The Evolutionary History of Mazda Motor Cars

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Depending on which way you look at it, it is either a depressing observation or an interesting psychological phenomenon that motor cars are often treated in the modern world as living things. Precisely what type of living thing they are is not clear. Once again depending on which way you look at it, they are either the object of a love affair or some form of antichrist. Interestingly, this often seems to depend on whether it is a wintery morning and they are having difficulty waking from their diurnal slumber; and thus does the observer enter into the observation, as they do also in quantum mechanics.

Either way, if this circumstance is to be taken seriously, then to a biologist it implies that motor cars must have an evolutionary history, including both phylogeny and speciation. Furthermore, if motor cars have an evolutionary history, then an evolutionary biologist can attempt to reconstruct it and interpret it in the light of their specialist knowledge. Speaking as an evolutionary biologist of some infamy, it is my intention here to do precisely this with respect to a selection of the products from the Mazda Motor Corporation.

I did not choose these organisms arbitrarily. I chose them as being “typical” representatives of the phenomena that I wish to discuss. In this sense, they show most of the features of biological evolution in a clear and unambiguous manner. All other cars show the same features, but it is not always as obvious, and so it is much harder to make a convincing case. Actually, I chose them because my dad used to own one, and what I am about to say became blatantly obvious even to someone as unobservant as I am.

The previous paragraph does not appear in formal scientific publications. It is replaced by the expression “representative sample of the Mazdaceae” or even “random sample”, which are more terse for the writer but require more careful interpretation by the reader.

I have chosen four models for consideration, designated by Mazda using numbers, which shows a distinct lack of sympathy by that company with the general thesis outlined here. They are:
(1) 929 – 4-door sedan, 4-cylinder engine;
(2) 626 – 4-door sedan, 4-cylinder engine;
(3) 323 – 5-door hatchback, 4-cylinder engine;
(4) 121 – 5-door hatchback, 4-cylinder engine.

These specifications describe the most common form of these organisms during the past two decades. Minor morphological variants have been ignored as representing intra-specific variation that is irrelevant to the current thesis.

For each of these species I collected information on three continuous quantitative morphological
characteristics, all of which measure body size. They are:
(1) overall body length (cm);
(2) overall body width (cm);
(3) wheelbase (cm).
To help highlight the dynamic nature of evolution, measures of these variables were assembled for every year from the origin of these species up to and including 1998. The data were obtained from Carpoint (2000).

The data are shown in the three accompanying line graphs (Figs 1–3), which for the purposes of this dissertation represent the relevant evolutionary histories.

The first thing to note is that three of the species originate simultaneously in 1978. To the uninitiated this might look like good evidence for spontaneous generation. However, there were a number of pre-existing Mazdaeae species that became extinct at precisely the same time. So, instead, this is good evidence for the strict cladistic viewpoint that during speciation the ancestral species becomes extinct upon the origin of two daughter species, even if one of these daughter species is otherwise identical to the parent species. Once again, a strict interpretation of cladism triumphs. (Triumph is, of course, a completely different family of motor car, whose evolutionary history might also be worthy of closer analysis.)

That all three species have a contemporaneous origin is clearly an example of some macroevolutionary event. I have been unable to discover any contemporary circumstance that could be an hypothetical cause of such an event, either inside or outside of the Mazda car company. However, it is a testable hypothesis that such a circumstance exists; and it would therefore be profitable for sociologists to investigate further this fertile field of endeavour.

**Figure 1.** Overall body length of the models of Mazda motor cars. The arrow indicates the acquisition of a 6-cylinder engine, while the asterisk denotes an extinction.
Figure 2. Overall body width of the models of Mazda motor cars. Symbols as in Fig. 1.

Figure 3. Wheelbase length (length between wheel centres) of the models of Mazda motor cars. Symbols as in Fig. 1.
The next thing to notice is the consistent, though punctuated, size increase through time in all three of these models. This, for those of you who are unacquainted with evolutionary generalizations, is an example of Cope’s Rule of phyletic size increase. This rule states that within evolutionary lineages there is a general tendency for body size to increase. Quite why this should be so is not clear. However, Gould (1980) provides the following summary of various published speculations: “Some have cited general advantages of larger bodies – greater foraging range, higher reproductive output, greater intelligence associated with larger brains. Others claim that founders of long lineages tend to be small, and that increasing size is more a drift away from diminutive stature than a positive achievement of greater bulk.”

Given that these potential explanations are probably not directly testable, we can resort instead to pleasing postulations. That larger cars might have a greater foraging range is a reasonable suggestion, at least when considering the intent of car designers, but strictly speaking this depends mostly on the size of the petrol tank. That larger cars might be involved in greater reproductive activity also does not necessarily follow, although they certainly give you more room for it. They are, however, very useful for transporting the products of prior reproductive activity. I doubt that larger cars are associated with either larger brains or greater intelligence. I drive a relatively small car.

Interestingly, Gould (1980) reports a case of phyletic size decrease among manufactured goods, in his case a chocolate bar, and notes that “phyletic size decrease surrounds us in products of human manufacture.” In fact, he states as the sole assumption for his analysis of economic inflation that: “If organic lineages obey Cope’s rule and increase in size, then manufactured lineages have an equally strong propensity for decreasing in size.” Obviously, the data presented here refute this premise. Once again, an ardent non-cladist is soundly confuted.

As a corollary to the temporal phyletic size increase in the lineages, various of the car species replace each other in size through time. That is, the 626 from 1994 onwards is as long as the 929 was prior to 1983, and the 323 from 1995 onwards is as long as the 626 was prior to 1984 (Fig. 1). A similar trend can be seen in the wheelbase attribute (Fig. 3), which might in practice be partially dependent on length. In width, however, the replacement is even more marked, as the 626 catches the previous 929 in 1984 and the 323 catches the previous 626 in 1989 (Fig. 2). Quite why there should be a greater increase in girth than in length is not clear, as width is no more associated with foraging, reproduction or intelligence than is length (although given my own girth:length ratio perhaps I should argue for the latter, at least).

It seems to me likely, given these size replacements, that these species might also replace each other in the niches to which they are adapted. This is thus an ecological prediction that can be derived from our evolutionary data. This hypothesis could be tested by examining the sociological make-up of the people who purchased individuals of these species during the relevant period. My explicit prediction is that there will be a change in this make-up that coincides with the phyletic size increase.

The next thing to notice is the speciation event resulting in the origin of the 121 model in 1987. It is not evident which species is the ancestor of this new model, at least not without some more phylogenetic information. The quantitative data presented here do not provide any explicit synapomorphies, and so the branching sequence is not readily explicable. However, the body-size characteristics indicate that the 121 replaced the 323, in the same manner as the 323 replaced the 626 and the 626 replaced the 929. Thus, the 121 presumably occupies the same niche as did the 323 prior to that time. An unoccupied niche will not long remain unfilled, as any ecologist will tell you.

This temporal replacement sequence, of course, eventually makes the 929 redundant, and it duly became extinct in 1994. As the dinosaurs are reputed to have discovered many eons before, getting too large does not necessarily confer any evolutionary advantages. Size per se is not the ultimate goal of evolution; and it would be wise for all species to remember this simple fact, lest they too go the way of the brontosaurs.

Allied to the general increase in size of the 929 was its acquisition of a 6-cylinder engine in 1987. This quantum leap might have been part of a stratagem designed to take the species into a new adaptive zone, particularly as it was followed shortly afterwards by the largest single increase in wheelbase size for any of the species. Perhaps it was going for the ultimate goal of an 8-cylinder engine? If so, then the sorry failure of this scheme should be a lesson to us all: don’t get too big for your boots.
The final thing to consider is the apparent convergence of the 323 and 626 in their wheelbase size, subsequent to 1995. This seems to be a result of a failure by the 626 to increase its wheelbase, at least in comparison to the increases by the other three species. This suggests the existence of some form of evolutionary constraint. Exactly what this constraint might be is not immediately obvious. Indeed, the 929 only managed to overcome this constraint at the same time as it acquired the 6-cylinder engine, and so these features might not be independent. Given the subsequent extinction of the 929, perhaps it is wise of the 626 not to attempt this jump too soon.

So, what have we learned from this in-depth consideration of the family Mazdaceae? There is, indeed, considerable evidence in favour of treating motor cars as living things. They apparently have an evolutionary history that shows all of the essential features that evolutionary biologists have come to know and love. Loving your science is, thus, no different from loving your car.

References