Sociology of Science

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Lecture - 10
Matthew Effect in Science: R.K. Merton-Part II

Dear students, I have been discussing in the Matthew effect in science, in the previous lecture. Matthew effect in science is a significant thesis by Robert martin. It is his conceptualization which has. In fact, revolutionized the field of sociology of science, this is a very unique thesis. I have already discussed the basic idea behind Matthew effect in science in the last class; I will just do a quick recap.

We know that whenever somebody becomes famous the person gets certain advantages, additional advantages and the person who is not that famous may have to struggle a bit to get those advantages. Now transfer this basic idea to the scientific community and we have Matthew effect, and why is it Matthew effect, why is it named Christ and as Matthew effect, is because Robert martin has taken this idea from bible.

He is taken it from Saint Matthews's gospel and bible, where he says in typical biblical language that those who have will have more, and those who do not have anything for those who are very little it will be taken away from them, in certain biblical context.

Now he has applied this basic idea to the scientific community to look at the unequal distribution of resources available to the scientists of unequal rank, unequal rank somebody who's senior, somebody who has already made a name for himself or herself somebody he is re reputed, somebody who has got recognition an eminent scientist. An eminent scientist finds it easier to get further recognition, get further importance.

How does the person get further importance, that is when the eminent scientist applies for funding he or she easily gets it, compared to a newcomer or not so eminent one. Whenever a famous scientist writes a research proposal, it gets easy acceptance by the funding agencies.

Whenever an eminent scientist writes a an article, sends it to a top reputed journal, the eminent saint say scientist has much bigger chance of getting published in relation to compare in comparison to a relative newcomer a junior scientist or not so eminent one. Or whenever a person of eminence wants to buy expensive scientific instruments or apparatus for his or her laboratory, the person succeeds in getting the requisite funds to, to, to, buy those equipment's, either from the university or from the resource center, whatever the person is working or is best at all from some private funding agency or from the industry.

The another way, in which the eminent scientist, gets more advantage is the person gets to be invited to speak, as a keynote speaker in a international conference of repute. The person manages to find a place in select committee in important committee set up by government. Regarding science and technology affairs of the country, so these are different ways in which a person of eminence gets more advantage compared to a newcomer or compared to a not.

So, eminent scientist now this is what he calls Matthew effect, that is giving more additional incremental advantages to a person who already has it and at the same time withholding, withdrawing, those advantages, those facilities to persons who are not that reputed, who have not made their mark, or who are junior, or who have just joined, a department or an institute, a new faculty.

Now how does that happen and where does that happen, it happens in two cases essentially, first in case of joint collaboration, joint publication if a eminent person is with not so eminent one or junior faculty member or junior research or junior scientist.

Even if the junior scientist has made significant contribution to that article to that project to that book to that experiment, but it is always the person of eminence who takes away all the credit, house credit given. Invite this article, this argument this thesis the Robert martin is based on a series of interviews conducted by harajuku man and academic elaborate of Robert martin with the Nobel laureates, well the study is also based on the biography, the autobiography, the diaries, the notes, life histories of eminent scientist and Nobel laureates.

Based on this study he has come to make this very important statement that Matthew effect actually is an operation within the scientific community, and essentially it happens in two cases, one in case of joint collaboration or joint publication second in case of independent multiple discoveries.

In case of joint collaboration always a person who has a person of eminence gets all the credit, and the person who has done lot of hard work is ignored not given that much of importance, because everybody thinks that it is the reputed person the Nobel laureate the senior scientist. Who has done all the hard work; hence it is an injustice to the junior scientist.

In case of multiple discoveries, independent multiple discoveries if the same thing has been found or arrived at, but two different scientist, at two different institutes, at two different departments, or two different countries, it is always the person who is already known will get the credit, people will tend to associate that discovery that invention that new thing, new formula, new equation, with the person of eminence, because it is assumed that the fellow who has already proved his worth or proved her worth must have done this.

So, it is double increment double advantage to the person of eminence and it is always double injustice to the not so eminent person, the junior scientist or the relative newcomer. Now this is we have already discussed this in the last class, but I thought I would do a quick recap of this in this lecture. Now, this is Matthew effect as it appears has positive connotation for a person of eminence for reputed scientist, because it always helps them further and it has negative connotation for junior scientists not. So, eminent ones they always end up not getting credit, not getting due credit, not getting deserving credit.

So, it is dysfunctional for individual scientists who are new comers, or not so eminent ones. But at the same time Robert martin says, it can be functional, it can be positive for the very field of science itself, how because whenever we pick up a book or a article by a person of eminence, automatically whatever the ideas that has been expressed in that book or an article gets diffused, it spreads through the readers to the broader scientific community and that is one of the important goals of science that is spread of knowledge diffusion of scientific knowledge.

It is through communication that scientific knowledge is spread, and if a scientist has already communicated his or her ideas through a book or an article, and the readers read it. Then this process of diffusion of scientific knowledge occurs which is one of the important goals of science, and how is it functional, because that is a ultimatum of science that is the ideas expressed should be communicated it should reach out to the broader scientific community.

And how is Matthew effect functional for science in this way, because we tend to pick up the books or the articles by famous ones, we do that because it is impossible for us to go through all the articles of books written in our respective disciplines or fields of activity or scientific domain. So, we pick and choose, and we choose who we choose persons we are familiar with, persons who have already made a name, persons who are acclaimed, renowned scientist.

And in that process since we pick up the books by read authors were well known in that process whatever idea that has been expressed gets easily diffused, and scientific diffusion of knowledge is possible.

So, that is functional for science now in this class in this lecture, I shall discuss another important dimension of Matthew effect that is, is there a social psychological base to the reputed scientist, is the something that inherently worthy about the scientists themselves, that is it is there something about them which makes them famous, has it something to do with their way of working, way of picking problems in the way they handle research, their personality, their character, in the nature if Matthew effect is biased towards senior scientist or established scientist or reputed scientists.

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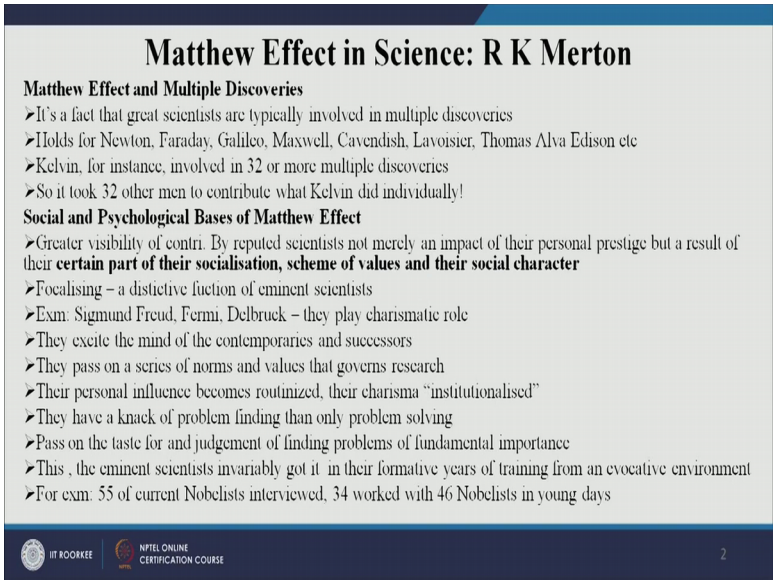

Is there a base to that is there a social psychological basis to the reputed scientists? So, if you look at the history of science, would know that great scientists are typically involved in multiple discoveries. It holds for newton, which holds for faraday, for Galileo, for Maxwell, Cavendish, Lavoisier, Thomas Alva Edison.

All these people were prolific they came up with multiple inventions, they came up with multiple scientific discoveries, for instance kelvin was involved in 32 or more multiple discoveries the genius, what makes them genius is there something to do with us social character or their bond genius.

That's what we are going to find out. So, a discussion of social and psychological basis of Matthew effect as pointed out by Robert Merton. Now this greater visibility of contribution by reputed scientist, not merely in an impact of their personal prestige, but a result of their certain part of their socialization, scheme of values and their social character.

If they are great, if they are reputed it has a lot to do with their social character with their socialization pattern with their norms and values that they have imbibed with they pass it on to their juniors to their successors. Now one of the distinctive characterize function of eminent scientists is focalizing, Sigmund Freud for me Del brock they always played charismatic role in their respective fields.

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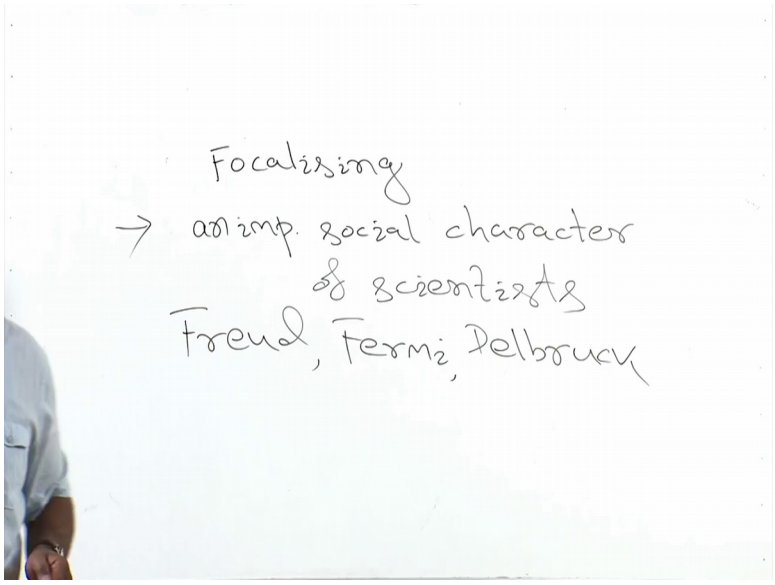

Now focalizing, what is focalizing? They tend to focus on certain areas within their field, and they elevate that field to a new stream to a new school of thought for instance, in case of Sigmund Freud his study of human mind, his study of inner consciousness of human mind, his study of a ede ego super ego of psychoanalysis, made it as much sought after field to pursue in the field of psychology.

Many scientist, later scientists they focused on that area thanks to the introduction of that area by Sigmund Freud. Sigmund Freud is known as the father of psychoanalysis, he created a new field, a new school of thought that human mind can be rationally scientifically explained. Nobody had given a thought to that beforehand he did it, and because of his continued work in this field, this field became very popular, very significant, many scholars latta psychologists they took up psychoanalysis and they may made for the contribution to that area.

Similarly, for me in physics for Delbruck, they all made significant contribution in specific fields and because of their contribution, because of their effort those fields became of immense interest to latter scientists and it. In fact, excited the mind of contemporaries as well as the successors it led to lot of research, in those fields led to further incremental scientific knowledge contributions in those fields.

So, because of their continued effort, because of their focalizing that focus on those specific areas. It could become a when known field, within that scientific domain. Now another point that is worth noting about the eminent scientist is the norms and the values with the pass on to their successors and the norms and the values which go on their research, what are these norms and values, the certain standards, the certain trends, in the certain specific approach that they bring to the research.

Certain ways of looking at the world, certain normative guideline, the certain tradition, and this tradition in this normative guideline, this trends this, values this standards, it becomes routinized over a period of time. How does it become routinized? Because wherever they work in whichever department or laboratories they pass it on to their successors to the not only to the contemporaries, but also to those who come after them.

So, whenever a person joins those departments or those labs they always told, this is how it has been done by this famous scientist this is the way he or she approached a problem, this is the way he or she solved a problem this is the way the methods the researcher the scientist have worked on these methods, so we need to follow that.

So, the junior scientists they get trend into those routinized patterns, norms, values, trends, and that leads to further important scientific contribution in those fields, because this famous scientists have a specific unique, style of functioning and that style of functioning they pass it on to the successive generation of scientist, and they just follow it.

Like the eminent scientist invariably, learnt how to go about problem solving, how to find fund important problems in their formative years of training from a very evocative environment, for instance Robert Merton himself gives an example, that 55 of current novelist. The one article was written in 1968; he says during that period 55 of the Nobel Prize winners, out of this 55, 34 had worked with 46 Nobel Prize winners in their younger days.

So, a majority of Nobel Prize winners have worked with Nobel Prize winners themselves, in the younger days it's a matter of socialization. They say it has something to do with the pattern of socialization that they have undergone, where this norms tradition values standards have been passed on we are finding important problems, we are looking at the scientific issue have been passed on to the successive generation by this eminent scientists.

So, it is something to do with the socialization pattern. It has something to do with the social character which tells them, how to find a problem, how to find look for a fundamental problem.

That can be of significant, implications in that a research area. Great scientist show what makes a great scientist, a great scientist what makes an eminent scientist an eminent one it is the pattern of socialization what they have gone through which they have been the way they have been trend in evocative exciting stimulating environment themselves, but they are exposed to a certain way of who looking at the issues looking at finding problems looking at scientific issues and another point is their ego strength.

They have exceptional ego strength, what does it mean ego strength. It means they have tremendous self-confidence. It may appear arrogance to many scientist or contemporaries, but that arrogance is rooted in tremendous self-confidence, they have an ability to critically evaluate their own work, they can criticize their own work, they can always find a fault with their own way of working not everybody can do that.

They have a capacity to tolerate frustration, if things are not working out if they meet with failure, if they meet with repeated failure, they have tremendous capacity to tolerate frustration, absorb repeated failures it's not easy for every individual to absorb to cope with repeated failures, but people scientists with exceptional ego strength can handle failure.

They are equipped to handle with, handle both success as well as failure that makes them a great scientist, because they have that basis they know that if it doesn't work out this time it will work, sometime in the future you have to have belief in yourself, you have to have confidence in yourself. They wait for big problems they do not they are not satisfied with mediocre issues mediocre problems they are not satisfied with mediocre publications they wait for big problems.

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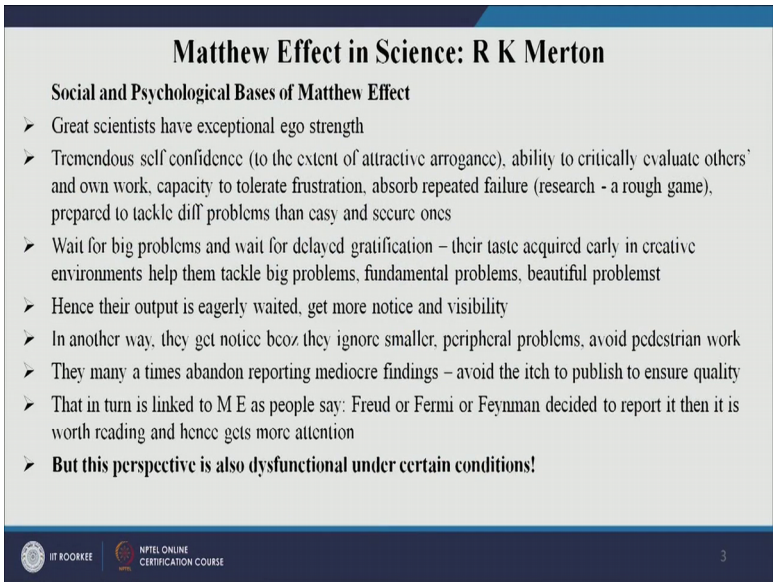

They work on important problems hence, the verticals that they write books that they write are eagerly awaited, because they must be saying something new in those books that's why the readers the scientific community waits for their next contribution for the new your contribution.

So, the output is eagerly awaited it gets more notice and visibility, but if you look at the entire thing in another way. Freud or for me or Richard Feynman, if they have decided to report it then it is worth reading and hence it gets more attention, see the kind of reputation that they have when they publish something people tend to look at it, tend to give it notice. They get easy notice, but this perspective can also be dysfunctional under certain conditions.

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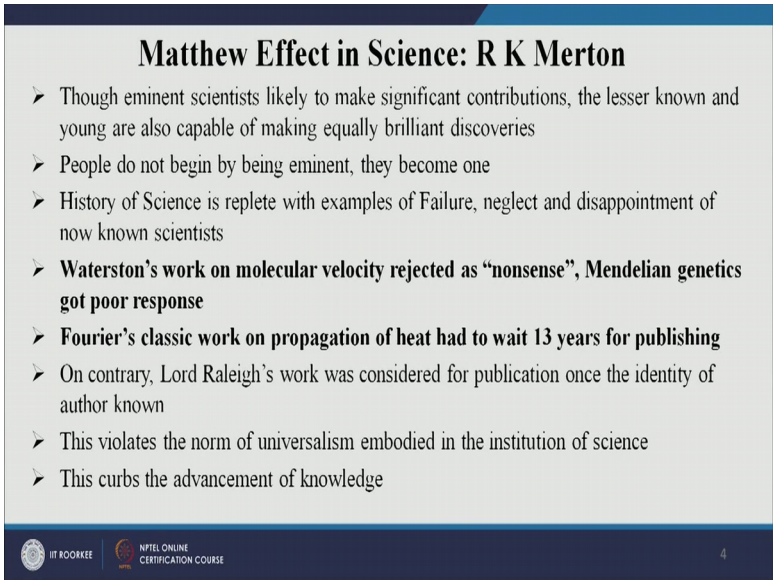

For instance eminent scientists are capable of making significant contribution. So, also the younger ones who are equally capable of making brilliant discoveries, people don't begin by becoming eminent by being eminent they become one you don't start as a genius you become a genius. So, we have to give that time for them for the younger scientists the newer ones to mature to show their greatness.

If you keep on giving importance to the works of already famous ones then those persons who are capable, equally capable are probably more capable, have more potential they get ignored, they don't get an opportunity. History of science is replete is full of such examples of failure neglect disappointment of not known scientists. I just take a few examples, water sons work on molecular velocity it got rejected as nonsense initially it got rejected as nonsense.

The fears the scientific fears did not give much importance to it, mendelian genetics. It got very poor response initially 4 years classic work, 4 year his classic work on propagation of heat it had to wait for 13 years for publishing, for 13 years nobody was giving any importance to his work, he had to struggle for 13 years to get his ideas communicated to the scientific community, but on the contrary Lord Raleigh his work was considered for publication, once the identity of the author was known who is Lord Raleigh.

Lord Raleigh is a noble man number one for me united kingdom. Lord, his lordship his work may have been mediocre, but as soon as people got to know the authors name that he is a lord they got, they published his work. That is if we have already discussed that is counter nom to universalism, as an it though we have already discussed about Robert martins universalism.

That people should not in scientific community should not look at the social background, but as a counter norm to that Ian Mitroff suggested, that people do look at the social background of the persons and this is a fine example of that. So, this violates the norm of universalism which is embodied in the institution of science, this difficult definitely curbs advancements are advancement of knowledge this is one example.

Another example is this is of course, in universalism as a antithesis to universalism which is particularism at the same time, we have another issue here that younger scientists are equally capable, but they do not get that much of attention. Now in the next lecture, I will discuss how Matthew effect Matthew effect operates at a macro level at the institutional level, and the symbolism of intellectual property which is linked to Matthew effect.

Thank you very much.