Understanding Consumer Difficulties in Dealing with Risk: Perspectives from Evolutionary Biology

Why do modern consumers seem to have such problems dealing with the variety of risks they confront? Evolutionary biology -- the study of humans adaptation -- provides an answer to that question. The implication is that consumers may be equipped to respond to risks in settings which are no longer common. Other insights into consumer risk behavior can also be drawn from evolutionary theory.

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Introduction

It is ironic that while risk is by nature probabilistic, the *fact* of risk is a constant. That is, consumers are *certain* to confront a variety of risks on a continuous basis. Whether the decision is ordinary (food preservation) or unusual (surgery), consumers must find ways to deal with risk. Collective actions may spread (through insurance) or reduce (via safety regulations) risk, but it cannot be escaped. Given that reality, it is all the more ironic that consumers tend to do such a poor job in dealing with risk.

Consumers tend to overreact to small risks, while not taking larger ones seriously enough (Breyer, 1993). Are, for example, airline passengers nervously awaiting their flights mindful that they were at much greater risk in their automobiles on the way to the airport than they will be when they are airborne? They may not be because accidents involving automobiles receive much less attention than those involving airplanes. Even if consumers are aware of the odds, they may not respond accordingly because the probability of an accident is a remote abstraction while the feeling of confinement and loss of control which some travelers experience in aircraft is immediate and real.

Collective actions are often no less muddled. As Breyer (1993) demonstrates, public policies dealing with risk are so torn by multiple agendas, bureaucratic intransigence and lack of information about true risks that emotion can triumph over evidence. As a result, it becomes less likely that decisions will be made rationally and more likely that resources will be misallocated. Hence the question: if we have so much experience with risk -- individually and collectively -- why don't we deal with it better?

Although they have documented the problem thoroughly, neither economists (Clark, 1990) nor legal scholars (Breyer, 1993) have a satisfactory answer to that question. Bergstrom, in his review of family economic relations (1996), suggested that recent developments in anthropology and biology can be useful complements to economic approaches. So, too, in this case, I suggest that we extend traditional economic approaches to risk by incorporating work from evolutionary biology.

Like Bergstrom, I want to investigate the "implications of the hypothesis that human preferences were shaped by natural selection," (1996, 1904), where preferences includes reactions to risk. My goal is not to endorse a one approach or to reject others. Rather, I want to suggest possible considerations which consumer researchers may not have taken into account. Specifically, I wish to:

1) demonstrate that findings from evolutionary biology can be related to how today's consumers react to risk; and
2) illustrate specific implications of that relationship.

Human Adaptations and Risk

Evolutionary biologists focus on *fitness*, by which they mean passing along one's genes through reproduction. Fit individuals have more offspring and therefore their genes are more likely to be passed on. Fitness implies being well adapted to one's environment (otherwise one would not survive). Genetic change may happen randomly, but changes which do not promote adaptation (and hence fitness) tend to die out. Color vision, for

example, may have occurred by chance, but it was retained and refined because it gave an advantage to individuals who possessed it and increased the likelihood that they would produce offspring (Tooby & Cosmides, 1992).

Fitness also implies that parents would be especially protective of their own offspring. If genes are to be passed along, having children is not sufficient. Those children must survive and then produce their own offspring. This is the essence of the mechanism of natural selection.

It is important to emphasize here that we are talking about *specialized* mechanisms of adaptation. Distinctive problems require unique solutions. Thus, one researcher noted:

> It is no more probable that some sort of general-purpose brain/mind mechanism could solve all the behavioral problems an organism faces (find food, choose a mate, select a habitat, etc.) than it is that some sort of general-purpose organ could perform all physiological functions (pump blood, digest food, nourish an embryo, etc.)... There is no such thing as a "general problem solver" because there is no such thing as a general problem. (Symons, 1992, 142)

Applying this logic to the question at hand, we would conclude that during the Pleistocene era (from about 1.75 million years ago until the end of the last ice age 10,000 years ago) when most human evolution took place, our hunter-gatherer ancestors would have had to deal successively with the risks presented by disease, ferocious beasts and a hostile environment. Individuals could not survive if they had not, in more formal terms, evolved "domain-specific cognitive mechanisms for solving [such] ecologically recurrent and important problems" (Wang, 1996, 2). We are the beneficiaries of the adaptations made by our ancestors and thus are genes are coded with those same cognitive mechanisms.

Contemporary Risks

The germ of the problem should now be clear. We are well adapted to deal with risks in an environment which no longer exists. Our ancestors may have lived in world which we might consider impossibly risky, but those risks were immediate and obvious. Indeed, we have no problem knowing we should avoid being eaten by wild animals. By contrast, low-level radioactive emissions are neither detectable by our senses nor immediately harmful. Nevertheless, we must be prepared to deal with their potentially harmful consequences over time.

We should also note that hunter-gatherers lived in small bands, usually under 100 people. It would have been rare for them to see even a few hundred individuals together at one time (Wang, 1996). Thus, while they might have evolved cognitive structures to deal with risks in the neighborhood of one in a hundred, they had no concept of a thousand people and hence would not have known how to respond to a risk of one in a thousand. We have the same problem; although we have experience with larger groups, we still cannot be sure whether we should be fearful of something which will kills us one time in 10,000.

An American's chance of death in a commercial airline accident is only slightly greater than one in 200,000 (Breyer, 1993). However, we are not equipped to assess that risk (i.e., we lack the necessary "cognitive mechanisms"). Most people find the risk acceptable (as evidenced by the increasing numbers of airline passengers), but some people reject the risk. Still others are willing to buy a lottery ticket with a .0000006 (or less) chance of winning. Each person must make his or her accommodation with the risk on an *ad hoc* basis.

This contention is supported by recent research on the decision bias known as the *framing effect* (Wang, 1996). Rationality may dictate otherwise, but individuals' response to risk varies with the manner of statement. People respond differently to an outcome in which one-third of a threatened population is saved than to one in which two-thirds die (Breyer, 1993), although the number of survivors is the same in both cases. Or responses may vary between deterministic outcomes (two out of six survive) and probabilistic ones (on average, one-third of six individuals survive).

However, Wang and Johnston (1995) found that the impact of framing was only evident when risks were stated in terms of groups ranging from 600 to 6,000. When a small-group context (6 to 60) was used, the effect disappeared. Because the latter involves groups consistent with groups of hunter-gatherers, Wang concluded that for risks involving larger groups "one might not expect humans to have evolved well-calibrated mechanisms, [and] people may be more vulnerable to *irrelevant cues* associated with the decision problem (1996, 4, emphasis added).

What policy makers might consider "irrelevant cues" also bedevil us with respect to the kinship question. In a cost-benefit framework, it is necessary to think dispassionately in terms of statistical outcomes (Campen, 1986). Thus, if one child in 50,000 will die from a vaccine, one thinks of the hypothetical (or statistical) individual, not a particular person. Yet in considering such possibilities, people shade their judgments because they tend to think of their own child as the one who might die (Breyer, 1993; Wang, 1996). Statements such as "regardless of cost, it's

worth it if one life is saved," may be patently ridiculous, but most parents can imagine themselves saying something similar if the one life is their child's.

Hence, our tendency to generalize from the particulars of our own situation to the general case gets in the way of good policy. Yet in doing so we are not being fuzzy minded or overly sentimental; we are merely responding to evolutionary cues which tell us that we need to be concerned about our own progeny. Wang (1996) found that responses to risky alternatives tended to be inconsistent when choices involved anonymous individuals, but that the inconsistency disappeared when offspring were involved. When policy makers ask us to make decisions about detached, statistical outcomes, they are asking us to reject the adaptive tendency to think in terms of our own children. It is evident that we do so with reluctance.

Reactions to risk are not the only evolved responses which may no longer be adaptive. Symons, for example noted that: "The sugar, salt, and fat served in fast food restaurants tell us at least as much about the nature and evolution of the mechanisms that underpin our appetite as hunter/gatherer menus do" (1992, 144). That is, while large quantities of sugar, salt and fats may constitute health risks for contemporary Americans, our attraction to them remains because of appetites evolved when those compounds were essential to our ancestors' survival.

That evolution, remember, covered a period of 1.75 years. We have not evolved adaptations in response to our new circumstances because there has been too little time. If we think of the period back to the beginning of the Pleistocene in terms of a 24-hour day, then agriculture emerged just over eight minutes ago and cities developed in the last five minutes.

Risk-Sensitive Behaviors

All of this may strike the reader as gloomily deterministic. How can we overcome tendencies which have been shaped over nearly two million years? While it is obviously too late to devise an intervention strategy for our Pleistocene-based ancestors, the alternative -- surrendering as slaves to our hunter-gatherer minds -- is hardly very satisfying.

Fortunately, we can move beyond such gross oversimplifications. Understanding why we react as we do does not mean we are powerless to change. Indeed, just the opposite is true. A better understanding of what underpins our behaviors enables us to design better, more appropriate responses. We can illustrate with an example dealing with risk sensitive behavior.

The insight is based in recent studies on foraging behavior. To illustrate, suppose that M calories a day are needed for survival. The forager must chose between two plots for which the expected yield is the same, but the variance is not. The proper strategy depends upon the relationship between the expected yield and M. As Wang states, if M is greater than the expected yield:

> the adaptive choice is to take a risk to forage on the patch that has a higher variance. As a result of this choice, the forager will have a better chance of getting more than M calories of daily intake. In contrast, if the mean daily intake is greater than M, the forager is better off foraging on the patch with a lower variance, as this decreases the chance of death. (1996, 3-4).

Thus, when survival is secure, it pays to be risk averse, but in the face of potentially fatal losses, risk seeking is rewarded. Maynes (1976) called the risk-seeking (or maximax) strategy the optimist's rule, but it might as well be designated the "desperation" rule. A long shot, after all, is better than no shot at all.

The reader may already see how this example illustrates the differences in financial choices of middle- and lower-income individuals. The former are more secure and can therefore afford to hedge against uncertainty through a more conservative (savings-based) strategy. The latter's insecurity predisposes them to a more dangerous (debt-based) approach. Because secure middle- and upper-income individuals set societal norms, the tendency is to think of savings-based approaches as "responsible," and contrast them to the "irresponsibility" demonstrated by the poor. In fact, the behavior may be a reasonable response to very a bad choice set. The same may be said for the higher proportion of lower-income persons who play the lottery.

In this case, the evolutionary perspective leads to conclusions which are quite different from those offered by conventional approaches. Those differences, and the differing policy responses which follow from them, argue for not just considering alternative points of view, but for a systematic review of behaviors based on the new perspective.

Context and Conclusions

Two final points must be addressed. The first concerns "culture" and "learning," terms that have not been used thus far even though they are traditionally used to explain differences in individual behaviors. However, evolutionary biologists explain those differences through the "domain-specific cognitive mechanisms" discussed above. Thus, this approach is, at the very least, inconsistent with conventional sociology (Tooby & Cosmides, 1992).

It may be dangerous to engage in even selected borrowing without becoming involved in the controversy. Nevertheless, it seems possible for now at least to build on the insights the evolutionary approach offers without becoming involved in the conflicts of neighboring disciplines.

Insights into the underpinnings of our behaviors should enable us to design better, more appropriate responses. Consider again the example of differing financial behaviors of middle- and lower-income individuals. How does it help to attribute those differences to the poor's "irresponsibility?" Even if we get beyond that point and consider differences in "time horizon," we have not advanced very far if we cannot explain the processes which shape time horizon. Is it possible that the evolutionary perspective actually helps explain those processes? The question is worth exploring.

> "An evolutionary perspective on standard topics of economic[s] ... ," Bergstrom observed, "is likely to produce deeper insights and better-posed questions than theory based on arbitrary assumptions about preferences" (1996, 1931). Indeed, the behavioral basis for economics is notoriously thin and might well be bolstered by a fuller understanding of the evolutionary perspective. If that contention seems worth exploring further, then this brief introduction has served its purpose.

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Endnotes

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