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This study is an attempt to reveal the historical roots of the idealized image of the scientist, and its functions for the scientific community. The analysis is based on historical excursions into important periods of the development of science. The evidence reveals the specific ways and means of the idealization of the image of the scientist, the importance of this ideal for the social recognition of science, and the establishment and functioning of the scientific community. The image is also revealed by empirical data, i.e. content analysis of essays written by a sample of Bulgarian high-school students. The students' shared representation comprises idealized elements. The historical analysis and the empirical data show that the idealized image of the scientist has become a means for recruitment to the scientific community and for regulating its relations with other social communities.

Introduction

Many leading sociologists of science have pointed out that the scientist is portrayed by society as an almost mythological figure. He is viewed as 'the paragon of reason and objectivity, an impartial genius whose visions and insights are matched only by his quiet humility'. Such provocative statements drew our interest to the social representation of the scientist. However, investigating the image of the scientist is not merely an act of pure curiosity: it is important both for understanding scientific activity and for the public understanding of science. Society's image of a given activity and of its actors to a great extent determines the probability of the very existence of the activity: its recruitment, its degree of relative autonomy, and the recognition and application of its results. With these considerations in mind and with a 'detached' scientific interest we investigated the image of the scientist among high-school students, a major source for the recruitment of scientists.

The theoretical framework of our investigation is the concept of social representations. Social representations have been described as a specific means for perceiving the world, as a cognitive schemata with their own logic and language. They can be analysed both on an individual level and on the level of the social community. A representation is social only when it is shared, i.e. only when there is a consensus in the community with respect to its elements.

People can have social representations about objects, phenomena, events, individuals and groups. Regarding individuals and groups, this theoretical vision approaches the other distinctively European trend of investigation in social psychology: social stereotypes, defined in turn as 'sets of fixed ideas and beliefs held by members of one
or more groups about members of another group. The distinctive element in this interpretation is the accent on the collective, shared nature of the stereotype. Thus the social stereotype can be viewed as not entirely dissimilar from the social representation. Indeed, there have recently been attempts to integrate the two concepts. Such an approach would be appropriate for the study of the image of the scientist, as far as it can be analysed, not only with regard to its social determination but also within the framework of the inherent cognitive development of science itself. In this respect the image of the scientist could be studied from the point of view of the shared ideal of scientificity in different historical periods. In this paper, however, we stress mainly the social determination of the image of the scientist, and its functions and deliberate promotion.

In studying the functions of the image of the scientist we build on the typology of the functions of social representations and social stereotypes. These functions have been distinguished for both inter-group relations and individual cognitive organization. We focus our attention on the functions of social stereotypes and social representations which refer to inter-group relations. The anticipatory, selective and justificatory functions of the social representations, and the justificatory and social identity functions of social stereotypes, have already been discussed in the literature. In the light of the considerations already identified we suggest that: (1) the functions of social stereotypes and social representations should be analysed in a common system, and (2) that they can be grouped according to their orientation (a) towards the very existence of the scientific community and (b) towards the regulation of its relations with the other social communities.

The objective of this study is to investigate the shared beliefs of students about the characteristics of the scientist. We also discuss the image of the scientist in a social historical perspective, and show that almost every trait in this shared image can be understood in the context of the social existence and recognition of science in Ancient Greece and seventeenth century Europe, two crucial periods in the development of science. Finally we consider how the image of the scientist functions within and for the scientific community.

2. The study

The informal, everyday, loosely structured shared character of social representations presupposes methods which provide mainly qualitative data. Often the authors apply 'looser' techniques such as interviews, open questions, essays on a given theme, etc. We used content analysis of an essay.

In half an hour high-school students wrote essays on 'My image of the scientist'. Subjects (120 male and 170 female) were from 15 to 17 years of age. In the Bulgarian educational system this is the last but one year before graduation. Subjects were randomly selected from three different high schools which represent the main types of high school in Bulgaria: language, professional and regular high schools. The sample comprised students with different social backgrounds, from workers to managers and intellectuals. The completed essays were randomly distributed among six independent judges. Each judge had to read about 50 essays. On average the length of an essay was about two pages. The only requirement for coding was that the judge differentiate the connotation of the words describing the scientist. So the task of each judge was: to write down each word or phrase pertaining to characteristics of the scientist; to list the
frequency of its appearance; and to indicate whether it is positive, negative or neutral in content. Thereafter, the judges had to provide a more general category for all similar words or phrases describing a given characteristic, and again to list their frequency of appearance. Finally, where the judges used functionally identical categories, we collapsed the original classifications.

By processing the information in this manner, we could demonstrate both the diversity of the characteristics attributed to the scientist and the frequency of their distribution.

3. Results

The first observation was the readiness with which the students participated in the study. All 290 students we approached collaborated willingly, even though they received no academic credits for participating. This is significant in itself, since it shows that the students have a clear vision of the scientist which could be easily expressed.

Secondly, the social representation of the scientist is entirely positive. Only five essays showed a negative attitude towards the scientist. The students wrote about the scientist in a sympathetic, and even glorifying tone.

Thirdly, the content analysis revealed three levels in the social representation of the scientist:

1. The core, comprising the characteristics listed by more than 50% of the subjects. Such characteristics are, for example: wise, noble, intelligent, disinterested, objective, open minded, hard working, honest, independent in judgement, devoted to science, selfless.

2. Relatively stable components, i.e. characteristics listed by 20 to 50% of the subjects.

3. Random elements listed by less than 20% of the students: serious, good-hearted.

Following Mead and Matraux's procedure we provide the 'composite image' of the scientist as presented in the students' essays. Each of the words and expressions used in the description given below is exemplary of the presentation pattern of the core characteristics in the essays. This composite image refers to the appearance of the scientist, his personality, and his work setting.

In the students' words the scientist is 'an elderly man with a grey beard and moustache and with sparse white hair . . . wrinkled face, big lively eyes, small firm chin, tall and slim, possibly with a walking stick . . . usually wears a dark suit, tie and black pointed shoes'. As for personality: 'the scientist is a person with a strong character, devoted to his work . . . harmoniously developed personality', 'good in every respect', . . . 'he combines knowledge and nobility', . . . and 'he is honest, impartial, selfless, a man of principles'. 'The scientist is the personification of the most progressive ideas of his time'. There are difficulties and deprivations in the life of the scientist, because true science knows no compromises. It is neither a quiet harbour nor something that brings money and fame—it requires complete devotion and disinterestedness. According to the students the work setting of the scientist is the laboratory and the office, 'not too big a room, but bright and creating a feeling of freedom . . . on the wall hangs the favourite picture . . . the big table is full of drafts, flasks, and piles and piles of books, a full ashtray and a cup of cold coffee . . .'.

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This vision of the scientist does not seem to be uniquely Bulgarian. In a similar study the positive side of the image of the scientist is described by American and French students in almost the same words.

The empirical data raises several basic questions. First of all, why is the image of the scientist so idealized? Which are the mechanisms which produced and maintain it? What are its functions? Looking for the answers to these questions, we turned to the social history of science.

4. The social determination of the image of the scientist

Derek de Solla Price places the emergence of the idealized and almost mythological image of the scientist towards the end of the nineteenth century. However, there are sufficient reasons to support the thesis that this process began much earlier, in Ancient Greece. There, for the first time, an attempt was made to explain the world ‘as it is’, to give a consistently rational picture of nature with no reference to supernatural forces. And this explanation was guided by specific and shared fundamentals of research.

Science was a new undertaking, and in order to change the hierarchy of values in accordance with its objectives it needed social approval, recognition of its superiority, and the assertion of its prestige. But as a new venture, science did not have to hand the appropriate means for acquiring these. What is more, its development was taking place in confrontation with the prevailing cultural tradition. Shaping the image of the scientist became one of the means for the legitimation of science in Ancient Greece.

Lay people had to become acquainted with a completely new spiritual tradition, and often it was fascination and enchantment that worked best. The new undertaking had to veil itself in mystery. There are three stands of mystification: of the source of knowledge; of the one who possesses the knowledge; and of the community which has access to it.

4.1. Mystification of the source of knowledge

Knowledge was presented either as a divine message, or as an ancient wisdom derived from remote countries. In certain cases, the scientist is simply a mediator of a truth unattainable to human cognition. In others, he had acquired his knowledge from the Far East. The enchantment that life in these countries had for the Greeks was used to stress the esoteric character of the new knowledge. In the biographies of the ancient philosophers we find the recurrent motif of studies from the East. Thus, Pythagoras claims to have learned mathematics from the Egyptians; Democritus, that he studied astronomy with the Magi; and Anaxagoras that he had predicted the falling of a meteorite only because he knew the ancient Egyptian texts. There were reasons for these perpetual references to the East. On the one hand, the new undertaking had to find its place in society, and this was attained not by harsh confrontation with the existing tradition but rather by the symbolic attachment to another imaginary one. On the other hand, the mystification was necessary for the ‘psychological health’ of the scientists themselves. For them the presupposition that nature could be understood by reason was not a commonplace in their life—it was a wonder to which they had not yet been accustomed. They needed to see the truth not as something contingent—discovered now, by me and my limited abilities—but as an ancient wisdom unknown
until now only because it was discovered in a distant place and kept secret by those who possessed it.

Significant to our analysis are the other two ways in which science strove for social recognition.

4.2. The mystification of the person who possesses the scientific knowledge

Since the source of knowledge is somewhere beyond, esoteric and abstract, it follows that the person who has acquired it should be strange, unusual, and different from other people. His detachment should receive positive social evaluation. Almost the entire story aims not only to describe the life of the scientist, but also to assess his uncommonness. He shares divine wisdom which is incomprehensible to others. This makes him superior in every respect. Devoted to this contemplations, he does not care for money and fame; Democritus says that it is a greater gain to find an aetiology than to become a king of Persia.16 The scientist was placed above his current social tradition. Thus for Anaxagoras, the fatherland was heaven.17 Others drifted away from everyday life in different ways: Heraclitus in his sombre silence;18 Democritus in his laughter.19 The scientist must sacrifice everything to reach the truth, and ‘instead of being a slave to the body and its lusts, as man is by nature, he must become a slave of knowledge’.9 He even possesses divine qualities. He could bring back to life a woman who had been dead for 30 days (Empedocles)20 and could listen to the music of the celestial spheres, or talk with the animals (Pythagoras).13

4.3. The mystification of the scientific community

An ideal example of the mystification of the scientific community is the school of Pythagoras. Anyone who aspired to be accepted had to pass a tough initiation. Pythagoras first wanted to know how the applicant behaved towards his parents, what his interests and passions were, who were his friends, and so on. Thereafter Pythagoras regarded the students for three years with contempt in order to see whether they were genuinely interested in learning. What followed was five years of silence so that they could show self control. Having passed these hurdles the students became ‘esoterics’ for the rest of their lives, which meant that they had the right to see and talk to Pythagoras. Before that they could only listen to him behind a curtain.21

This is a community of the chosen, and only its members are able to actualize the inherent aim of science which, for the ancients, was no less than the understanding of life—life not in its contingent everyday manifestations but in its lawfulness and harmony, in its deep and sacred meaning. For the early Pythagoreans scientific knowledge was not only a means for revealing the nature of things: above all it had profound moral value and was a way to salvation. In order to attain all this, the scientist must withdraw from the vanity of life, detach himself from current values and devote all his efforts to abstract contemplation. That is why the scientist is extraordinary and different from the other people, and scientific activity, as Aristotle writes, is the most adequate actualization of human nature, and the source of complete happiness.22

From the institutional point of view the rise of modern science in the seventeenth century is associated with its formation as a social system. Again there is a need for independence and autonomy; again science has to strive for social support and
recognition; again (in order to survive) it must attract people's interest, for there are other professions which 'draw away the inclinations of Men from prosecuting the naked and disinterested Truth . . . because the search into severer knowledge has been looked on as a study out of way, fitter for a melancholy humorist, or a retired weak spirit. [Those who] dig in the Mine of Nature are viewed to be in as bad a condition as the King of Spain's slaves in Peru'.

The aims of the new endeavour were announced in Thomas Sprat's history of the first institutionalized scientific body: the Royal Society of London. There we read that as science develops it will 'redeem the minds of Men, from obscurity, uncertainty and bondage'.

What sort of man should be the one who 'will bestow his time and Art, in revealing to mankind, those Mysteries . . . when all the rewards, which might give life to his Industry, (are) passing by them . . . [?] Strong spirit and great pains are necessary if you want to devote yourself to the common good'. And Sprat writes that if he were to form the Character of the True Philosopher, the foundation should be innocence and virtuousness. Only 'such men whose minds are soft, so yielding, so complying, so large will pass by nothing, by which they may learn: they will be always ready to receive, and communicate observations . . . they will rejoice, to see mankind benefited'. In order to understand the works of nature the scientist should have 'the Industry activity, an inquisitive humour . . . a cold . . . circumspect . . . and wary disposition'.

What a world scientists live in! There one can breathe a freer air, and 'without being engaged in the passions and madness of a dismal age . . .' can contemplate the harmony of nature which 'draw the minds off from past, or present misfortunes . . .'. This world 'gives (people) room to differ without animosity; and permits (them) to rise contrary imaginations upon it without any danger of Civil War'. Everybody in this community can defend his own position because this should be a true laboratory and not a school where some are masters, and other scholars, where one imposes and others 'submit with silence'. The members of this community do not keep their knowledge only for themselves, instead 'they reduce (their) principal observations into one common stock; and lay in public Registers, to be nakedly transmitted to the next Generations of men; and from them to their Successors'. And in this world any 'extraordinary man' from different religions, countries and professions is freely admitted.

After such a description one could hardly doubt that 'wise men would have two Religions; the one public, for their conformity with the people; the other private, to be kept to their own Breasts'; and everyone once acquainted with science cannot help but choose it as their second 'religion'.

Now we should look beyond the concrete empirical facts and try to reveal their sociological meaning. Beyond the diversity of historical figures and events, the social representation of the scientist has developed in two main ways: (a) it has been determined by the social context of the very existence of science; and (b) it has been deliberately promoted by the scientific community.

The development and maintenance of the image of the scientist has also been taking place recently. A contemporary example is the sociology of science itself. One of the achievements of this discipline in the 1950s and 1960s was the development of the normative system of science. It includes norms regulating the processes of scientific investigation (objectivity, rationality, logical consistency, empirical validity), and norms focusing on the emotional status of the scientist (emotional neutrality) as
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well as on the scientific community and its relationships with the wider social environment (organized scepticism, communality, disinterestedness, universality). Soon after this idea was promoted the first critical considerations appeared. Many of them are well grounded. The authors point out the obvious inapplicability of these normative prescriptions to everyday scientific practice, which is often guided by the opposite to these norms. The historical analysis, however, reveals that, though with different means, these requirements have been deliberately introduced by the scientists themselves. This, as we have shown, has had significant consequences for the development of the social representation of the scientist.

At this point we return to the problem of how the image of the scientist functions.

5. Functions of the image of the scientist

The first group of functions of the image of the scientist is directed towards the scientific community itself—toward its recruitment as an autonomous social community. To be a scientist is a difficult and risky activity since success, i.e. the discovery of new original information, can be achieved by only a few. That is why in order to provide its quantitative and qualitative recruitment the scientific community uses different means to make scientific activity attractive for new generations. The selective function of the image of the scientist consists in underlining the positive characteristics of the scientific community and in maintaining its positive differentiation. The world of science is shown as different from the everyday world, and the community of the scientists is presented as the community of the chosen. Hence, science and scientists have their own aims and values. Scientists, no doubt, are in the long run connected with practice and life in general, but can by no means be reduced to them. The ethos of science asserts that to be a scientist means to pertain to Truth and consequently to History. All this gives the scientists the right to be different in their way of life and in their attitude towards the world, and justifies (even presupposes) the manifestations of originality and eccentricity.

However the selective function of the image of the scientist, i.e. the emphasis on the positive, desirable characteristics of scientists, has another aspect. The image of the scientist is not supposed only to attract. By imposing specific requirements on the would-be scientists, it is also designed to differentiate. In this manner the selective function becomes a kind of 'natural filter' for those who aspire to be accepted into the realm of science. If your intention is to gain immediate success, or if you value money and power, then your place is not in science. Of course, science can bring you success and fame, but the chances are small, the competition is great, and success depends on hard work, risks, and possible failure. (By promoting a certain lifestyle, the image of the scientist can also have a more general socializing function.)

The next function of the image of the scientist is also oriented to the scientific community itself. It is revealed in the role which this image plays for the social identification of members of the scientific community, i.e. in the knowledge of the individual 'that he belongs to a certain group together with some emotional and value significance of his membership'. While the selective function provides the positive differentiation of the scientific community as a whole, in this case the function of the image is to help the positive social identification of the individual members of the community, i.e. to preserve it as an entity. On the individual level the identification
with a community is a prerequisite for a successful self-actualization in accordance with its objectives.

Nowadays the number of social roles played by scientists is rapidly increasing. Often they are at the same time scientists, managers, administrators and politicians. The traditional image becomes a kind of protective mechanism which helps scientists preserve their integrity as scientists despite the variety of roles they play.

The second group of functions of the image of the scientist is related to regulating the relations between the scientific community and other social communities. Here are the justificatory and the anticipatory functions. The promotion of a positive image of the scientific community, and the emphasis on intellectual superiority and on the extraordinary characteristics of the scientists, ‘justify’ their claims for autonomy and preserve their social distance from other social groups. The scientists, writes Mulkay, ‘have used their standard portrayal of science to justify their political claims . . . and the description of the supposed values of science . . . to justify its continued autonomy’.

On the other hand the specific qualities of the scientists anticipate the character of the relationship between the scientific community and the wider social system. ‘Pure’ science should be supported as a branch of ‘high culture’, because there is no-one except scientists who is sufficiently competent to be able to decide for them the aims and methods of scientific research, or to evaluate the results.

6. Conclusion

The main conclusion to be drawn from the empirical study is that the image of the scientist has been described in an elevated way with elements of idealization. Elaborating on this result we focused on the historical roots of the social determination of this idealized image, the mechanisms of its maintenance, and its functions. For the scientific community this image has become a means of recruitment and a way of regulating relations with other social communities and the general public.

Recently, the relationships between science and its public have been changing. These changes are due first of all to the emergence of ‘big science’. Big science is characterized by an exponential growth in the number of the people working in the system of science, and by the increased cost of scientific investigations. This, on the one hand, increases the probability that science will be ‘invaded’ by people who are not thoroughly devoted to the ideal of the ‘extension of certified knowledge’, and on the other can make it too dependent on forces external to it. The second reason for the tendency towards demythologizing the image of the scientist can be traced to the growing impact of the scientist’s image through transmission channels external to science (mass media, science fiction, etc.). Negative traits can be discerned in the image of the scientist, and traditional characteristics also tend to be negatively portrayed.

We also have reason to expect that, in the future, civilization will develop a deeper interpenetration between science and social life which might eliminate the necessity for scientists to claim autonomy and special status. These processes could lead to a change in the functions of the image of the scientist, and also alter components of the image itself.

However, bearing in mind the multi-dimensionality of this problem, and feeling torn between the scepticism of our age and the concern about lasting human values, we can not escape the question: yes, the image of the scientist could and eventually
would be demythologized, but are we fully aware of the consequences of this process, and should we deliberately participate in it?

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12 For a detailed analysis of these lines of mystification, see: Bojadjiev, Tz., and Bojadgieva, P., 1983, *Sotzialnato samoutrazhdane na rannogratzkatd philosophia. Philosophiska Misal, 9*.

13 *Parophyrii vita Pythagor* 12.


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