

More Women in Science: an opportunity for Women or an opportunity for Science?

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Abstract

A significant presence of women in research, teaching, training, education, and decision-making responsibilities at the highest levels is a landmark for a healthy society. This is a society which is able to evolve, produce and reproduce, innovate and renovate. It is a necessary condition especially in the scientific and technological areas of the knowledge society, where the gender gap is quantitatively large. A brief, personal view is sketched to understand why the achievement of such a goal is so important and why we are so far away from it, and a few proposals are discussed along these lines.

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1. Introduction

2007 has been stated by the European Community to be the *Equal Opportunities for All* year. This decision has activated many initiatives all around Europe, and created occasions to debate and rethink about the meaning of equal opportunities, especially between women and men. It is one out of several demonstrations that *simple* political decisions may bring large differences, stimulate creativeness and favor real cultural changes.

MASCOT 2007 has been a distinguished opportunity of the kind, since the organizers have decided to devote a whole session to the subject of women and science within a regular workshop intended for research results in a specific

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discipline. I think that this idea they have realized, is a first neat example of what we should get used to do. The conference session was indeed participated by scientists of both genders, that is a normal scientific community. Questions and comments have been raised by men and women. To look even farther, a next realization of this idea could be improved to include men's voices and views in the speakers list. The issue of Equal Opportunities needs in fact to get out of the ever-lasting debates and discussions closed within the women's world, to finally enter the everyone's world. Because more women everywhere in the public life is not just an opportunity for women, but it is an opportunity for the whole society. This is the case in all possible environments, professional careers, politics, decision-making positions in general. And, of course, in science.

My view of this problem results from my personal experience, that is a woman composing a patchwork life: as a wife and mother, physicist and teacher/trainer, activist in women associations, and more recently within the Associazione Italiana Donne e Scienza [1], president of the Council for Equal Opportunities of the City of Pisa [2], component of directorial boards of a political party. It also results from sharing ideas on the subject with friends and colleagues in the course of many years.

The present contribution is organized as follows. I will first review in sec. 2 a few basic and relevant issues on women and careers, through the voice of one of my favourite comics characters, Mafalda by Quino [3]. The question of women and careers naturally leads to the issue of role models, treated in sec. 3. Here, after a few remarks on social and working models, Mafalda's voice is also used to introduce the subject of gender perception and specificity. This is first faced through the consideration of a few stereotypes, and then rooted through the results of a research, promoted a few years ago and still significant, by the (Italian) National Commission for Equal Opportunity. A personal answer on why more women in science would also be an opportunity for science, is presented in sec. 4 followed in sec. 5 by a schematic wish-list of actions which could be useful for women empowerment in science. A few concluding remarks are contained in sec. 6.

2. Women in the public domain: women on work

“I’ve seen the apartment of Libertà, it’s really small” comments Mafalda to her mum’s shoulders while she’s ironing. *“Ahà?”* is her mum’s answer. *“And I’ve met her mum, she works, her mum”*. *“Ahà?”*. *“Yeah, she translates from french”*. *“Ahà?”*. *“Because, when she got married, she didn’t leave her studies as many women do. It’s clear that she’s made up of more tenacity than “Ahà”.*” [3]

“You’re right Mafalda” Susanita tells her friend Mafalda *“I can’t be a woman like our mums, who’re happy with knitting and sewing”* Susanita keeps going *“Our generation is different. We’re the generation of the technology and space era, electronics, cybernetics, etc. etc.”* and yet *“Thus, I won’t remain in the ordinariness of tailoring and knitting. Never! Science is calling me!!”* and then the final decision *“When I’ll grow up, I’ll buy an electronic sewing machine! Cybernetics fascinates me!!”* (Mafalda lifts her’s eyes to the sky) [3]

In a normal world, tenacity and competences would correctly be two necessary conditions for pursuing a successful career at work or in general high positions in public roles. In *our* normal world, we can be sure that these are necessary conditions for women. There’s always something missing for women to get to the highest decision-making positions. Women are to be competent. When they are competent, they are to be experienced. When they are also experienced, they often need to play male-role models to fit the system and have real chances for career advancements. This is one reason why it is crucial that the number of women in key-positions become large enough.

There’s no reason to replicate in detail the usual sadly known numbers. It is sufficient to remember that in Italy young women graduate better, faster, more. To fall, after the PhD, into both horizontal and vertical segregation. Horizontal segregation dangerously disfavors the presence of women in the scientific and technological areas, though less than in other countries. As to the vertical segregation, gross numbers say that the percentage of women is almost 60% among the graduated students, about 50% among PhD’s, slightly more than 40% among researchers, about 25% among associate professors, less than 15% among full professors. A very few women are leaders of large projects, almost none leading research or academic institutions, still too few in all kinds of evaluation committees. This 15% seems to be a kind of magic percentage, as it is about the the fraction of women entering any kind of decisional-making Italian institution.

However, a few more numbers are perhaps less known and should be taken into account. While only about 12% of women submits projects, about the 80% of these projects is granted, against the 25% for men. This quality *vs.* quantity issue will come back later in sec. 5.

If women were in a large enough number, they would likely allow themselves to play their own different, female-role model. Which is not necessarily better or worse than a men-like model. It is just different. Besides being a democracy principle, having more women in leadership positions would thus mean an opportunity for the whole society to be rich of new and different resources.

3. Role models

The question is which are the male and female role models. I would distinguish two categories. Roles that hinge on irreducible differences and roles that have been socially built up. The former are the essence of gender specificity, and are hopefully hard to be changed, that is to say that they can be modified on the longest time-scale of human beings evolution. The latter have for centuries been just a simplified representation of gender differences, where men characteristics are considered better suited to public-life roles whereas women specificities to private-life roles. As such, they are fortunately doomed to change on the shorter - yet long - time scale of society evolution, and in fact significant modifications are being visible in the last decade.

An analysis of the first role category goes to the heart of the question posed in the title of this contribution. Before proceeding to discuss in more detail gender specificity, a few remarks on the second role category is in order.

3.1. Social and working models

Social and working models have been subjected to enormous changes in the last one or two decades. The age-differentiated system has died, where youngs learned, mid age individuals worked and elder persons find ways to spend their free time. It has been almost completely replaced by the age-integrated system, where learning, working and free-time living are activities balanced over a whole lifetime at any age. The age-integrated system is so similar to the usual way women play the game of balancing work, life and long-life learning, that the term *feminization* of the labour market is often used to label this currently most widespread working model. This hinges on flexibility, a very attractive and modern concept bearing a lot of positive opportunities, if it were effectively realized while guaranteeing the individuals rights.

This working model especially fits the Italian academic and research environment, where balancing work and life can become an unusually hard task. Researchers have real opportunities to get permanent positions when they get close to the 40es. When both productivity and reproductivity capabilities have well started to roll down from their maximum. Even harder for young women, this situation is not easy at all for young men either, as remarked in the interesting article *Cervelli in...cinti (i.e. Pregnant brains)* by R. Gini [4]. This is the way creativity - intended at least in the two above meanings - is severely frustrated in Italy. This occurs in spite of a very good legislation, as *e.g.* the Law n.53 8 March 2000 to begin with, which is one of the best in Europe at least if not worldwide; in spite of huge cultural steps ahead that young generations have made, whereas men and women are get used to share family-care [5].

To conclude, old working models (age-differentiated) have hampered women careers. The same is going to occur with current working models (age-integrated) as they are often played with old cultural attitudes. However, it has to be clear that current working models do not hinder women *per se*. Women are just more used to flexibility during multi-tasking activities, with a long-lasting

practice in work-life balance. But any individual who conceives life as a puzzle composed of many pieces would end up to be hindered. Men too.

3.2. Perception of gender specificity: wishes and fates

Scientists share a general consensus on the fact that some gender specific characteristics have survived, with slight though visible modifications, eras of human-being evolution, remaining written in our brains [7]. This is a fortunate event, because real differences are left between women and men. These differences make life interesting, and society more able to solve its own problems and positively evolve. Once I have locked the keys of our rented car somewhere inside the Mesa Verde National Park (USA). Other visitors passing by have notified the rangers that we were stuck. Two rangers arrived to help us, extracting different tools from the large trunk of their pickup. Each of them placed himself to work on either one of the front doors. The *tech* ranger had a booklet with all the electrical schemes of all possible car models, and a tiny wire which he was very gently inserting between the door and the window, trying to reach the exact unlock spot in the circuitry. The *brutal* ranger instead started hammering a wedge between the car roof and the door on the topside. In less than a few minutes the car was unlocked. It is immaterial to know who succeeded first (and I will never reveal it, neither under torture), as each of the two methods had goods and bads. The obvious remark here is the possibility of exploiting different abilities and tools, which makes like simply more easy. In this story - and in general I believe - it made life also more fun.

The problem with women specificities is that they have for too long been segregated. That is, to use an euphemistic statement, they have been considered better useful in private, family-like, environments. It is time, and there are almost suited social conditions, to recognize that this is not necessarily the case. It is time to recognize that women specific characteristics can be helpful to “unlock the car” also in public spaces *and* that men specific characteristics can be helpful in private spaces, actually they are even needed to grow up kids with more and better abilities. The two statements above should never be sold out as disjointed.

Which are these specific women characteristics, which are so often and unfortunately simplified into stereotypes and fates? Once again, I will use Mafalda’s voice to start with. Then I will root these story-board concepts on data extracted from an opinion poll by CENSIS.

The Mum-Fate I: energy sources available always and anyways

Mafalda's little brother Miguelito is dreaming, full of love, of being on his mum's lap, when he decides to pass from dreams to actions. "Mummy!" he cries out smiling and wide arms to his mum, who is in turn wearing housewife-style clothes and tiding up. "Stop saying mummy and go away, as I've a whole lot to do!" she answers nervous and angry. Miguelito does not give up, finds out a little toy car, places it in strategic position at the door-step. Miguelito's mum arrives and crashes down slipping on the little car. Next picture is Miguelito sitting on his knocked down mum and thinking "Here she's, mummy!". [3]

The Mum-Fate II: energy sources available always and anyways

Mafalda's mum is breastfeeding the newborn son, shoulders to the reader, while Mafalda is assisting the event and the tasty sucking up noises. First picture sees Mafalda smiling. Second picture, Mafalda is seriously thoughtful, while the little brother keeps sucking with greed. Third picture, Mafalda's face is increasingly puzzled. Last picture, Mafalda finally shares her thoughts with her mum: "Perhaps he believes you are the Venezuela and he's an oil company" she suggests. [3]

The sweet-and-warm fate -but-so-hard-to-understand

Mafalda is together with her friends Felipe and Susanita, and switches the discussion on. "Could you figure out a woman president of the republic, Felipe?" she fires. "God save us" answers Felipe lifting his eyes. Susanita enters the discussion "Ehi! just for you to know it. Women are more clever than men! CAN YOU UNDERSTAND?" she shouts angrily. "And more kind and noble! CLEAR?". "And more sweet and loving! ALL RIGHT?" she thunders in an increasingly aggressive manner, while waving a brick against Felipe. Who, scared, dashes away while thinking "And then people say that women are hard to be understood?". [3]

The educator-fate (and where are the men?)

The youngest Libertà is at school, answering to the question of her teacher: "What's the highest mountain of America?" asks the teacher. "It is a mountain, I've seen it on a magazine with picture and anything" answers Libertà. "Yes ok, but what's its name?" the teacher insists. "I can't remember, but it doesn't matter" plainly replies Libertà. "HOW IT DOESN'T MATTER?" shrieks the teacher. "I've the magazine at home. Tomorrow I'll bring it and we'll have a look at it together, eh?" Libertà assures her teacher. "NO! YOU'RE JUST GOING TO COME WITH WELL DONE HOMEWORKS TOMORROW! HAVE YOUR SEAT" keeps shouting the teacher to a gloomy Libertà. "You must be a very lonely woman, miss, very lonely" comments Libertà.

Knowledge, Experiences, and Role Models are handed down generations, from mother and father to sons and from mother and father to

daughters I

“*Stop it!*” shouts a mum to her desperately sobbing and crying son on the road, Mafalda assisting the scene. “*I want a bit of ...*” “*PEACE!!*” storms the lady while slapping her son’s face. “*Allegoric, though!*” comments a perplexed Mafalda.

Knowledge, Experiences, and Role Models are handed down generations, from mother and father to sons and from mother and father to daughters II

Mafalda is eating the usual hated soup, definitively disgusted, frantically swallowing spoonful after spoonful, to end up the torture as quickly as possible. “*Did you finish ALL of your soup, Mafalda?*” inquires her mum. “*Puah! Yeah!*” replies back Mafalda, yet more disgusted, if possible. “*The soup which was in your plate yes, but the one sticking on your face no! Wipe yourself off!*” states reproachful Mafalda’s mum. Mafalda wipes her face off while sharply commenting “*It will be worse and worse when a psycanalist will have to wipe away ALL the soup sticking to my subconscious!*”

The complexity-fate and the relationships system (Theres only one mum. Or not?)

“*There’s a guy at the doorstep*” indicates Miguelito to her sister Mafalda. Mafalda steps at the door. The guy, a distinguished full-teeth smiling door-to-door vendor, asks Mafalda: “*Good morning, baby, is your mummy in?*” “*It depends*” is Mafalda’s prompt answer, “*Which one?*” “*What do you mean?...*” asks terrified the guy “*How many mums have you got?*” “*Uff!*” sighs Mafalda, before starting and enumerating: “*One who adores me with all her soul...another one who persecutes me with the soup...another one protecting me...another one spanking me... one who’s happy...another one who’s slave of the house...another one who...*” she keeps going. Next picture is Mafalda standing out the house door, staring at the dust that the dashing away guy has left behind, while her mum asks from indoor “*Who was out there Mafalda?*” “*Beh!...*” thinks Mafalda weighting her thoughts, “*A door-to-door vendor whom someone had sold out the one that there’s only one mum*” calmly explains Mafalda to her desolate mum.

3.3. What women would bring different (not more, not always)

Without going into the detailed data, an opinion poll performed by CENSIS a few years ago in Italy, under the promotion of the Commissione Nazionale per le Pari Opportunità, provides many interesting hints on the perception of gender specificity. It renders a picture of italian society which, at that time (2003), was a way more advanced than the average proposal capability of institutions and

political actors was. Positive and significant signals eventually begin to show up in the very few last years in this regard.

According to this opinion poll, both women and men think that women are skilled by a more pragmatic approach, more inclined to mediate and to obtain consent, not necessarily more autonomous or less aggressive than men. The opinion poll evidences that women are on average more open than men to welcome diversities (as *e.g.* in the case of immigrants), more demanding on the quality of public services (schools, transports, health-care system) and of environment protection. Yet, the interviewed sample evaluates very important to have more women playing public decision-making roles and thinks that women somehow would play a different leadership model. One may also add to these data that the women-like leadership model is on average (not always) based on networking experiences and competences, more than on hierarchical organization, and includes effective communication skills and emotional intelligence among the resources that can be (if trained and positively oriented) be used for problem solving. It is not very surprising, but dreadfully true, that leadership skills and women have so far been considered unfitting to each other. As D. Tannen states [8] *"If a woman speaks using the women style, she is considered an inadequate leader. If she speaks using the leader style, she is considered an inadequate woman"*.

These characteristics make women especially inclined to a multidisciplinary and integrated approach in knowledge, as well as to different group-leading and different role models in young training and education. In passing, together with flexibility these are all the main and basic tools to be found in the surviving kit of present and future researchers [9].

4. Why Would All This Be Useful to Science?

There are at least two types of reasons why more women in science would be an opportunity for science. There is first of all a principle reason, that is the realization of democracy. Then, there are several reasons of practical usefulness, a few relevant of them being listed below.

First, as already remarked, a society where all differences have citizenship is more effectively able to evolve and improve. Using a metaphore, the result of giving value to gender differences and equally empowering women and men, would provide the society with *"two equally powered wings to be able to fly far away"* [10]. Second, we have seen how women are naturally inclined to survive the evident crisis which is overwhelming the research and academic system, at least in Italy and Europe. As a consequence, it thus might help introducing new role models in methodological approaches, research quality evaluation, group leading, and training. In any event, we would be forced to think over the existing role models, single out what makes them non effective, and think out new solutions.

5. What Can We Do?

Along the lines of the previous sections, and closely following the proposals from the work of E. Molinari *et al.* [11], a list of actions to be taken would include: think over (i) the mechanisms used in evaluating research (see the numbers on the granted projects in sec. 2) and teaching; (ii) the mechanisms used while selecting men and women to access first steps in career as well as governance positions; the working conditions and the organization of everyday life in the laboratories; (iii) change the role models to which young men and women may look at.

To this list of actions, I would like to add a few comments. First, for the success of action (iii) it is crucial the success of action (ii). Women and men in governance positions who are unable to play the correct role model will prevent young women and men to correctly grow up. A similar risk occurs when those young women and men are fed into the system, who replicate since the beginning the existing uncorrect models. As remarked in sec. 2, the number of women is also to be large enough, to effectively root female role-models.

Second, a few tools can be proposed to pursue the listed actions. Politics should introduce reward/non-reward policies at economical (even fiscal) and funding level to encourage those academic and research institutions who are committed in such actions, and of course monitor all the above. Gender auditing and budgeting in research and academic institutions could be an effective, transparent and fair tool for verifying the effects of political actions and re-addressing the decision makers.

6. Concluding remarks

Opening with Mafalda's voice, closing with Mafalda's voice.

Two bald, middle-class men are stepping on the sidewalk ahead their car, Mafalda walking behind, staring at them and listening. One to the other “*Change the world! Ah!... just kids ideas!*”. “*Me too, when I was a child, I had such ideas, and look at me now!...*”. Mafalda keeps staring at the car while it flashes away. Then she runs back to her friends, who are playing soccer on the street, and shouts, worried “*Damn, guys! It seems that if one does not hurry up to change the world, then it is the world who will change him back!*”

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