

Difference Between Gradualism and Punctuated Equilibrium

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Key Difference – Gradualism vs Punctuated Equilibrium

Evolution and the process of species evolution are based upon the changes that take place in a population over a period of time. There are many theories put forward by scientists, [geologists](#), and philosophers on the theory of [evolution](#). Considering all the available theories, scientists have accepted two basic theories in which a species can evolve; Gradualism and Punctuated Equilibrium. Scientists believe that all species evolved in either one of the ways or through a combination of the two. Gradualism is the concept where it is believed that the large changes are actually the culmination of very small changes that build up over time. Punctuated Equilibrium states that changes in species take place over a relatively short amount of time "punctuating" the long periods of equilibrium. Thus the **key difference** between Gradualism and Punctuated equilibrium is the period of time it takes to assume changes. **Gradualism takes a longer period for the evolution of the species whereas Punctuated equilibrium it requires only a shorter time for the evolution of species.**

What is Gradualism Equilibrium?

Gradualism is the concept which describes the evolution of species as a long-term process. In Gradualism the selection and variation of a species happen in a more gradual manner. The minute changes taking place in a species is therefore hard to be noticed. The visible effects of Gradualism occur when many such small changes get together over time. Thus it takes a longer time to observe the visible evolutionary changes.

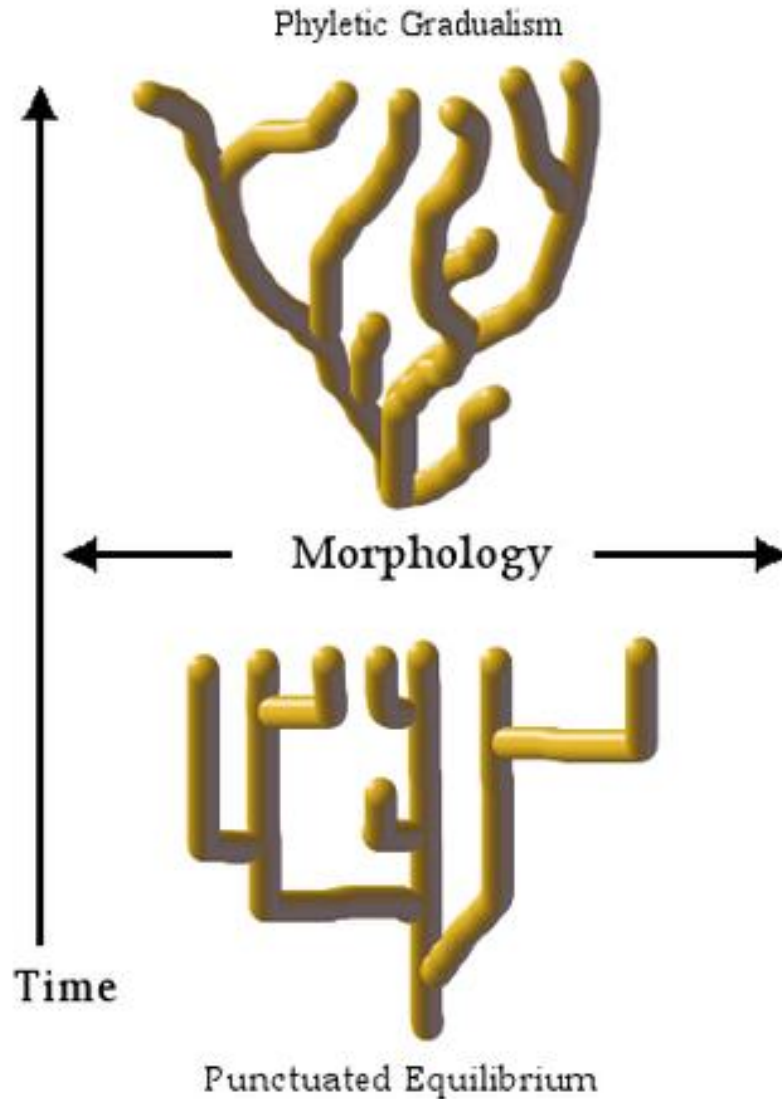


Figure 01: Gradualism and Punctuated Equilibrium

This theory is based on the findings of James Hutton and Charles Lyell. Charles Darwin when adopting his idea of natural selection and survival of the fittest, used this theory as a baseline guide. This factor is being proven by the studies conducted on transitional fossils. The few more individuals with more of the helpful trait survive, and a few more with less of the helpful trait die. The geologic time scale helps show how the species have changed over the different eras since life began on Earth.

The main features of gradualism are;

1. Very gradual
2. Takes place over a long time.
3. The population change is slow.
4. The population change is constant.

- The population change is consistent.

What is Punctuated Equilibrium?

The concept of punctuated equilibrium states that a change in a species is brought about in spurts. The process of punctuated equilibrium is mainly of two phases. There is a period of very little change or no change. This is known as the equilibrium phase of punctuated equilibrium. The other phase is where one or few significant huge changes occur within a short period of time. This punctuating phase is the other phase of punctuated equilibrium.

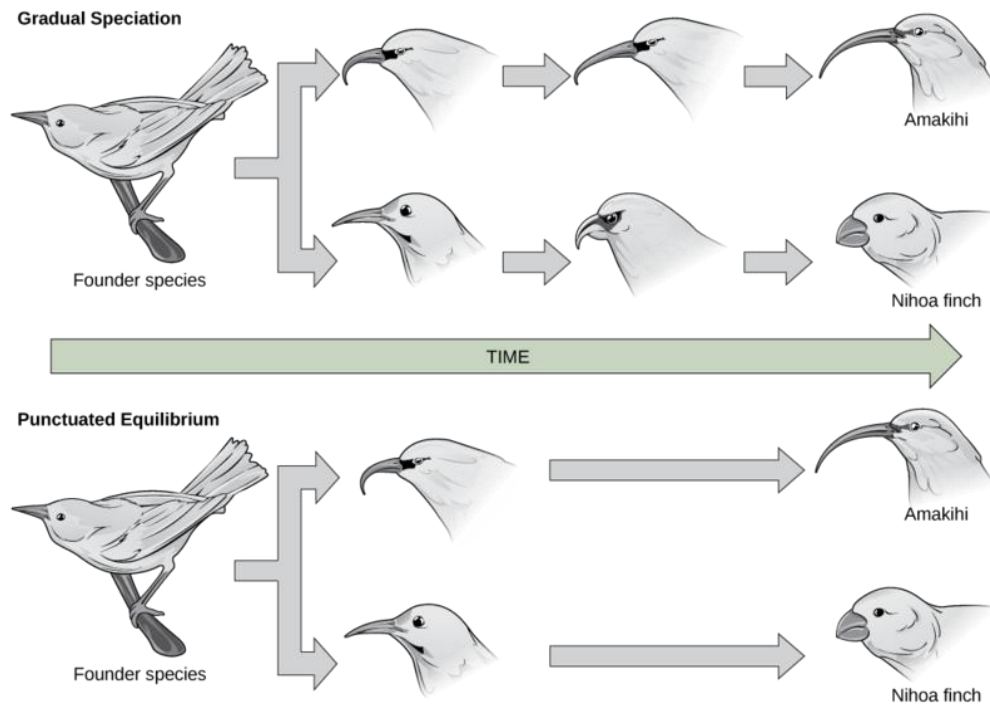


Figure 02: Gradualism vs Punctuated Equilibrium

The huge changes that occur in punctuated equilibrium are often through mutations in the genes of a few individuals. [Mutations](#) are random changes in the [DNA](#) of a species. These mutations are not inherited from the previous generation but are passed on to the offspring generations.

Though mutations are often harmful, the mutations that result in punctuated equilibrium are very helpful. These mutations increase the adaptability of the species to their environments. The species undergo changes very rapidly over a few successive generations and are equilibrated for a period of time.

What are the Similarities Between Gradualism and Punctuated Equilibrium?

- In both theories, changes on a species take place over time.
- Both occur in small and large populations.
- Both define the cause for the evolution of species.
- Both undergo changes that are based on DNA changes or epigenetic changes.

What is the Difference Between Gradualism and Punctuated Equilibrium?

Gradualism Equilibrium vs Punctuated Equilibrium	
Gradualism is the concept that large changes in species are actually the culmination of very small changes that build up over time.	Punctuated equilibrium states that changes in species take place over a relatively short amount of time "punctuating" the long periods of equilibrium.
Time Period	
A long period of time is considered for gradualism.	A short period of time is effective for punctuated equilibrium.
Production of new species	
Slow by gradualism.	Fast through punctuated equilibrium.
Population change	
Constant and consistent in gradualism.	Irregular and inconsistent in punctuated equilibrium.

Summary - Gradualism vs Punctuated Equilibrium

Evolution is a complex process that takes place over time and is subjected to many controversies due to the theories expressed by different groups of scientists. Gradualism and Punctuated Equilibrium are two such theories put forward to explain the evolution of a species. Gradualism explains how a species evolve over a long period of time in a gradual manner. Punctuated equilibrium explains the evolution of species in intervals but in a more rapid manner. This is the difference between gradualism and punctuated equilibrium. None of the theories are completely accepted and declared hence extensive research is conducted to confirm the theories.

Reference:

1.Scoville, Heather. “Gradualism vs. Punctuated Equilibrium.” *ThoughtCo*. [Available here](#)

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