianetics and the Church of Scientology in the short period of 20 years from 1952 to 1972.

In this way, the context-based model explains cultural innovation but what accounts for cultural continuity? In particular, what explains the perception that cultural concepts such as gods, ghosts, and angels have not changed for a long time? As anthropologists and historians know, despite the need for protagonists of conservative movements to argue otherwise, cultural ideas are continually undergoing change, so much so that social movements and societies often have to build a number of safeguards to prevent unwanted innovation. This includes writing down the doctrines in books and elevating such books to the level of the sacred, punishing any changes in the content of these books, and instituting measures to discourage translation and interpretation of these books.

Orthodox Christianity’s attempts at rooting out heresies (Hogan, 2001) spanning over two thousand years illustrate problems that organized religions face as they attempt to maintain continuity over time. Both Judaism and Islam also had to repeatedly put down various attempts at introducing innovations in their religious doctrine and practices. In the case of Islam, the Quran was not allowed to be translated in any language other than Arabic until the 19th century. Innovation in religion (termed as “bidah”) is explicitly forbidden (Islam, 2008). NRMs, despite having had to fight

against the oppressive measures against innovation to have their own voice heard when facing the same need to protect the integrity of their own doctrine, disdain any attempts at introducing further innovations into their doctrines. For instance, the founder of Scientology, L. Ron Hubbard is reported to have referred to those who modify his techniques as “squirrels” who should be harassed, “in any possible way” (Welkos & Sappell, 1990). Weapons used to discourage any change in religious doctrine and practice include ridicule, expulsion, and harassment. Continuity in group ideologies is explained to the extent that such thought control techniques are successful.

Conclusions

Cognitive scientists, including cognition and culture researchers have long favored general models of cognition over specific ones not just because they explain a larger variety of phenomena but also because they are perceived as more parsimonious and subject to a larger battery of tests because of the availability of a larger number of data points to test them on. This paper makes a contribution to this literature by presenting a generalized version of the minimal counterintuitiveness hypothesis to argue that better recall for minimally counterintuitive ideas is part of a larger class of memory preference for distinctive items and that ideas that violate a small number of expectations generated by offline cognition/doctrinal thinking should also be remembered better than ideas that do not violate such expectations. The secondary contribution of this article is the development of the notion of social counterintuitiveness which allows us to explain the spread of culturally counterintuitive ideas.

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