

**Do you agree that it is "astonishing that so little knowledge can give us so much power" (Bertrand Russell)? Discuss with reference to the natural sciences and one other area of knowledge.**

Bertrand Russell's argument that little knowledge is already able to give much power can be examined in both the areas of natural sciences and human sciences. In natural sciences, in the field of medicine in particular, it may be argued that little knowledge can provide much power in curing patients; however, it may also be argued that only much knowledge can give much power, considering the knowledge both used and produced in the process of medicinal drug production. In the human sciences, in the field of politics in particular, it may be argued that little knowledge can yield much power through research inspiring political change; conversely, it may also be argued that much knowledge can still only result in little power, considering the unpredictability inherent in politics.

In the natural sciences, particularly in the field of medicine, it may be argued that limited knowledge can give so much power. Knowledge here can be defined as scientists knowing the specific causal mechanisms of the disease, and power can be defined as the ability to help improve people's lives. An example of this is chlorpromazine, medication often used in treatment of schizophrenia (National Center for Biotechnology Information). The knowledge of the scientific community on the psychiatric condition of schizophrenia is surprisingly limited and can thus be defined as "little knowledge". There are multiple theories for the cause of schizophrenia such as the dopamine hypothesis, the NMDAR hypofunction hypothesis and the GABA-glutamate hypothesis, all of which are well-supported and plausible; however, the root cause of schizophrenia is still not known conclusively ("Schizophrenia."). Despite this limited knowledge, just knowing that chlorpromazine medication for some reason works gives medical professionals power to greatly improve the quality of life for their patients, which is much power as according to the above definition of power. Through this example, it can be seen how limited knowledge can give so much power. The knowledge scientists have on the specific causal mechanisms of schizophrenia is limited; and yet the power to help people is vast, with 24 million people afflicted by schizophrenia worldwide potentially having a higher quality of life with treatment ("Schizophrenia"). Thus, this example

illustrates how so little knowledge can provide so much power in the field of medicine, as even limited knowledge can be used to effectively treat many patients and improve their quality of life.

However, it can be argued that in natural sciences, much knowledge is still required for much power. This can be seen in medicinal drug creation. Knowledge here can be defined as scientific knowledge about a drug — the knowledge produced during drug testing and the knowledge required for drug-testing techniques — and power again may be defined as the ability to help improve lives. An example where this can be seen is in GEMM mice, which are genetically engineered to have higher susceptibility to cancer, and are used to study cancer drugs (Kersten et al.). The process of drug development is long, with preclinical phases, where researchers must demonstrate the validity of the drug, followed by 4 clinical stages (Lo and Field). Animal testing is done in the pre-clinical phase; if the results of this are not conducive to approval of the drug, the pharmaceutical company cannot move forward with drug development. This arduous 15-year-long process, done using many GEMM mice annually, produces much knowledge about the drug such as side effects and safety, before the drug is approved to be used (Lo and Field); the importance of the relationship between knowledge and power can be seen here, as less knowledge may result in unsafe drugs consumed by patients. Not only does the process produce much knowledge, it also requires much knowledge. This is evident in the preclinical phase with animal testing (Lo and Field); animal testing in particular requires much knowledge, as is demonstrated by GEMM mice. Genetically altering mice requires gene altering technology, alongside detailed knowledge of what genes promote the development of tumors. Therefore, through this example it can be argued that much knowledge is required for much power. It may be argued that this example can be used to disprove the argument of the first example; whilst usage of chlorpromazine medication arguably shows how little knowledge can still provide much power, the very development and production of chlorpromazine as a drug produced much knowledge.

Aside from the natural sciences, the field of human sciences can also be examined in debating this question; more specifically, the field of politics. In politics, it may be argued that little knowledge can give much power to human scientists. In this case, knowledge would be defined as information drawn upon during research on socio-political phenomena, with power being defined as the ability to make political

change. An example of how little knowledge can give much power is that of Erica Chenoweth's research into non-violent resistance in the book "Why Civil Resistance Works", which examined instances of civil resistance from 1900 to 2006 (Chenoweth). This can be classified as "little knowledge"; even though it spans 106 years, it is still arguably limited and only a small snapshot of political history when considering how long human history is, corresponding with how long civil resistance has existed for. From examining these campaigns, Chenoweth concluded that non-violent civil disobedience has twice the success rate of violent resistance, with no campaigns failing after achieving the support of 3.5% of the population. ("The success" 00:03:50). This knowledge of nonviolent campaigns being of greater benefit than violent ones would greatly benefit those seeking to create change in a state, both political scientists and activists, granting them more ability to create political change. This is especially evident with how it only takes 3.5% of the population to create change; this is a shockingly small critical mass, and this fact can inspire and motivate people into trying to create change via nonviolent protest. Through this example, it can be seen how limited knowledge can give so much power, with knowledge being defined as research on socio-political phenomena, and power being defined as the ability to create political change. The knowledge Chenoweth and associates drew on to make their conclusions is limited; and yet the power to create political change is vast, as it inspires activists worldwide, showing the importance of the relationship between knowledge and power in inspiring political change. Thus, this example may be used as an example of how so little knowledge can provide so much power.

However it may also be argued that regardless of the amount of knowledge one has in politics, one is still unable to effect any political change; that even a vast amount of knowledge only provides little power. This may be true when defining knowledge as political theories, and can be seen in the example of the theories of realism and liberalism. Both these theories can be defined as "much knowledge"; they are two of the predominant theories in international relations, with professors such as Mearsheimer spending their entire academic career studying a facet of these theories. However, knowledge of these theories does not give power — defined here as the ability to effect political change. This can be seen when using the two lenses to argue why states should undertake acts of humanitarian intervention; realists would assert that states should only intervene for national interests, whilst liberalists would argue that intervention should be

motivated by human rights. However, regardless of the lens used to understand it, the state's behavior in deciding whether to undertake humanitarian intervention remains unchanged. Thus, it may be seen how much knowledge can still result in only little power, when power is defined as the ability to make political change. The theories can only assist with understanding the behaviors of states; they do not result in power as defined by political change. This is true not only for when knowledge is defined as theories in politics, but also for other definitions of knowledge such as research reports like Chenoweth's publications. A research report on child labour in the Democratic Republic of the Congo was previously published by Amnesty International, containing suggestions for the government and companies in reducing child labour (*"This Is What"*). However, the suggestions were ignored, leading to no difference in the prevalence of child labour (Amnesty International). It may be concluded that in the human sciences, regardless of the amount of knowledge, it can still be irrelevant for generating power for political change in society. The previous example showing how little knowledge can give much power may also be refuted; though Chenoweth's research may perhaps inspire activists, there is no guarantee of success in making political change. 3.5% of a population is still a significant number of people; and oftentimes movements fail to stay fully nonviolent, due to dissatisfaction with state repression. As can be seen in all these examples, it may be difficult for knowledge, no matter how much, to translate into power— defined as the ability to create political change—in the field of politics. Each circumstance is too variable, with too many moving parts and large groups such as states. This leads to knowledge not being able to directly equate into power, thus disputing the claim that little knowledge yields much power.

In conclusion, the claim that little knowledge gives much power does not hold true in both the areas of human and natural sciences, more specifically in the fields of politics and medicine. In the field of natural sciences that is medicine, this is due to the knowledge both required for and produced during the process of drug manufacturing, which in turn is necessary for having much power. In the field of human sciences, particularly politics, little knowledge is unable to equate to much power due to the variability and unpredictability of political circumstances and situations.

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