

Punctuated Equilibrium and Language Change

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Abstract (100 words):

Punctuated equilibrium is a theory developed in evolutionary biology and has been applied by several people to language change. In the most common application of the theory, socio-cultural events are taken to affect (and to some extent predict) types of change in language families. Although all languages are constantly in a state of change, some languages change much faster than others; some areas are suitable for reconstruction by traditional methods, while other language groups seem intractable. The model has been applied to several areas of the world, notably Australia, with differing degrees of success, and opinions on its usefulness are mixed.

The theory of PUNCTUATED EQUILIBRIUM was originally developed by Nils Eldredge and Stephen J. Gould as an alternative to gradual Darwinian evolution in biology. In their model, evolutionary change occurs rapidly among small, peripheral populations, which may later spread out over a larger geographical area, obliterating other populations and creating what appear to be breaks in the fossil record. The alternative, “phyletic gradualism”, assumes that species mutate gradually over large interconnected populations. Punctuated equilibrium is controversial in evolutionary biology and has met with differing levels of acceptance in the literature.

Many researchers have adapted punctuated equilibrium to their own fields. In linguistics, it seems to have been first taken up by Thurston (1987), and Heath (1998). Thurston is particularly concerned with notions of gradual versus abrupt change. Heath argues that equilibrium is defined by isolated monolingualism, while periods of punctuation involve intense contact. The most commonly quoted application of punctuated equilibrium, however, is that of R.M.W. DIXON in several works, most notably in *The Rise and Fall of Languages*, and this view differs from both Thurston’s and Heath’s. Dixon’s formulation will be considered from here on. In developing his model Dixon was seeking to explain several pieces of data and to correlate types of linguistic change with different types of socio-cultural events.

Under Dixon’s model, Language change (and history in general) is assumed to be characterized by long periods of stasis (or “equilibrium”) and much shorter periods of

punctuation. Language groups are assumed to have coexisted for most of human history without a great deal of social or natural disruption. During such periods of EQUILIBRIUM, languages slowly change, largely by borrowing from one another. In this way traits can diffuse across an area. Thus during these equilibria, local as well as larger linguistic areas are created, across boundaries of “genetic” families. As a consequence, languages which are not genetically related (that is, though the inheritance of linguistic material from a common ancestor) may nonetheless come to share considerable material.

The long periods of equilibrium are interspersed with much shorter periods of PUNCTUATION. Punctuation could be caused by several factors, either natural or manmade. The introduction of new technology, invasion, mass migration, fire or flood are some examples of punctuation. It is only in times of punctuation that there occur recognizable language splits, of the kind well modeled by a family tree and of the type usually thought of as indicative of genetic relationship.

Equilibrium has been the natural state for most of the world’s languages for most of human history, while the family tree model is applicable only in the time following a punctuation and language spread. Thus (in Dixon’s model) languages change at different rates at different times, but the rate is loosely tied to whether the language is in a state of punctuation or equilibrium. Languages in equilibrium will “converge to a common prototype”; that is, they will tend to continue borrowing lexical items and grammatical structures until they reach approximately 50% in common (first proposed in Dixon

(1970); see Dixon (1972) for a more accessible formulation). According to Dixon, any lexical or grammatical component of a language can be borrowed, although languages tend to borrow vocabulary more easily than grammatical items. However, he states that there is no universal that basic vocabulary is borrowed less than non-basic. Therefore, adjacent languages that have little in common are likely to have come into contact relatively recently.

The model is based on some empirical observations and some negative evidence. Firstly, if languages had diverged at the rate of the Indo-European or Austronesian families over the last 100,000 years, we would expect to find many more languages than the 6,500 or so that are spoken today (more than 10^{34} , Dixon calculates). That rate of change cannot be constant across all language families at all times. Secondly, the “standard model”, the FAMILY TREE MODEL, seems to approximate the linguistic situation much better in some parts of the world than in others. Dixon frequently uses Indo-European and Austronesian as examples of families where the method succeeds, and Australia as a paradigm case of where the method fails. Finally, the model provides a way to link together non-linguistic events and their reflections in the linguistic record, thereby “explaining” why some areas of the world have proven difficult to model using the family tree.

Fundamental for punctuated equilibrium is that the family tree model of linguistic relationship is only applicable in a period following a punctuation; at other times, Dixon argues, there is so much diffusion between adjacent languages that borrowing clouds any

recognizable splits. He argues that this is the case in some parts of the world, particularly Australia, where linguistic relationships are difficult to model on a family tree. Thus he draws the inference that macro-families such as NOSTRATIC are misguided for rather different reasons from that normally supposed; while most people reject reconstructions of Nostratic because of the paucity of recurrent correspondence sets and the difficulty and uncertainty of comparing proto-languages (see, for example, Campbell 1998), Dixon primarily rejects it because beyond the recent spread and split of Indo-European languages, one can't reconstruct using the family tree because that model is not applicable.

Punctuated equilibrium has been enthusiastically endorsed in some quarters because it provides a way of tying hypotheses about language relationships to technological innovations. Work by COLIN RENFREW and PETER BELLWOOD has been prominent in this regard. For example, they tie the spread of the INDO-EUROPEAN language family to the spread of agriculture (arguing for the spread of agricultural technology as a major punctuation). Bellwood uses similar arguments for the spread of the AUSTRONESIAN family in Asia.

Despite the enthusiasm for punctuated equilibrium amongst some prehistorians, historical linguists have been quite critical of the model, and support for punctuated equilibrium as an explanatory model of linguistic prehistory seems largely confined to archaeologists. Criticisms have been focused on the underlying assumptions of the model (for example,

that linguistic and non-linguistic events can be directly correlated), the data adduced as evidence, and the model's application to particular families and parts of the world.

Let us first consider criticisms of the architecture of the model. Dixon does not overtly distinguish in the model between the languages of the “punctuators” and those of the “punctuatees” (that is, speakers of languages who cause a punctuating event versus those who suffer one). Both the punctuator and the punctuatee speakers/languages are undergoing punctuation, but with different effects. “Punctuator” languages, for example, can show substratum influences (see, for example, the development of a set of retroflex consonants in Indic languages); thus language contact and convergence is not the province of equilibrium situations alone. Many cases of convergence are the result of (in Dixon's terms) short-term punctuation, and not long-term equilibrium.

Secondly, not all punctuations result in family-tree-like splits. TURKIC LANGUAGES, for example, would seem to be a good example of a family undergoing “punctuation”. Yet the internal relationships between Turkic languages are very complicated and are the subject of ongoing dispute (see, for example, the discussions by Schönig or Tekin and Ölmez). The Indo-European family itself is not nearly as clear-cut as Dixon argues, as seen by debate on the status of higher-order subgroups such as Italo-Celtic, Greek-Indo-Iranian and the date of the splitting off of Germanic.

Others have argued that punctuated equilibrium simplifies language contact too much.

Watkins, for example, provides illustration of cases from Anatolia where “regular” family-tree-like changes and language contact are going on at the same time. Watkins sees no reason for separating areal developments and genetic developments, because the two occur concurrently. Dixon’s notion of equilibrium is assumed to produce symmetrical borrowing patterns (that is, convergence of two languages by mutual borrowing); it is known from many studies in the literature that accommodation need not be symmetrical (see, for example, Heine and Kuteva 2001 and Thomason and Kaufman 1988).

Just as Eldredge and Gould’s punctuated equilibrium was an alternative to a received theory, so too Dixon aimed to provide an alternative to a set of standard assumptions, in this case, the comparative method and the family tree model. Although Dixon challenges the applicability of the family tree model to certain language families, he does not challenge the principle of the regularity of sound change or the applicability of the comparative method in broad terms. Dixon’s arguments against the comparative method and the relative advantage of punctuated equilibrium are specious. The comparative method is based on the assumption that internal language change is regular, and that regular, systematic correspondences between languages are meaningful and highly unlikely to be due to chance. Furthermore, sound change is usually exceptionless, and exceptions require further investigation (such as loan-word analysis, dialect interference, back-borrowing). Nor does the comparative method necessarily lead to the drawing of a family tree for the languages under analysis. The comparative method can still be used,

for example, within linguistic areas and in the analysis of loan words (for an Australian example see work by HAROLD KOCH on loan words between ARANDIC LANGUAGES and WARLPIRI).

Dixon further criticizes the comparative method because it will over-generate in some cases. For example, if a change occurs in all the languages of a group independently, the change may well be reconstructed to the ancestor of the group, giving the false appearance of a common innovation (in the absence of evidence from relative chronology). We cannot reconstruct states for which we have no evidence. This is, of course, a weakness of the comparative method; however, it is a problem with all reconstructions of the past — if evidence has been obliterated, we cannot see it, no matter what the method used, be it carbon-dating, stratigraphy, thermo-luminescence, punctuated equilibrium or glottochronology. This is not a valid criticism of the comparative method *per se*, it is a fact of making hypotheses about prehistory.

Finally, some comments are warranted on the application of punctuated equilibrium to Australia, as it is one of the few areas of the world where the model is claimed to have empirical support. Punctuated equilibrium has found little support amongst historical linguists working on Australian languages, as there is a considerable amount of evidence contradicting Dixon's model (see for example, the papers in Bower and Koch 2004).

Dixon assumes that Australian languages have been evolving largely *in situ* from a period shortly after the initial settlement of the Australian land mass, probably around 60,000 years ago. His reasons are partly to do with origin myths (cf. Dixon 1996) and partly because, as he states, if Proto-Australian had been spoken only a few thousand years ago, the split and expansion would have happened rather recently, and a family tree model should be applicable. One set of languages, called the PAMA-NYUNGAN family, is taken to be an archaic diffusion area, with few genetic groups. In contrast, most other Australianists prefer a model under which speakers of Pama-Nyungan languages spread out across most of Australia, their movement perhaps governed by climatic change at the end of the Pleistocene (that is, more than 50,000 years later than Dixon's claim). Under this view, we can infer nothing about initial dispersal from the current distribution of languages. There is considerable archeological evidence for site abandonment and resettlement in various parts of the continent, for continual "punctuations" (in Dixon's terms) caused by climatic variation, and for population movement.

Linguistics and biology have long borrowed metaphors, terminology and ideas back and forth. Punctuated equilibrium has proved appealing to those who wish to link types of linguistic change to events in prehistory, however correlations in events and linguistic outcomes are elusive. Several areas in the world would appear to be counterexamples to the principles of punctuated equilibrium and the flagship case, Australia, is perhaps not as immune to reconstruction by traditional methods as Dixon has suggested. It remains to be seen how durable a framework punctuated equilibrium for be for linguistic prehistory.

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Claire Bower is assistant professor of linguistics at Rice University. Her PhD dissertation (Harvard University) was a reconstruction of the history of the Nyulnyulan language family, spoken in the Kimberley region of Northern Australia, concentrating on one language, Bardi. She specializes in historical linguistics, syntax and endangered languages. In addition to her work on Kimberley languages, she has done field research in Arnhem Land and Western Queensland. She is an associate member of the Australian National University's Centre for Research on Language Change and a consultant linguist for the Kimberley Language Resource Centre. She is currently involved in salvage work with the five remaining speakers of Yan-nhaṅu.