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Between brains and breasts—women scientists in fiction film: on the marginalization and sexualization of scientific competence

Eva Flicker

The popular media, film, cinema and television, contribute to the public's general understanding of science. This article focuses on the portrayal of female scientists and the reception of such depictions within the general understanding. The article questions: the images depicted; their relation to scientific reality; how such depictions have changed over time (1929–1997); and their significance within the broader social context.

1. Introduction

Most people have never and will never personally meet a scientist. Yet, at the same time, there is a great deal of interest in new knowledge arising from scientific research, especially from the natural sciences. Since the 1940s and 1950s, especially the military use and misuse of scientific knowledge (for example, the atomic bomb), there has been widespread skepticism about science. This skepticism is made evident in intense public debates, for example those on reproductive technologies, genetic technology, etc.

In the meantime we have become accustomed to public depictions and images of science within the most diverse contexts. The mass media have become a key means for publicizing scientific production and research results. The popular media of film, cinema, and television—in the area of documentary as well as fiction—contribute to a general overall picture and also to the public understanding of science. The present text summarizes the results of a study¹ and focuses on the reception of the occupational roles in science, and here, exclusively on the female actors, the women scientists.² The following questions will be raised and investigated from a sociological perspective:

- What is the image of women scientists offered in feature films?
- How do these images of women relate to scientific reality?
- How have the representations of women scientists changed over a time period of 70 years—in a sample from 1929 to 1997?
- What is the significance of this within a broader social context?

2. Sociological approach

Sociological aspects

A brief assessment the situation of women in science in Europe in 2002 notes the following: women were first granted admission to universities in Europe approximately 100 years ago in 1900.³ Until that time, the universities were exclusively male domains. Over the course of these hundred years women have made great strides in catching up; they now comprise more than 50% of all students and graduates (ETAN, 2000). Their equality in terms of academic qualifications, however, is not mirrored in the academic hierarchy. Men still fill the key positions of power and authority. On average, women fill only 10% of all professorial positions. The data on the structural positioning within the university system in the US show a somewhat better situation, although the ratio is still quite uneven: Women assistant professors: 45%, professors: 23%.⁴

Almost nothing has changed in the actual marginalization of women in the upper ranks of the academic hierarchy in terms of the positions equipped with status and prestige and with the privilege of lifelong employment. (Wetterer, 2000)

Academic policy programs and gender mainstreaming, from outside of the university sphere, attempt to induce a gender-equitable appointment of positions and resources within the higher education system.

Media sociological aspects

Media sociological perspectives focus on the interaction of social practice and the construction of reality in film. On the one hand, film takes social realities and weaves them into film stories. On the other, mass media's images of reality influence the audience. The mass media, including film, have a central function in the creation of opinions and myths. Film functions as more than a simple mirror, it also works as social memory and cultural metaphor. In contrast to purely linguistic media, film creates pictures that continue as social myths.

Scientific communication aspects

Myths and prejudices about science are components of a shared culture. What should be emphasized is the ambivalence between beliefs in technical progress and the fear of technological disaster. This polarization between trust and mistrust in science seems to be intensifying.

Even experts within the various disciplines are no longer able to assess the complexity of scientific specializations. A layperson's position on a scientific theme is therefore based much more on an intuitive guess rather than rational deliberation. Mass media play a crucial role in this process. Art—including painting, comics, literature, theater, radio, film, and television, etc.—also contributes to the mediation of science. The images drawn of science and scientific work are deeply embedded in the culture and remain fairly uniform. In the following I will focus on the media of the feature film from within the realm of mass media's communication of science.

In all media, the scientists portrayed in the key scientific roles are, for the most part, men (82%).⁵ Women scientists are rare and when they do appear, their roles differ greatly from those of their male colleagues. The audience is confronted with a perspective on science that cuts straight across the natural and social sciences and humanities, in which a male character role is adapted to suite the woman scientist. Most analyses of the

representation and communication of science pay scant attention to the gender relations of the scientists. The purpose here is to remove this blind spot.

3. On the methods of sociological film interpretation

The method of sociological film interpretation allows comparative analysis of film content of a large sample in terms of the films' social references (Faulstich, 1998). Films are viewed for social context and in terms of their date of origin. Cognitive interest focuses on the relation of film content and social reality. What is meant here by "society," is the entire environment surrounding the film, including the production conditions, financing, politics, etc., of the film. From this arises the issue of the ideological positioning of a film's content. Questioned are the messages and biases of a film. Films are investigated in terms of their reality content and their positioning in terms of relations of power and authority, problematic themes, peripheral groups, etc. The analysis of the *content* of a film begins at the manifest, explicit level. The *significance* of the film requires the working out of latent, implicit constructions of meaning. Sociological film interpretation is mainly relevant for large samples that work systematically with focused lines of questioning (e.g., certain epochs, occupations, political themes, etc.).

This study will join together typical issues of sociological film interpretation:

- *Occupation*: woman scientist (also woman scholar, researcher with academic qualifications)
- *Time frame*: approximately 70 years of the twentieth century. This not only depicts film history, but also the (social) transformation of the woman's role in general in the feature film.
- *Socio-political theme*: Sex/gender as a central guiding difference for social inequality. How is social transformation depicted through gender performance in feature films?

Examined were feature films from *all genres*: entertainment, romance, drama, action, science fiction, horror, etc. The sample of examined feature films was created according to a *content-based* and a *pragmatic* criterion. First of all, in the film story there must be at least one woman scientist/scholar; excluding scholars who did not do scientific work or research, for example, doctors, lawyers, etc. Second, the films had to be available on VHS video media (a filmography precedes the references at the end of the paper).

4. The widespread cliché of the scientist

The depiction of women scientists is not the same as the widespread cliché of the male scientist, which can be sketched as follows (Haynes, 1994): He is a hard and very diligent worker; he emanates an aura of absent-mindedness, extreme confusion, or even madness. He is more of an outsider in terms of social contacts. He is inattentive to the people around him and is uninterested in social trends and fads. He seems socially displaced. He is not a particularly attractive hero with glasses, a work apron, ruffled hair, etc. His enthusiasm for his work could almost be called an obsession. His work attitude can sometimes be completely apolitical or even scrupulous. In the eagerness of his scientific curiosity, in some cases he even takes the risk of causing immense damage to humanity.

5. Women scientists in feature films

The complex overlapping of sociological, socio-historical, and gender differentiated perspectives have resulted in the following.

Quantitative representation⁶

Of the films examined, the genre with the most depictions of women scientists is science fiction, representing nearly 50% of the total. This typically corresponds with the genre that most often thematizes science. The proportion of women scientists as a whole in the various disciplines are: two-thirds in natural and technical sciences and one third in the social sciences and humanities. Aerospace researchers and cosmonauts are remarkably well represented. (Job titles are generally assigned to a discipline in a very simplifying way.) The share of women represented in the technical disciplines in no way corresponds with the actual situation. In reality, the largest share of women can be found in the social sciences and humanities. If one compares the age of the scientists depicted in the films with their academic qualifications, then the women are unbelievably young.

Qualitative representation—model of presentation

The cliché of the scientist sketched out above is not valid for both genders. From a sociological film interpretation of approximately 60 feature films, it is possible to determine the following six stereotypical portrayals of women scientists in feature films:

1. The old maid
2. The male woman
3. The naïve expert
4. The evil plotter
5. The daughter or assistant
6. The lonely heroine

The old maid (example: *Spellbound*, USA, 1945)



Figure 1.

Dr. Constance Peterson (Ingrid Bergmann) sits behind her desk, which is overflowing with papers and books. She is writing down some notes and while doing so, is smoking a cigarette. Her hair is neatly pulled back; she is wearing a white work apron and glasses. A male colleague enters the room and speaks with her, first about business. Then he says how much he admires her and her psychoanalytical competence. He wonders why such a wonderful woman is only dedicated to her work. He tries to kiss her. She lets him but does not reciprocate his desire. Then she looks at him, surprised, and says that she finds his behavior highly interesting—"from a psychoanalytical perspective."

The "old maid" type of woman scientist is only interested in her work, as though she were married to it. There is no doubt about her professional competence, but as a woman she is lacking something. In terms of looks, she is depicted as a typical bespectacled "four-eyes." The stereotypical old maid does not actually have to be all that old—it is much more her *style* that is old fashioned. In keeping with a successful character development, over the course of the film her deficit will be balanced out. Her femininity will be (re)instated. A man will appear who sets her off in a spin and shows her the ways of love despite her routine rationality. This female character pays the following price: during her transformation into the perfect, attractive, and desirable woman, she loses her professional competence and slips up, making mistakes. According to this model, femininity *and* intelligence are mutually exclusive characteristics in a woman's film role.

The male woman (example: *Andromeda Strain*, USA, 1970)

One often encounters the "male woman" scientist in science fiction and action films. This woman scientist is a member of a male team and "stands up for herself." She has learned to be assertive within a male environment, has a rough, harsh voice, dresses practically and from time to time succumbs to an unhealthy lifestyle (bad sleeping habits, smokes, drinks, takes pills . . .). This female character is put together in a way very similar to the character of the male scientist. Thus, this type of woman scientist also has asexual characteristics. Her existence as a woman does not play a role in terms of femininity or erotic attraction, but rather, in her female intuition. Therefore, this woman scientist seems to be lost somewhere in the middle. Related to her scientific competence, she is inferior to her male colleagues. She also cannot be taken seriously as a woman as she is missing female charm. However, she can find allies in the audience, as it is her emotional approach to science that will enable the solution of the problem at the end of the film. Seen in this way, she is essential for the resolution of the story.

The naïve expert (example: *The Lost World—Jurassic Park*, USA, 1997)

Figure 2.

Two men discuss “the lost world,” in which dinosaurs still roam. A team of the best scientists is necessary to investigate this world and work on it for future generations. “She” should be one of them. “She” is the best paleontologist in the world. She knows everything and has the most extensive experience. But, alas! She is the girl friend of one of the two men. And he does not want her to take the risk. What he does not know is that she set off for the journey long ago and is already underway on the island, alone

He meets her there; she is entirely independent in her decisions and actions and pursues her scientific curiosity with utter enthusiasm. She is just about thirty years old, athletic, attractive body, slightly opened erotic mouth/lips—perpetually inviting a kiss. She wears practical action adventure clothing and a tight T-shirt that emphasizes her breasts. She is taking photos in the midst of gigantic dinosaurs (herbivores). They simply walk right by her. She discovers one young dinosaur who fascinates her. She pats it, lovingly. Only he, her man, and the audience know the danger she has thus entered into . . .

The “naïve expert” type of woman scientist has little significance for the scientific theme of the film; perhaps she supplies the audience with some professional knowledge. For the dramaturgy, however, she is a crucial character. A very good-looking woman, who is incredibly young if we take her professional status into consideration, fills this role. This woman scientist has a brilliant career, but her naiveté and feminine emotions get her into some difficulty in the films’ story line. Only a man’s help can get her out of these difficulties. She embodies the “good” type of woman—morally impeccable—who believes in goodness and is accordingly naïve in her actions. She offers the audience a positive character for identification. Her counterpart could be the following stereotype.

The evil plotter (example: *Indiana Jones—The Last Crusade*, USA, 1989)



Figure 3.

Surprise! “Dr. Schneider” is a woman—a young, highly attractive blonde. Elsa Schneider (Alison Doody) is a competent historian involved in the search for the Holy Grail. Soon, however, it becomes apparent that she is a Nazi and that nothing will stop her in her search. With her wily femininity she has already dragged two renowned scientists into bed—father and son, Professor Henry Jones (Sean Connery) and Professor Indiana Jones (Harrison Ford).

Also remarkably attractive and young, this woman scientist is a scrupulous egoist ready and willing to cooperate with evil forces. She is corrupt and uses her sexual attraction to trick her opponent with a “woman’s weapons.” Even the cleverest male scientists fall into her trap.

These two types of woman scientist, the “naïve expert” and the “evil plotter” represent the ambivalent relationship of society and science. They present polemics similar to the belief in the benefits of science and the mistrust of scientific research. Both categories, belief and mistrust, are emotional categories and according to traditional assignments of gender, are tied to female roles. Both depictions of the role of the woman scientist thus contribute greatly to the discordant social image of science.

The daughter/assistant (example: *Them!*, USA, 1954/*Torn Curtain*, USA, 1966)



Figure 4.

Strange things happen out in the desert of Nevada. The doctors Medford are flown in to bring some light into the situation. A plane lands at a military airport in the desert, a hatch is opened below the plane and a ladder drops down. We await the scientists. First, an older man in a suit and hat emerges, but then, surprise! high heels, sexy legs, and a dress slowly enter our field of vision. A smart young woman with pocket book, gloves, hat, and a charming grin appears. The second Dr. Medford is a woman! and what a woman!

The essential characteristic of this type of woman scientist (*Them!*) is that this female character is anchored in a social relationship to a male scientist. As a woman, she is assigned the smaller, weaker part, the “typical” female characteristics. The activity of this film scientist consists of assisting, whether as the daughter of a highly renowned and successful scientist—with or without formal qualifications—or as his assistant. He represents the classical cliché of a scientist: genial, confused, nervous, and completely incompetent in practical matters. Although she is indeed scientifically qualified, her strength lies in her social competence. As subordinate to her more competent scientific partner, her role is as translator for society. Her profile is marked by dependence on a male character. Also here it is clear that the character of a woman scientist in film takes over the function of a type of bridge between rationality and emotion.

Sometimes she merely offers emotional assistance—for example, as a fiancé (*Torn Curtain*). In accordance with the era of women’s sexist roles in Hollywood films, which presented a major setback in comparison to the female figures in the films of the 1930s and 1940s, also in the sample for this study, the films of the 1950s and 1960s show a particularly discriminatory image of the woman scientist: the main task of the assistant comprises solely the sexual assistance she provides to the professor. Her task is to (sexually) satisfy the successful scientist, her work place is limited to the bed.

The lonely heroine (example: *Contact*, USA, 1997)



Figure 5.

The main character, Elleonore Arroway (Jodie Foster), has been interested in the stars and the universe since childhood. As a scientist, she is convinced of the existence of extraterrestrial beings and one day she receives evidence of this from Wega. She decodes a message from intelligent beings. This brilliant scientific discovery embroils her in diverse scientific and political conflicts. She is the first person (and along with her, the audience) to make contact with extraterrestrial beings yet she nevertheless has no scientific evidence . . .

The type of woman scientist described here can be found in more recent films.⁷ She has outstanding qualifications and her competence outclasses the men. She is possibly the most competent scientist in her special area. She is a modern, emancipated woman. She finds it natural to move within a male environment, and accordingly she also has appropriated some male traits. Her greatest (or only) interest is in her scientific research. The positive qualities of the image of science are linked up here: an insatiable curiosity, job as a calling, moral integrity, modesty, strong belief in visions. A likeable, good-looking and unrealistically young woman fills this role as well.

Similar to the second type of woman scientist, the “male woman,” here we also find a linking of rationality with female intuition. However, this type of woman scientist is different in the matter of factness of her sexual experience and self-determination. Sexual relations and scientific work are not mutually exclusive—as long as she keeps her priorities straight. This woman is not an old maid and also not a male woman; she is young, attractive, emancipated, and a highly competent professional, who even has experience with one-night stands. All in all, she is a strong film character. Nonetheless, she is still lacking something: professional recognition by those in power and the right lobbying, which her male counterparts deny her. Thus she remains in a restrictive situation, dependent on financial support and political and social recognition. Naiveté in dangerous situations, for example, or belief in the just distribution of financial means offer signs of her weakness. In order to be a match for those male-bonded structures, or to counteract them, this competent woman scientist still needs a male mentor. This maintains the suspense in the character.

In *Contact*, the main character, Elleonore Arroway (Jodie Foster), has six male and no female counterparts. Already when she was growing up, her father was her first mentor when she was learning radio technology and astrology. He is followed by a male colleague with whom she shares a fascination in research, a scientifically less competent, egoistic,

powerful, vain senior researcher, a powerful skeptic as representative of the US president, a super rich sponsor who offers her the necessary financial support and last but not least, a lover, who is her philosophical opponent. His role embodies the decisive power of granting or denying her scientific competence. In the end, this powerful female character remains particularly dependent on his recognition.

6. Conclusion

The cliché description of “mad scientist” does not apply to women scientists. They do not work in hidden laboratories on dubious projects but rather, remain solid “with their feet on the ground.” Female characters in feature films do not contribute to the build up of negative myths surrounding the image of science.

The role of the professional “scientist” is reserved for men; women are represented in less than a fifth of these roles.

The audience is surprised; “the professor” is a woman. The woman scientist tends to differ greatly from her male colleagues in her outer appearance: she is remarkably beautiful and compared with her qualifications, unbelievably young. She has a model’s body—thin, athletic, perfect, is dressed provocatively and is sometimes “distorted” by wearing glasses.

From the analysis of the character role of the woman scientist in feature films, clear transformations can be seen across the sample period. Although women scientists first had to choose between a career *or* a private life, in the meantime they are able to have both. Although once dependent on male mentors (father, husband), now it is “only” the system that holds them back. Femininity *and* intelligence can both be completely developed. Femininity and success, however, are mutually exclusive in feature films.

When the women scientists in feature films work in teams, their positions are subordinate to those of their male superiors. They also remain inferior to a male counterpart in terms of their scientific qualifications. The character role of the woman scientist presents more of a stereotypical woman’s role than the occupational role as a scientist. In the character portrayal, the professional stereotype is overlapped by a gender stereotype. From a dramaturgical perspective, the character of the woman scientist is employed to enable suspense. At the professional level of science they bring in intuition, emotional elements, love affairs, and feelings. They do not represent the rational scientific system of their male colleagues. They are therefore taken less seriously as “scientists.”

At a superficial glance, the differentiation between the roles of women and men scientists in feature films seems to have nearly dissolved since the 1990s. Appearing are powerful, competent, utterly qualified and feminine women scientists. Shown is the uniting of an intellectual and erotic person. Nonetheless, in the end, also these female characters remain dependent on male characters and in this respect stand in the second row, behind their male colleagues.

Despite a strong transformation of the images of women in film, the analysis shows that women’s character roles in general and those of the woman scientist in particular, are clearly subject to sexual stereotypes. This is problematic to the extent that also the social image of women scientists and their social relevance is influenced, as mentioned previously. In the actual scientific world, women are still structurally disadvantaged and discriminated against. In this respect, the depictions of women scientists described here portray social reality. Women still commonly stand in the second ranks of the scientific world, not because they are less qualified, but rather, because of strategic marginalization. The portrayal of women scientists that is oriented on their deficiency—either not a “real” woman or not a “proper”

scientist—contributes to the formation of myths about women scientists' lack of competence and therefore also to women's experience of social discrimination.

Notes

- 1 On the history of this study: during my student years in the late 1980s I was often confronted in my surroundings by questions that are the tasks and activities of sociologists. Most people had basically no knowledge of scientific work or the daily life of a scientist. Sociology was a particularly foreign field. Perhaps this was my motivation for completing my study of sociology (major: film sociology) with a master's thesis: "'Professor, mir ist nie aufgefallen wie reizen Du bist!' Eine film- und wissenschaftssoziologische Untersuchung zur Darstellung der Wissenschaftlerin in Spielfilm"—a study on the portrayal of women scientists in feature films. Around 12 years later, the theme of science's reception seems to be very popular and the inquiries about the results of my study have become so numerous that I have to check my results to make sure they are still up-to-date and valid. I wanted to know whether in the past 12 years anything had changed in the portrayal of women scientists or if new models and means of depiction were being employed. My curiosity in the theme was rekindled but, unfortunately, I realized that not much had changed in the portrayal of women scientists in feature films.
- 2 The term "Wissenschaftlerin" (woman scientist) in German comprises all scientific disciplines in the natural and social sciences and humanities.
- 3 The exact time of opening of the university to women differs according to country and academic discipline.
- 4 See: Women in Science Statistics, <http://www.awis.org/statistics/statistics.html>
- 5 See Petra Pansegrau and Peter Weingart, Forschungsseminar, "The Perception and Representation of Science by Hollywood", University of Bielefeld, 2000–2002.
- 6 The following study does not claim to describe the phenomenon in his quantitative aspects. For that, see Weingart and Pansegrau.
- 7 Here I would like to thank Robert Rosenstone for his discussion on updating my typology.

Filmography

- 2001: A Space Odyssey*, UK, 1965–1968
A Flash of Green, USA, 1984
A Nightmare on Elmstreet 3: Dream Warrior, USA, 1987
A Winter Tan, Canada, 1987
Adam's Rib, USA, 1949
Alien, UK, 1979
Aliens, USA, 1986
Another Woman, USA, 1988
Ansikte Mok Ansikte, Sweden, 1975
Barbarella, Italy/France, 1967
Beautiful Mind, USA, 2001
Brainstorm, USA, 1982
By Rocket to the Moon, Germany, 1929
Contact, USA, 1997
Continental Divide, USA, 1980
Daktari, TV-Series, USA, 1966–1969
Das Experiment, Germany, 2001
Desert Hearts, USA, 1985
Die Hinrichtung, Spain, 1987
Gorillas in the Mist, USA, 1988
Indiana Jones and the Last Crusade, USA, 1989
Moonraker [James Bond], GB/France, 1978
Jaws-2, USA, 1978
Jaws-3D, USA, 1982
Knight Rider, USA, 1982
La Citta Delle Donne, Italy/France, 1979
Leviathan, USA, 1989
Local Hero, UK, 1982
Mosca Addio, Italy, 1986
Murder By Night, USA, 1989

Ödipussy, Germany, 1987
Omega-Project, USA, 1985
Orca—The Killerwhale, USA, 1977
Piranha, USA, 1978
Project X, USA, 1987
Prototype, USA, 1983
Retribution, USA, 1987
Sankt Petri Schnee, Austria, 1991
Shadow on the Wall, USA, 1950
Spellbound, USA, 1945
Sphere, USA, 1998
SSSSSSSS, USA, 1973
Star Trek—The Motion Picture, USA, 1979
Star Trek, USA, 1966–1969
The Empire Strikes Back, USA, 1979
Terminal Choice, Canada, 1984
The Abyss, USA, 1989
The Andromeda Strain, USA, 1970
The Fury, USA, 1978
The Group, USA, 1965
The Six-Million-Dollar-Man, USA, 1973
The Surrogate, Canada, 1984
Them!, USA, 1954
Torn Curtain, USA, 1966
Tron, USA, 1982
Une Femme ou Deux, France, 1985
Yentl, USA, 1983
Young Einstein, Australia, 1988

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