In Defense of Typical Function

Ariel Bineth[1]

"We live in an age of science, but science has not eliminated fantasies about health; the stigmas of sickness, the moral meanings of medicine continue." [2]

Introduction

In this essay, I am making an extension to Ron Amundson's argument against biological normal function (2000). I notice how Amundson does not entertain possible benefits of biological normal function, although representing the opposite position could give even more coherence to his argument. I attempt to fill this gap and ask *if the concept of biological normal function can be useful*? After making a distinction between the often-conflated concepts of normal function and what I call *typical function*, I argue that *typical function has pragmatic benefits* and support my claim with an example from the history of immunology. I begin my case by an overview of Amundson's argument against normal function which is partially a response to Christopher Boorse's biostatistical theory of health (1977). Amundson states that the concept of biological normal function has no strong biological legitimation, as well as the harms experienced by people with 'abnormal' function are stemming from social prejudice as opposed to biological predisposition. I will summarize both papers to present the premises of my reasoning which establish the absence of discussion on the benefits of biological normal function in Amundson's essay. In the next segment, I engage with the polysemic nature of the concept of normal function following Jiří Vácha (1978). I make a crucial distinction between the statistical and normative implications of normal function. Based on this semantic distinction and Vácha's claim for a less ambiguous word choice, I propose the concept of typical function; describing strictly the statistically frequent characteristic of biological functioning. Therefore, I describe typical function as a reference concept with significant pragmatic advantages. To support my case, I present the example of the fight against poliomyelitis which – I argue – could not have been as successful without using typical function. Considering the large-scale benefits of typical function, especially in public health care, I confirm that the concept of typical function has useful applications.

[1] Department of Sociology and Social Anthropology, CEU

[2] Porter, Roy. "The Greatest Benefit to Mankind: A Medical History of Humanity from Antiquity to the Present." *Harper-Collins*, 1997, pp.710.

Biological Normal Function

Ideas on biological function has long been one of the major conceptual products of the life sciences due to its unique promise of explanatory capability. Ideas on biological function also involve a series of other disciplines, such as the philosophy of biology and medicine, where questions of function are approached in a distinctly theoretical way. This becomes increasingly crucial as an editorial in *Nature* noted that biologists spend little time to explicate their views on function and therefore, often end up using the term with a different definition than their colleagues (2013). While biologists don't elaborate on function, there exists a large body of literature among philosophers. In philosophy the debate on biological function started over a century ago and over that time it produced a diverse set of perspectives, repeatedly stimulated by ongoing technological innovations (Garson 2016). One of these schools of thought in the philosophy of medicine emerged in the 1970's when Christopher Boorse (1977) proposed to understand disease as a matter of biological function. Boorse's theory took a statistical approach to understand distinctions between healthy and unhealthy states. In *Health as a Theoretical Concept*, Boorse argues that health equals the absence of disease, a value-free medical conception consisting of two main elements, namely biological function and statistical normality (1977). Boorse's theoretical framework elaborates the argument the following way:

> 1. The reference class is a natural class of organisms of uniform functional design; specifically, an age group of a sex of a species.
>
> 2. A normal function of a part or process within members of the reference class is a statistically typical contribution by it to their individual survival and reproduction.
>
> 3. A disease is a type of internal state which is either an impairment of normal functional ability, i.e. a reduction of one or more functional abilities below typical efficiency, or a limitation on functional ability caused by environmental agents.
>
> 4. Health is the absence of disease.

There is a large array of objections to Boorse's biostatistical theory of health. While Boorse replied to many of his critics, some objections were left unanswered, among them Ron Amundson's paper *Against Normal Function* (2000). Being the champion of disability rights, Amundson takes a strong stance against the negative implications of the concept of biological normal function and formulates an insightful criticism of Boorse's theory. Amundson offers a two-fold argument. First, he asserts that the concept of normal function has no biological legitimacy, making the distinction between 'normal' and 'abnormal' health states superfluous[3]. Second, Amundson stresses that the detriments 'abnormal' individuals suffer do not originate from the biological properties of the individual, but instead source from the implicit value judgments of the social environment based on acceptable forms of biological variation (33). To bolster his argument, Amundson deploys a series of evidence including insights from Darwinism, genetic variation and developmental plasticity which presents a strong rationale for the unwarranted foundations of biological normal function of human beings. Amundson has good reasons for demolishing the validity of normal function as it creates, as well as historically created circumstances where atypically functioning people were exposed to cruel procedures to

[3] Amundson's argument follows the tradition of David Hull (1986) who famously argued against biological essentialism among the members of the *Homo Sapiens*.

mold them into the frame of what was considered normal. Those who are atypically functioning are perceived to be somehow broken and have only themselves, their biology to blame for any kinds of social disadvantages. While Amundson offers a strong case against normal function, he does not elaborate on the possible benefits of the concept. Treating the advantages of normal function would further increase the coherence of Amundson's argument, therefore I am providing an extension by fulfilling this gap. In this effort, the first step I take is to dissect the concept of normal function.

Typical Function

Jiří Vácha (1978) noted the term 'normality' has been excessively used in the fields of biology and medicine with a double insinuation. The first implication of normality entails a notion about typicality, meaning that considering a set of data one may generate an average or mean which then can serve as a yardstick to determine ranges in variation. Some data points may fall into an interval which can be considered normal or frequent in statistical terms. The second implication of normality entails a notion of normativity, an explicit value judgement of whether something is for example, good and desired or bad and sickening. Normativity augments the concept of normality with a value-laden dimension, a semantic aspect which can heavily influence social decision making. Therefore, when analyzing normal function, we are encountering a polysemic concept with at least two categorically different implications.

Throughout his paper Amundson abstains to explicitly acknowledge the semantic duality of normal function, although he curiously refers to it. For example, he cites and summarizes the essay of Vácha (1978). This leads me to assume that Amundson was clearly aware of this distinction, but then why did he refrain from using it? I can imagine two scenarios of why Amundson avoided the polysemic discussion. First, he might have cited Vácha but did not realize the far-reaching implication of the semantic distinction, therefore ignored it. Second, he was aware of the implications of the semantic distinction, however it would have weakened the main point of his argument, in the sense that it is more impactful to disarm one big concept (i.e. normal function), especially when that concept commands so much traction in academic, medical and even popular discourse. Reflecting on these possibilities and considering the principle of charity, I assume the latter scenario to be true.

While Amundson disarms the concept of normal function, I engage in the defense of what I call *typical function.* I distinguish typical function as a strictly mathematical property referring to statistical frequency in relation to elements of a given data set. The purpose for this was to detach the normative burden annexed to the concept of normal function. The main issue with normal function was that its typical and normative meanings got conflated causing extensive harm to individuals facing stigmatization based on their atypical function. The coinage of typical function follows the advice of Vácha who proposed that the field of biology should abstain from using the word 'normality,' due to its polysemic nature, and instead substitute for unambiguous, clear terms such as "average, frequent or reference" (1978). I consider that by applying the word 'typical' as a designation of the occurrence of statistical frequency the normative burden of 'normal' can be at least reduced. Furthermore, I propose utmost precaution in using the notion of typical function narrowly, only as a reference concept. A reference concept is a constructed ideal-type which represents a cluster of properties based on the average of all cases. Typical function, as a reference concept, is partially fictitious in that there does not exist a

person with absolutely average physical or psychological characteristics. Although, typical function is partially real in that the concept was constructed based on the aggregation of real-life examples. Nevertheless, being a reference concept, typical function must be treated in practice as ultimately a fictive construction, therefore safeguarding that it does not become a source of prejudice. With that being said, reference concepts have a great pragmatic potential which I will support with an example from the history of immunology.

Usefulness of Typical Function

In my understanding a reference concepts and thus, typical function, is an intellectual milestone which offers the capability for the observer to measure her observations against it. For example, knowing that the average person does not continuously sneeze, this being typical function, allows an observer to gage a person as atypical who continually sneezes. Reference concepts are extremely useful since they allow generalization. Imagine that our observer notices that a person started to sneeze often then after a few days of sneezing the person passed away. The same observation occurs for one hundred times and our observer concludes that the atypical function of sneezing is a precursor of approaching death. Good generalizations allow knowledge to be used universally, therefore the next time our observer sees a sneezing person she can predict the person will die soon with a relatively high level of confidence. Now, imagine a sneezing person's wish was to eat some of the observer's vegetable soup. Our observer being generous and also, aware of the imminent death of the sneezer, gives some of her soup. The moment the sneezer swallows the soup she stops sneezing and appears to miraculously return to her typical function of not sneezing. Our observer being a good logician figures that the soup cures the sneeze and thus, prevents death. Armed with knowledge she opens a soup station where she disseminates soup from massive bowls to masses of sneezers who, as expected, return to good health. In this thought experiment the ability to generalize using typical function yielded three distinct benefits. First, it allowed our observer to distinguish the atypical function of sneezing from the typical function of non-sneezing. Second, it allowed our observer to make a prediction that a person who starts to sneeze will soon die. Third, it allowed our observer to prevent unnecessary deaths by discovering that soup cures the sneeze. Real-life health care employs typical function similarly to my thought experiment.

As an example, let's take the case of poliomyelitis, the disease simply known as polio. Polio is an infectious illness contracted through the poliovirus affecting both children and adults, however children under 5 are most likely to contract the virus. Usually it produces no symptoms at all, sometimes it creates mild flu-like symptoms, however in about 1% of the cases it attacks the nervous system and leads to the loss of reflexes, severe muscle pain, limb deformation and paralysis (WHO 2019). This occurrence is known as paralytic polio and it made polio one of the most feared diseases in the first half of the 20th century. Paralytic polio has an estimated mortality rate of 2-5% among children and 15-25% among adults (paralysis of breathing muscles), yet even those who survive polio have 25-50% chance of developing signs of post-polio syndrome where the survivor experiences muscle atrophy, joint weakness and trouble with breathing. The WHO reported 33 cases of polio disease in 2018 which is down from 350,000 instances in 1988, the year when the organization set out the goal to completely eradicate the disease (2019). While polio still makes a few occurrences, it is considered eradicated in Europe, North America and Southeast Asia. The main tool in the fight against polio

is an immunizing vaccination first developed by Jonas Salk in the 1950's. Today the Salk vaccine (IPV) is a mandatory element of childhood immunization and it allowed for nearly complete suppression of the detrimental virus, and this would have been impossible without an existing body of knowledge on typical function.

The stages illustrated in the thought experiment, also apply to the real-life example of poliomyelitis. For example, the poliovirus was first identified by the Austrian immunologist Karl Landsteiner in 1908 which allowed for a biological explanation of the harmful, atypical state. Furthermore, the mass field experiment involving 1.8 million children developing the Salk vaccination would have been impossible without knowledge of typical function, since the experiment was based on observing the occasions of developing atypical biological function after having the active-agent or the placebo administered. If there was no reference concept of typical biological function the researchers could not have been able to interpret physiological symptoms as the indicators of a potentially deadly illness. Of course, polio is just one example among other successes of immunology, such as the eradication of smallpox in 1977 which formerly killed 35% of infected people leaving others scarred or even blind. Nevertheless, cases from immunology prove that having a concept of typical function is necessary to prevent often deadly epidemics, especially considering the high population density of urban settlements which are particularly exposed to viral propagation. Therefore, the concept of typical function lies at the foundation of a public health care infrastructure which has the capacity to sustain large, densely saturated populations.

Conclusion

I began this essay by calling for an extension to Ron Amundson's argument against biological normal function, since it did not entertain the possible benefits of the, otherwise, controversial concept. Given this, I endeavored to make a defense of biological normal function. During my research process I realized – what Vácha also indicated – that normal function has two different, often confused implications: a statistical and a normative. Based on this crucial distinction, I formulated the concept of *typical function* which, contrary to normal function, aims to indicate only the statistically frequent characteristics of biological function. Subsequently, I made a defense of typical function by appealing to its pragmatic benefit. By presenting the concept of typical function as a reference concept, I pointed towards its merit of generalizability, as well as indicating its fictive nature. I brought the case of eradicating poliomyelitis as a real-life example of the benefit of typical function. By showing the benefit of typical function, I strove to extend Amundson's case against normal function. While, Amundson argued for eliminating the normative portion of normal function, I argued to keep the statistical one; both perspectives warrant for a clear-cut separation of normative and statistical implications when describing biological function. Although I made my case, I am aware that we do not live in an ideal world.

One of the most plausible objections against my defense of typical function is the likelihood that regardless of the less ambiguous word choice, the concept of typical function will end up gaining a normative connotation in everyday use (i.e. typical is good) which in turn continue to sustain social prejudice against people with atypical function. Supposing this is the case leaves two possibilities. First, there can be a proposal for an even less ambiguous term than

'typical function' to name the concept. Second, the concept of typical function should be eliminated altogether. Given the possibly indispensable benefits of typical function in public health care, I refrain from the second option. Regarding the first, I encourage anyone to come up with an even less ambiguous term than 'typical function.' Personally, I settled on the word because it is already familiar to medical practitioners and it considerably reduces the normative burden compared to 'normal function.' More importantly, I suggest that health care institutions adopt standard operating procedures advocating greater precaution when using the concept, especially with patients or in public discourse.

References

Amundson, Ron. "Against Normal Function." *SHPSC Studies in History and Philosophy of Biol & Biomed Sci*, vol. 31, no. 1, 2000, pp. 33–53.

Boorse, Christopher. "Health as a Theoretical Concept." *Philosophy of Science*, vol. 44, no. 4, Dec. 1977, pp. 542–73. *journals.uchicago.edu (Atypon)*, doi:10.1086/288768.

Garson, Justin. "A Critical Overview of Biological Functions." *Springer EBooks*, 2016. *sierra.ceu.edu Library Catalog*, http://dx.doi.org/10.1007/978-3-319-32020-5.

Hull, David L. "On human nature." *PSA: Proceedings of the biennial meeting of the philosophy of science association*. Vol. 1986. No. 2. Philosophy of Science Association, 1986.

Nature. "Form and Function." *Nature News*, Nature Publishing Group, 22 July 2019, https://www.nature.com/news/form-and-function-1.12580.

Vácha, Jiří. "Biology and the Problem of Normality." *Scientia*, vol. 72, no. 13, 1978, pp. 823.

WHO. "Poliomyelitis (Polio)." World Health Organization, World Health Organization, 22 July 2019, https://www.who.int/topics/poliomyelitis/en/.