Historicism and its Monsters
Inauguaral addres by Marcel Boumans

"Doe normaal of ga weg"

Or in plain English: "Act normal or go away"

This call was the core message of a letter from the Dutch Prime Minister Mark Rutte, published in the two largest Dutch morning newspapers on January 2017.[1]

The problem is that to act upon this call one has to know what normal is. In the letter it was only indicated what normal is by mentioning a few examples of social interaction, like "that you shake hands," and emphasizing that these kinds of behaviour were typical Dutch. In social science, to find out what Dutch normality is, one usually investigate this by statistical means.

The chair I am officially assuming by this inaugural lecture is History of Economics, which I consider a subfield of History of Science. Today, I hope to demonstrate the relevance of history of science to understanding modern social science and the influence of social science on the political debate, by the analysis of Mark Rutte's call from a history of science perspective. I will show that this call for normality, or actually any call for normality, contradicts the Utrecht University's core values of "open minds, open attitudes and open science."[2]

This analysis consists of three parts. The first part will be the historical analysis of the term "normal," which finds its roots in the history of statistics. In statistics, the normal is defined as the center of the normal or Gaussian distribution. Therefore, to determine what is normal in the Netherlands, social scientists have to find the statistical averages of various kinds of Dutch social behaviour.

The second part of my lecture will be a clarification of how a term that refers to a statistical average has become a representation of national identity and attitude. And the last part will show the consequence of this naturalisation: why not doing normal means that one has to go away, that is to say, to leave The Netherlands.

Part 1: How do we determine in social science what is normal?

We are living in the age of Big Data and Machine Learning, a time which is characterised by a strong belief in the possibilities of gaining objective facts about social groups due to the availability of almost unlimited numbers of data and unsupervised statistical inference, where unsupervised suggests that the "machine," that is to say, the algorithm, can handle it on its own, without the need of human interaction.

Therefore, to understand how the normal is determined, we first have to look closer into what machine learning entails. Machine learning is the modern term for what formerly was called

[1] This letter is posted on the website of the VVD: https://vvd.nl/content/uploads/2017/01/briefvanmark.pdf. Last accessed on 15 October, 2021.
[2] https://www.uu.nl/en/organisation/about-us/who-we-are. Last accessed on 8 November, 2021.

statistical inference or statistical induction. The problem of induction is how we gain general facts about, for example, a social group, based on a particular data set about that group. These general facts about that group are supposed to tell us more than just a summary of this data set. The main question then is: Does a statistical average tell us only something about this data set or does it tell us something more general about that particular social group?

The first scholar who emphasized that induction is more than only a summary of the data, is the British 19th century scientist William Whewell.[3] According to Whewell, the salient point in every induction on the basis of data is the invention of a new concept that ties the data together, that "colligates" them. Whewell used the term "colligation" for the binding of a number of loose data by a general notion or hypothesis. As examples of the kind of methods for the construction of such a colligation, he mentioned the Method of Means and the Method of Least Squares.

This idea, that induction is more than a summary of observations, was also discussed in detail by John Maynard Keynes in his *Treatise on Probability*, published in 1921.[4] Keynes made a distinction between the descriptive function of statistics, which involves ways of representing and summarizing large amounts of data, and the inductive function, which seeks to extend the descriptions of observed events to other events that have not been observed.[5] This second function of statistics thus implicitly claims that induction is more than only summarizing data. Crossing the line from description of a sample to inference about things beyond the sample necessarily involves making assumptions about the relationship between the sample data and the phenomenon outside the sample.

According to Keynes, induction relied on what he called the method of analogy. The characteristics shared by a set of observations constitute a *positive analogy* of the set, while differences in characteristics across the observations constitute a *negative analogy*. Keynes argued that it was through careful consideration of the positive and negative analogy in sets of observations, in what is shared and what is different, that one refines inductive generalizations. Before one can arrive at an inference, one need to ascertain the commonalities in the data that creates a positive analogy. Exemplary for such an analogy is the assumption that nature is "uniform." Nature is assumed to be uniform when differences of position in time and space can be treated as irrelevant. Keynes called this assumption "the principle of uniformity."

This principle of uniformity was an important argument in Keynes's critique on Jan Tinbergen's method of regression analysis. In the 1930s, the Dutch economist Tinbergen had introduced this method to economics to analyse time series in order to find the causal relationships underlying the business cycle. The time series were all kinds of economic observations across a period from 1919 to 1939, a period of enormous economic turbulence, a period that hardly could be called uniform in time. This critique by Keynes and Tinbergen's response to it, came to be known as the Keynes-Tinbergen Debate. Keynes's main concern was the applicability of regression analysis to economic data, which were known to be non-constant through time.[6] In his view, regression analysis was only applicable to data about a system that is uniform through time.[7]

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[3] Whewell 1858.
[4] Keynes 1973a.
[5] Keynes 1973a, p. 359.
[6] Keynes 1973b, p. 286.
[7] Keynes 1973b, p. 286.

To briefly summarize the issue raised by Whewell and Keynes: A statistical average is only more than a summary of a specific data set and gives a characterization of a social group if the individual members of that group have something in common.

Part 2: The naturalization of the normal

Regression analysis is the statistical method of estimating relations between variables. These statistical relations are called correlations. The main problem of regression analysis is to decide whether a correlation is spurious, that is whether the connection between the variables is coincidental, or whether the correlation represents a real relationship. In other words, the problem is whether a correlation only summarizes the characteristics of the data sets of the variables, or that it represents something more general, more structural, about the relationship between these variables.

This problem of commonality was not an issue in the field where this kind of statistical analysis, regression analysis, originally came from. Regression analysis originates from biology. The historian of science Judy Klein has argued that commonality was a given in the early biometric studies.[8] In these studies,

1. the correlation was between the same organ of different generations or different organs of the same organism. Thus the variables were measured in comparable units and although they were samples drawn from different populations, they were organically related. Or in these studies
2. the observations for each variable were taken from a cross-section of the population at one point of time. Although the goal was to study evolution, the observations comprised a sample from a single population. And
3. The observations for each variable usually displayed a "normal," bell-curve frequency distribution.

Klein showed that when this method of statistical inference came also to be used in social science, correlation analysis begged the question of which of the several components of the social and economic statistics were to be correlated. Keynes had indicated that these components should be uniform.

One of the founders of modern statistics, the 19th century British scientist Francis Galton also emphasized this uniformity as a requirement for statistical inference. But according to him, the condition of uniformity was met when the data cluster into a bell-curve. And he emphasized that if the data would not show such a bell-curve, the average is monstrous and meaningless.[9]

In answering the question, "What do the members of a social group have in common, what is what they share?," Galton, implied that these members belong to the same *natural class*, they are of the same *type*; the common characteristics are *typical* of the natural class to which they belong. That is to say, if these characteristics do not cluster to a bell-shaped curve, they are not "typical;" but if they do, the "normal" represents the ideal type of that natural class.

[8] Klein 1997, p. 224.
[9] Galton 1879, pp. 160–61.

To Galton, it was not problematic to apply the methods of biometrics to study social groups, because he was convinced that certain social groups were natural classes, that is he assumed that the members of these social groups have biological or physiological characteristics in common. The groups he studied with this presumption were Jews, criminals and patients suffering from tuberculosis. Galton's statistical work was motivated by eugenic concerns, in which some types were understood as superior to others. The term eugenics was coined by Galton, which he defined as "the science which deals with all influences that improve the inborn qualities of a race; also with those that develop them to the utmost advantage."[10] Eugenics aimed to improve the genetic quality of a human population, by excluding people and groups judged to be inferior or promoting those judged to be superior.

This idea that clustering around the normal in a bell-shape provides information about a natural class was based on Quetelet's concept of "*l'homme moyen*," "the average man," which was considered to represent true human nature.

To, the Belgian astronomer Adolphe Quetelet, statistical regularities were signs of a deeper social reality, and the average man was representative of it. The average man had, according to him, more reality than the diverse range of actual individuals who populated a town or a country. As such, the average inhabitant of Brussels represents the typical *Brusselaar*, and the average inhabitant of Belgium represents the typical *Belg*.

According to these early statisticians, a statistical average of a specific characteristic of a social group is only meaningful if this characteristic of the individual members of that group cluster around that average, and this clustering shows a bell-shape. The appearance of a bell-shape distribution, the normal distribution as it is usually called, shows that this characteristic is a "natural" characteristic and that the average represents its type. This means that whenever it is assumed that the normal distribution represents a data set – which is often implicitly done to legitimize regression analysis – this assumption has ontological consequences: it not only uniforms the social group, but even turns the social group into a natural class, that is to say naturalizes it.

The more commonly known meaning of naturalization is its legal meaning, namely the act of giving someone a nationality. It is however relevant to know that one of the conditions for acquiring the Dutch nationality is the civic integration exam, which includes a basic understanding of the Dutch language, culture, such as Sinterklaas, and customs, such as shaking hands.[11] I assume that this is the context, the act-normal-or-go-away letter was referring to.

This tendency in social science, or more particularly in social statistics, to see social groups as natural classes, was, according to the 20th century philosopher Karl Popper, a combination of two trends, which he called "holism" and "essentialism". According to holism, a social group is more than only the sum total of its members, and it is also more than only the sum total of the personal relationships holding between its members.[12]

The second trend, closely related to holism, is "essentialism." An essentialist approach works as follows: We first collect a group of single individuals and then give it a label, for example "Dutch," and then we say that we call each single individual "Dutch" on account of a certain

[10] Galton 1904, p. 1.
[11] https://ind.nl/en/dutch-citizenship/Pages/Naturalisation.aspx#Conditions. Last accessed on 26 October, 2021.
[12] Popper 1944, p. 91.

assumed intrinsic property that they are believed to have in common: that is to say, their "Dutch-ness." This intrinsic property denoted by the universal term "Dutch-ness" is thereupon regarded as something which deserves investigation. This goes often along with the assertion that these universal terms represent real existing objects, for instance, that Dutch-ness really exists over and above single individuals. And moreover, such an universal object, such as Dutch-ness is seen as the "essence" of the members of that particular group.

Popper criticised mainly a specific combination of holism and essentialism, which he called Historicism, because of the particular function of history in it. In Historicism, the historical method is seen as most adequate for the analysis of the nature of social groups. Historicism considers a social group to have a history of its own, and hence the nature of the Dutch is considered to depend to a great extent on this history. A group is supposed to keep its original nature even if all of its original members have died and are replaced by new ones. All groups have their own traditions, for example Sinterklaas, their own institutions, the polder, and their own rituals, shaking hands. Historicism claims that we must study the history of a group, its traditions and institutions, if we wish to understand its essence.[13]

Popper's critique on historicism was developed and incorporated in his impressive defence of liberal democracy, *The Open Society and Its Enemies*. According to Popper, the "enemies" of the "open society" are the philosophies of Plato and Hegel which are based on the idea that a State has an "essence." According to these essentialist philosophies, everyone who is considered to impair this essence should be considered as a dangerous enemy of the state, and can therefore be legally expelled or destroyed.

The reason that I have taken historicism as core theme of my inaugural is that we currently are facing a comeback of historicism in current political and societal debates on national identity by grounding this identity in what is called a national "canon" or "tradition." How strongly one's identity is interwoven with these national traditions, even though they are sometimes of a surprisingly recent date, is shown by the sometimes violent defence of these traditions. In the same way that historicism creates its enemies, the call for normality creates monsters which one subsequently wish to expel, as expressed in the second part of Rutte's call: "go away."

Part 3: Here be Monsters

Popper's discussion of historicism was meant as a criticism of certain trends in social science in his time. But, in my view, it is today equally relevant to discuss current trends in statistics, in particular those which are related to the applications of machine learning with the aim of "pattern recognition," or "profiling," as pattern recognition is called in some of its applications. The main issue I would like to focus on in this part is that these modern forms of historicism creates "monsters."

While the statistical average was considered to represent the "true type" of a category, the subsequent question is then what the deviations from the average represent. Quetelet had always idealized the average as the point of virtue lying between vicious extremes.[14] For example, he had discussed the average man as the type of a nation, the Belgian, in comparison to whom all real individuals are flawed. Similar to the theory of error in astronomy, the

[13] Popper 1944, p. 91.
[14] Gigerenzer e.a. 1989, p. 53.

average man was like the true position of a star (where error is zero), and the deviations of that average are caused by errors. Real individuals are imperfect copies of the virtuous golden mean. To categorize the deviations from the average, he introduced "limits."[15] These limits were fixed distances from the average to define the non-ordinary categories. In terms of the "height of man" he defined distances to the average with which he established the following categories: the middle group around the average was labeled as "the ordinary size." At both sides of this category are the categories, which he called, "large men" and "small men." Beyond the limits of these groups one then finds "giants" and "dwarfs," and beyond the most distant limits at both sides there are "monstrosities."

Popper did not address the idea of monsters in his account of historicism, but the term played a conspicuous role in a discussion of developments in mathematics by the philosopher of science Imre Lakatos.[16] Popper and Lakatos, having a common philosophical and historical view on science, shared their aversion to essentialism. In mathematics, essentialism takes the shape of Platonism. One of the core ideas of Platonism is that mathematical concepts are perfectly real and exist independently of us.[17] Hence, Platonists see the development of mathematics as a process of discovering an already existing objective mathematical world.

In the Platonic world there is no place for monsters, they are seen as threats against "harmony and order." They are considered to be "pathological cases," which lead to feelings of "disgust," because they propagate "anarchy and chaos."[18] According to the dominant Platonic view, "monstrosities never foster growth, either in the world of nature or in the world of thought." According to the Platonic view, evolution always follows an harmonious and orderly pattern.[19]

The French mathematician Henri Poincaré was probably the first in using the concept of monsters to discuss the foundational crisis in mathematics at the end of the 19th century. These monsters were mathematical objects that clashed with the existing mathematical theory. According to Poincaré they were "dishonest" and "bizarre."[20] He compared them with objects of a "musée tératologique," a teratologic museum. Since the late eighteenth century, anatomists began to assemble collections of malformed human and animal foetuses. Poincaré's father was a professor of medicine, so we can assume that he had first-hand experience of such collections. But it is also relevant to know that the term "teratology" was coined by Poincaré's grandfather-in-law, the naturalist Isidore Geoffroy Saint-Hilaire to describe the study of congenital malformations.[21]

In opposition to the Platonist view, Lakatos described the development of a mathematical theory not in terms of discovering a harmonic Platonic world and the banning of monsters. He saw the history of mathematics as a process of "problem-solving," "concept-stretching," and the adoption of monsters; the mathematical development is not one of discovery but of construction. Lakatos, in his history of mathematics, showed that beside the Platonic strategies of banning monsters, also nominalist strategies such as concept-stretching can be distinguished. In opposition to essentialism, Popper had advocated nominalism.

[15] Quetelet 1849, p. 102.
[16] Lakatos 1976.
[17] Brown 1999, p. 11.
[18] Lakatos 1976, p. 19.
[19] Lakatos 1976, p. 21.
[20] Poincaré 1913, p. 435.
[21] Aberdein 2019, p. 394.

An essentialist asks questions like: "what is?," for example "what is the nature of?" A nominalist, on the other hand, puts questions in terms of "how." The task of science, according to the nominalists Popper and Lakatos, is to describe the behaviour of phenomena and not to ask what the nature is of them; and this should be done by freely introducing new terms wherever necessary, and by re-defining old terms wherever convenient. Therefore, Lakatos proposed concept-stretching instead of monster-barring as a more fruitful strategy in mathematics.

In the same way that any mathematical system creates its malforms, that is forms that do not fit in, any other scientific ordering or categorisation will create misfits. The relevant question is how to treat them? Do we look upon a monster as something disgusting, or even dangerous, or as something hopeful, opening new avenues, leading to new discoveries, as Lakatos was suggesting? The answer to this question cannot be separated from the view whether the existing order is considered to be essential, or even divine, or just one that has emerged culturally. A prominent advocate of this latter view is the anthropologist Mary Douglas. According to her view, "anomalies are not installed in nature but emerge from particular features of classificatory schemes."[22] In her book with the telling title *Purity and Danger*, Douglas discusses cases in which people are treated as "dirt."[23]

Douglas shows that dirt is essentially disorder and cleaning and cleansing is re-ordering our environment. But, according to Douglas: "There is no such thing as absolute dirt: it exists in the eye of the beholder."[24] Dirt is the by-product of a systematic ordering and classification of matter, in so far as ordering involves rejecting inappropriate elements."[25] Cleaning is the reaction which condemns any object or idea likely to confuse or contradict cherished classifications; cleaning is supposed to reduce this dissonance.[26]

By the comparison of disorder with dirt, Douglas is able to clarify why and when disorder is considered dangerous: Dirt is seen as dangerous if it consists of pieces and bits that have some remaining identity: when some of these bits reveal where they came from, hair or food or wrappings. When dirt has this half-identity it is seen as most dangerous. Only when after a process of pulverizing, dissolving and rotting, all identity is gone, dirt is not considered dangerous anymore – just think of the manure you use in your garden as fertilizer. But, it is unpleasant to poke about in the rubbish to try to recover anything, for this revives identity. So long as identity is absent, rubbish is not dangerous.[27]

Although Douglas does not use the term monster in her anthropology of dirt, if one looks at the meanings attached to the term monster, the definitions of monster are similar to Douglas's descriptions of dirt when it is seen as most dangerous. The Oxford English Dictionary lemma to monster includes descriptors like misshapen, malformed, and compounded of incongruous elements. The comparison between monsters and dirt gives insight in why being not normal makes that people want you to go away. Monsters resist – like dirt – an existing order, and are therefore considered to be a dangerous threat. But in particular when they composed of different components, when they have two or more identities, they are conceived to be most

[22] Douglas 1996, p. 126.
[23] Douglas 2002.
[24] Douglas 2002, p. 2.
[25] Douglas 2002, p. 44.
[26] Douglas 2002, p. 340.
[27] Douglas 2002, pp. 197-8.

dangerous. To see this, I only have to refer to the issue that has become to be known in The Netherlands as the "toeslagenaffaire," in which the people with two national identities were most mistrusted.

The most iconic, but fictional, monster created by science is the creature of Frankenstein. In her famous book *Frankenstein*, Mary Shelley shows that it is not the nature of this creature that makes him a monster, but because of his "miserable deformity."[28] Despite the fact that his nature shows all the features of Victorian virtues: he is gentle, curious, and refined, only because of his half-identity as human being he is considered to be a monster, that is he is seen as cruel and dangerous. Only after being treated for many many years as a dangerous monster, he started to behave as such.

Modern techniques of statistical induction, with names such as machine learning, can be the modern Frankensteins, when the resulting profiles claim to say something what is typical or natural of a social group. Any order implies the existence of misfits, but as soon as these orderings are seen as natural, these misfits are seen as dangerous.

The determination of normality implies an assessment of its deviations. An interest in the meaning of deviations from the normal – called variation – was crucial to the development of mathematical statistics in Britain, which is where modern statistics was founded. This part of the history of statistics cannot be separated from the rise of eugenics. The founders of modern statistics, Francis Galton, Karl Pearson and Ronald Fisher were deeply committed to eugenic control of human evolution. These shared roots of modern statistics and eugenics is well-known among historians of science, and being explored in several excellent works in the history of statistics. From Galton's time to our days of machine learning, clustering of data is still conceived that we have "hit" at some true natural characteristics of the social group we are investigating. This is essentialism in statistics. We assume that the statistically determined characteristics are "natural," "typical," or "generic," and thus reveal a real essence. The higher the degree of clustering, the stronger is this faith.

Monsters are items that appear at some distance from the central cluster. If there are only a very few of them, they are harmless: they are the seen as "outliers" which can be ignored, they are not assumed to share identity with the normal. But if the number of them is big, they are seen as threats against order, which is the order determined by the central cluster, the normal. Any shared identity with the normal, even though only partly, makes them dangerous.

Instead of banning the abnormal, considering monsters as dangerous, I appeal to be open to monsters and welcome them, they are the possibilities for growth and development. This welcoming of monsters is what open science is.

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[28] Shelley 2018.

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