

Arts1301 – evidence and methodology in darwin's origin of the species



**ASSIGN
BUSTER**

Critically assess the roles of evidence and methodology in Darwin's argument for natural selection in Chapter 4 of the Origin of Species. Darwin's argument for natural selection in Chapter Four of 'The Origin of Species' is well-founded and convincing, due to the interweaving of both evidence and the methodology, which is of particular importance since this is the constituent upon which he represents his research data (evidence) and forms the basis of his argument.

His theory is distinct from the others in the period, although similar ideas such as transmutation and extinction of species had been circulating while he fashioned his theory (and he does modify and incorporate some of these theories), Darwin's uniqueness is likely a result of his 'deviating', attractive style of writing which provides a detailed, wide-ranging 'complete package' explanation of his theory founded upon common undisputable facts, whereas many previously proposed theories lacked evidence and less prominent arguments or methods of communication, therefore subject to criticism and sparking debate with the public and religious conservatives.

In regards to the methodology Darwin uses, the hypotheses and concepts he forms for his argument are established from observations made by other experts, as well as 'thought experiments' and also his own experiments to test his predictions, justifying his conclusions both through an inductive and deductive method using secondary and primary sources of evidence. Throughout the chapter (Chapter 4: Natural Selection; or survival of the fittest), Darwin mainly relies on the observations of other experts in the field, such examples from the Sexual Selection subchapter, in which the

observations of Sir R. Heron on the female peacock's attraction of male counterparts and M.

Fabre observing certain insects that " have been seen to fight for a particular female, ... (who) then retires with the conqueror" [1] supports his argument/hypothesis (the ' victor' or the best adapted in terms of attracting or fighting through natural selection, is " always allowed to breed" [2] in this particular section, asserting " Thus it is, as I believe, ..., have been mainly caused by sexual selection" [3], demonstrating his inductive methods to back his hypothesis. Furthermore, the evidence he draws from expert sources also support his argument and their status within the scientific community assists in persuading readers. Additionally, the observations which Darwin uses are relatively ordinary and commonplace, for example the aforementioned sexual selection example, to both the amateurs in the field, that is, the general public (E. g. he lower class; farmers and breeders) as well as the respective professionals thus allowing both parties in the audience to understand and encourage his argument further. Note that the ' usual' means of providing evidence was through the Scientific Method, in use 200 years before Darwin, validates the hypothesis by designing a suitable experiment for testing, a deductive approach, so Darwin's slightly aberrant inductive approach was to rationalise the empirical data to fit his argument. The prominence and influence of his inductive methodology are emphasised in his observations while visiting the Galapagos Islands, in particular of a collection of finches " which was in fact a closely related group of distinct species, all similar except for their bills" [4].

On examining the disparate use of the beak and food sources, Darwin asserts that natural selection had shaped “one species has been taken and modified for different ends”[5] and the inductive process in which arrives at his hypothesis is recurrent and persists in many (modern) secondary sources* describing Darwin’s theory. Apart from pure inductive reasoning from the observations of other experts, Darwin also justifies a number of his conclusions utilising deductive methods, a more conformed ‘scientific-method’ approach where hypotheses are tested, somewhat a reverse of inductive methods, consequently resulting in a very thorough examination of his hypotheses which are supported by a ‘cycle’ in which of inductive evidence supporting his postulate which in turn is backed by deductive evidence. As B.

Runnegar advocates, “Natural selection, amazingly was simply developed from fabricated evidence” [8], Darwin does indeed take various accounts of ‘fabricated evidence’, that is, his ‘thought experiments’, in his argument, which display both inductive and deductive reasoning. One instance of this is seen in the observation of insects seeking plant nectar [9]. Darwin through research and observation proposes hypothetically (induction) that plants which excreted the most nectar, would most often be visited by insects transporting the pollen, and most likely cross to give rise to various seedlings thus having the best chance of surviving. He then deductively proceeds to test his hypothesis by examining male and female holly-trees, showing even in unfavourable weather conditions, female flowers rendered highly attractive by bees had been fertilised, before returning to a hypothetical, imaginary case where with different environmental conditions some species of bees

may have adapted to collecting pollen, seen having a “ differently constructed proboscis” [10] from certain types of flowers in the country. The inductive and deductive methods involved in demonstrating the separation of sexes, supports this single “ doctrine of natural selection” [11] through detailed evidence and precise illustrations and explanations. Furthermore, ‘ thought experiments’ analogous to the aforementioned example in the previous paragraph, are influential in his argument as they build upon prior accepted theories and theory loaded facts, allowing a deductive argument from the grounds that the assertions cannot be false, removing doubt and scepticism associated with certain hypotheses.

In the subchapter ‘ Extinction caused by natural selection’ leading onto the next subchapter ‘ The probable effects of the action of natural selection through divergence of character and extinction, on descendants of a common ancestor’, Darwin alludes to the commonly accepted fact that extinction did occur, and provides a meticulous hypothesis on how extinction transpires with the aid of a diagram displaying the divergence of a particular species with each successive generation while in a previous subchapter, he suggests that man’s ‘ artificial’ selection in breeding is comparable to natural selection rhetorically asserting “ No one objects to agriculturists speaking of the potent effects of man’s selection” [12], and supposes in a hypothetical ‘ thought experiment’ that men in different nations bred for swifter and stronger/bulkier horses, thus creating two sub-breeds, and over time horses neither swift nor strong, thus not used for breeding, would tend to disappear. By means of the diagram, he portrays the divergence of a certain species, a horse in this case, over time branching out to multiple descent species (in

the case of horses, swifter/stronger characteristics) meanwhile showing another branch leading to the extinction of the less desired characteristics (slower, smaller horses for example). Hence, Darwin integrates an established theory into his hypothesis, which strengthens his argument into a presumably well founded, structured, persuasive argument since theories or facts with 'prior commitments' will have an implicit authority when the hypothesis is judged.

Darwin's theory of natural selection, like any other theory was subject to criticisms and tests to assess the plausibility of his hypotheses though he addresses, modifies and explains aspects of his hypothesis to produce a firm, comprehensive argument. With regards to the 'Scientific Method', "Howard E. Gruber, in his book 'Darwin on Man', sets out to argue that Darwin by 1838 had already deduced a hypothesis from the observations of previous years - except that his hypothesis was wrong. Thus, Darwin kept following a self-corrective path, tweaking ideas or throwing them out entirely" [13], hence portrays the significance of the methodology where a hypothesis is corrected until deemed satisfactory and corresponds with the evidence.

There are many instances of Darwin addressing criticisms from other experts, (although these are in later editions of his book), one such example where "Mr H. C. Watson thinks I have overrated the importance of divergence of character ... convergence has likely played a part" [14] to which he responds "It would in most cases, be extremely rash to attribute convergence a close and general similarity of structure ... The shape of a crystal is determined solely by the molecular forces, and it is not surprising that dissimilar substances should sometimes assume the same form" using a

deductive example, thus counteracting scepticism from experts in the field, consequently further supporting his various hypotheses in his argument for natural selection.

Additionally, Darwin's ability to account for possible objections to his hypothesis, evident in the 'On the degree to which organisation tends to advance' subchapter in which he conflicts with Lamarck's belief that nature tended to absolute perfection in organic beings, questioning "how is it that ... a multitude of the lowest forms still exist ... Why have not the more highly developed forms ... exterminated the lower?" [15] and postulates that "natural selection ... does not necessarily include progressive development ... takes advantage of variations ... beneficial to each creature" [16], thus his remarks positively alter how the audience would judge and interpret the outcome of the hypothesis by backing his assertions with extensive evidence.

Darwin knew if "he was to avoid the ridicule experienced by the writers of previous evolutionary tracts, he needed to put forward a rigorously tested theory" [17], and the all-encompassing research and evidence together with a range of refined methodological approaches allows the presentation of a well-founded argument that alters the thinking of the public in Darwin's time, due to "Such confidence in his own ideas, use of large numbers of familiar examples, and presentation of theory in opposition to an alternative, made many a convert in his day, and is still as powerful today." [18] References:

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