Human Evolution, Genes and E-Communication in Organizations

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ABSTRACT

Could our genes influence our behavior toward e-communication tools? This paper argues that they can and illustrates the mechanism underlying their influence. An alternative to the media richness hypothesis, proposed by media richness theory, is developed. This new hypothesis, called media naturalness hypothesis, states that there is a negative causal link between the degree of naturalness of an e-communication medium (or its similarity to the face-to-face medium) and the degree of cognitive effort required from an individual to use the medium in an e-communication interaction. The new hypothesis is based on an analysis of the evolution of the human biological communication apparatus through natural selection, according to the laws proposed by Darwin's theory of evolution by natural selection. Key implications for managers are discussed, particularly for the development of business-to-consumer e-communication tools.

INTRODUCTION

The emergence of the Internet led to an explosion in the number of electronic business-to-consumer interactions. Empirical research on electronic communication (e-communication) behavior also increased considerably (Kock, 1999). Several theories informed this research, including media richness theory (Daft and Lengel, 1986), which has attracted the interest of many researchers (Carlson and Zmud, 1999; Daft et al., 1987; Fulk et al., 1990; Kinney and Dennis, 1994; Lengel and Daft, 1988; Markus, 1994; Rice, 1992; Trevino et al., 2000) even though it was first published in the mid 1980s when the Internet as we know it today was largely unknown.

Media richness theory was built around a central hypothesis, the media richness hypothesis, which states that different communication media possess different degrees of a trait called "richness" (Daft and Lengel, 1986; Lee, 1994; Carlson and Davis, 1998), that make them more or less effective conduits of information and knowledge. The richer the medium the more face-to-face-like it is, being the face-to-face medium the richest of all (Daft and Lengel, 1986). According to the media richness hypothesis, effective workers choose appropriately rich media for tasks that involve communication, and the choice of communication media of low richness (whether accidental or due to accessibility constraints) leads to decreased task outcome quality.

Several studies found general support for the media richness hypothesis (Daft et al., 1987; Rice 1992; Rice and Shook, 1990; Sproull and Kiesler, 1986; Walther, 1996), other studies found weak support (Fulk et al., 1990; Markus, 1990), and yet other studies found little or no support at all for the media richness hypothesis (Kinney and Dennis, 1994; Kinney and Watson, 1992). Empirical findings that were not well aligned with predictions based on the media richness hypothesis were often explained based on the influence of social factors (El-Shinnawy and Markus, 1998; Markus, 1994), such as peer behavior and manager pressure in connection with the use of certain communication media, which social theorists argued had been left out of the media richness hypothesis and could influence media choice and task outcomes, which social theorists argued had been left out of the media richness hypothesis and could influence media choice and task outcomes.

It is argued in this paper that the theoretical polarization above is due to two problems associated with the media richness hypothesis. The first of these problems is that there is a wealth of empirical evidence that provides direct support to the notion that people in general prefer face-to-face or face-to-face-like media for a variety of business tasks that involve communication (Basdogan et al., 2000; Carlson and Zmud, 1999; Daft et al., 1987; Kock, 1998; Lengel and Daft, 1988; Sallnas et al., 2000) which seems to provide support for the media richness hypothesis. The second problem is that the media richness hypothesis is built on a "vacuum", as no underlying explanation was ever presented for our predisposition toward rich, or face-to-face-like, media. The hypothesis is based on the intuitive, and somewhat circular, assumption that we somehow prefer face-to-face or face-to-face-like media for communication.

The main goal of this paper is to offer a solution to the above problems by providing an alternative to the media richness hypothesis, referred to here as media naturalness hypothesis, developed based on Darwin's theory of evolution by natural selection. Like the media richness hypothesis, the media naturalness hypothesis has important implications for the selection, use and deployment of e-communication tools in organizations. However, unlike the media richness hypothesis, the media naturalness hypothesis is compatible with social theories of behavior toward e-communication tools. The "e" in "e-communication" stands for "electronic", so the term "e-communication" refers to, essentially, any form of computer-mediated communication plus more traditional forms of electronic communication, such as telephone communication (since the telephone is also an electronic device). The term e-communication includes computer-mediated communication over the Internet as well as over other computer network infrastructures, thus also including computer-mediated communication that takes place through group decision support systems and local area network-based communication tools.

THE EVOLUTION OF HUMAN COMMUNICATION

According to the modern version of Darwin's (1859) theory of evolution, the human species evolved through natural selection, a process in which random mutations are introduced in the genetic makeup of offspring, leading to traits that are selected based on their usefulness for survival and mating (Darwin, 1859; Dawkins, 1989; Mayr and Provine, 1998). The evolutionary pace set by natural selection is usually very slow (Boaz and Almquist, 1997; Dobzhansky, 1971; Lorenz,
1983). Genetic mutations that enhance the changes of survival and mating, in many cases only slightly (Dobzhansky, 1971), slowly accumulate and spread through the members of a species, leading to the development of species-wide physical, behavioral and cognitive traits over long periods of time. These may span thousands or millions of years, and are contingent on breeding speed and mortality rates. In the case of the human species, the evolutionary process is not believed to have led to significant physical and cognitive changes in at least the last 100,000 years (Campbell; 1992; Dozol, 1992; Wilson, 2000). During the vast majority of this process (over 99 percent), human beings and their ancestors communicated primarily in a co-located and synchronous manner through facial expressions, body language, and, initially, discrete sounds, which later evolved into speech (Boaz and Alquist, 1997; Cartwright, 2000).

The human species developed a complex web of facial muscles (22 on each side of the face; more than any other animal) that allow them to generate over 6,000 communicative expressions, very few of these muscles are used for other purposes, such as chewing (Bates and Cleese, 2001; McNeill, 1998). There is a noticeable evolutionary direction towards the development of a biological communication apparatus that supported ever more sophisticated forms of speech, or increased communication complexity, culminating in the development of complex speech by Homo sapiens. The advent of complex speech was enabled by the development of a larynx located relatively low in the neck and an enlarged vocal tract – key morphological traits that differentiate modern humans from their early ancestors and that allow modern humans to generate the large variety of sounds required to speak most modern languages (Laitman, 1984; 1993; Lieberman, 1998). The morphology of the human ear also suggests a specialized design to decode speech (Lieberman, 1998; Pinker, 1994).

With respect to the development of our biological communication apparatus, one could reach an unequivocal conclusion based on the evolutionary principle of “repeated use” (Mayr, 1976; Mayr and Provine, 1998; Wilson, 2000), which argues that there is a correlation between degree of evolutionary optimization of a particular set of organs used to perform a certain task by species and the number of generations (or, generally speaking, the amount of time) in which those organs are repeatedly used to accomplish the task. The conclusion is that, since our biological communication apparatus has been used for co-located and synchronous communication using facial expressions, body language, and sounds over such a long period of time, it should have been designed for communication interaction modes that present those characteristics. A plausible corollary would be that other communication interaction modes, including e-communication in general, would be matched to different degrees to our biological communication apparatus, some poorly, some not so poorly, depending on the degree to which they approximate face-to-face communication. But, what does this mean? Or, more specifically, what would happen if we used communication interaction modes that are not closely matched to our biological communication apparatus? To answer this question, we need to invoke one key theoretical principle from evolution theory, the brain-body co-evolution principle (Lieberman, 1998; Wills, 1989; 1993).

The brain-body co-evolution principle states that body and brain structures co-evolve in a closely matched way (Lieberman, 1998; Wills, 1989; 1993). Therefore, the gradual evolution of certain characteristics of our body, such as a complex web of facial muscles and vocal communication organs (Laitman, 1984; 1993; Lieberman, 1998; Pinker, 1994), was accompanied by the evolution of specialized brain functions that control those organs’ operation. For example, it is known that the development of a larynx located relatively low in the neck (Laitman, 1993; Lieberman, 1998) considerably increased the variety of sounds that we could generate (and, at the same time, significantly increased our chances of choking on ingested food and liquids, which illustrates the key importance of oral communication in our evolutionary history). According to the brain-body co-evolution principle, the development of this “customized” larynx was necessar-
The media naturalness hypothesis also provides the basis for management decisions regarding “partial” incorporation of a naturalness element to an e-communication medium depending on resource constraints. Each of the five naturalness elements – i.e., co-location, synchronicity, and the ability to convey facial expressions, body language, and speech – can be incorporated to an e-communication medium to varying degrees, or partially; full incorporation means that the element is identical to what would be available in the face-to-face medium. For example, between two video conferencing applications, the one whose video and sound quality approach most closely what is seen and heard in actual face-to-face communication is the one with the highest degree of naturalness of the two.

IMPLICATIONS FOR MANAGERS

The media naturalness hypothesis argues that cognitive effort increases with decreases in e-communication media naturalness. However, unlike the media richness hypothesis, the media naturalness hypothesis does not state that people always choose natural media for tasks that involve communication, or that the choice of communication media of low naturalness (whether accidental or due to accessibility constraints) leads to decreased task outcome quality. That is, the main dependent variable of the media naturalness hypothesis is cognitive effort, not media choice or task outcome quality.

The change in focus and dependent variable provided by the media naturalness hypothesis has important implications for online businesses. In business-to-consumer interactions conducted online, increased cognitive effort may lead to lower perceived quality and dissatisfaction from the part of customers. Since the Internet makes it much easier for customers to change suppliers, who are literally “a few clicks away”, the use of e-communication media of lower naturalness than those provided by the competition can have negative consequences for companies that rely heavily on online interactions with their customers to increase or maintain their revenues. This conclusion is aligned with, and partially explains, the constant calls in the popular media for companies that rely heavily on online interactions with their customers to “humanize” the Internet. As Eichler and Halperin (2000) observe, a Cyberstar is Born, Marketing Week, V.23, No.45, p. 54.


Kinney, S. T. and Watson, R.T. (1992), Dyadic Communication: The Effect of Medium and Task Equivocality on Task-Related and Inter-
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