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EXCELLENCE IN SCIENCE: A CRITICAL AFFIRMATIVE RESPONSE[1]

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ABSTRACT

Excellence in science is defined as a neutral process for the selection and recognition of worthy theories and researchers. This principle is based on the metricization of academic life through employing universal criteria that support fair play and equal opportunities. However, feminist theories have claimed that the organization of science based on excellence is never neutral or objective. Meritocracy reproduces inequality from social structures, particularly those related to gender stereotypes and barriers in researchers' career evaluation, as well as research outcomes. In this paper, we propose that excellent knowledge is produced only through gender and science in the making.

PROFESSIONAL DEVELOPMENT • MERITOCRACY • WOMEN • INTERDISCIPLINARITY

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RECENTLY, A REVISION OF HOW WE PRODUCE KNOWLEDGE IS BEING RECONFIGURED and well-known feminist debates on objectivity, neutrality and how we conduct research have been revitalized in the academic field (TICKNER, 2006; ASBERG et al., 2011; SCHIEBINGER; SCHRAUDNER, 2011; KELLY; BURROWS, 2011; CODE, 2014). Science has been built on the idea of excellence as more of an individual, competitive pursuit than a collective and relational creation of knowledge. This definition leads to the evaluation of knowledge and researchers' careers according to the funding provided for projects, research careers and scientific institutions.

Excellence prioritizes neutrality and objectivity as universal principles that ensure fair play and equal opportunities, thus guaranteeing the advancement of both knowledge and the people conducting research. However, feminist theory has claimed that the organization of science based on excellence is never neutral or objective (HARDING, 1986; HARAWAY, 1991; GRIFFIN, 2004) or equal and fair (BAGIHOLE; GOODE, 2001; SEALY, 2010; REES, 2011).

Firstly, many factors related to historical and social forces bias knowledge production so that it is oriented only toward specific areas of interest. Thus, content, methodology and quality of research are constructed by gatekeepers in research. Secondly, the generalization of excellence in order to pursue a single model leads to ignoring invisible local structures and individual factors that involve scientific traditions

(for example in humanities and social sciences), thus ignoring new emergent areas of knowledge that are based on the hybridization of different traditions. Thus, interdisciplinarity is punished by "regimes of homogenization" (EVANS, 2006) that value excellence through rankings in scholarly journals and a feedback system of citations (KELLY; BURROWS, 2011). And thirdly, citation practices involve subjective processes that recreate hegemonic knowledge, producing and re-producing equal standards of knowledge and partially informing genealogies of knowledge (HEMMINGS, 2011).

The idea of excellence encompasses the idea that every researcher has equal opportunities to achieve outstanding professional goals, unhampered by external barriers or prejudice. However, it hides the materialization of invisible oppression and sustains inequalities towards women's differences. Therefore, "excellent science" re-establishes hierarchical structures of knowledge production, which are reflected in the evaluation process and in the recognition of meritocracy. As Scully (2002) said, meritocratic ideology legitimizes inequality based on liberalism, since the "poor must try harder" to get ahead (SCULLY, 2002, p. 399). Furthermore, elitism involving excellence-based meritocracy sustains new managerialist practices in higher education and research institutions (DEEM, 2009, p. 14). Knowledge has *always already* been power (FOUCAULT, 1976) and an asymmetrical distribution of knowledge is *always already* a hierarchical distribution of power. In this article, we argue that a hegemonic conceptualization of science disregards "situated knowledge" (HARAWAY, 1991; CODE, 2014), prioritizes the objective collection of information over subjective and qualitative approaches and, therefore, discards research that diverges from the dominant model of natural science. Such conceptualization is a centripetal force that absorbs any other model of knowledge and dismisses those sciences concerned with human interpretation and subjective meanings (ADKINS; LURY, 2009). In contrast, we aim at proposing a critical affirmative response in order to introduce a diverse and multiple conceptualization of science based on *gender-and-science in the making* (BARAD, 2007), a methodology in which the evaluation of knowledge and the structure of scientific institutions intersect. This conceptualization is a feminist situated goal that proposes a revision of excellence and meritocracy.

In the next section, we address the historical genealogy of the principle of excellence in science. Secondly, we outline the main concepts that regulate science to uncover many myths on neutrality, objectivity and individual merits. Thirdly, we revise the hegemony of scientific cultures based on male-dominant environments that govern the principles of excellence in careers in order to understand what is at work. Fourthly, we set out the affirmative response for reshaping

the current concept of excellence through the theoretical framework of agential realism. Finally, we present our conclusions.

THE GENEALOGY OF EXCELLENCE IN SCIENCE

The idea of excellence has been adopted as a common regulation principle in science. Along that line, the European Comission (2011, p. 4) aims to *raise*:

> [...] the level of excellence in Europe's science base and ensure a steady stream of world-class research to secure Europe's long-term competitiveness. It will support the *best ideas*, develop talent within Europe, provide researchers with access to priority research infrastructures, and make Europe an attractive location for the world's *best researchers*. (emphasis added)

Thus, the European Union supports excellence by financing system-oriented research based on meritocracy which organizes knowledge production, scientific institutions and talented careers. This pillar of the *Horizon 2020* consists of a framework with four main actions: the European Research Council, future and emerging technologies, Marie Sklodowska-Curie Actions and main research centers.

The paramount presence of this concept had increased in scientific knowledge by 2000, as reflected by the growing number of articles aiming at the production of excellence (e.g., articles compiled by ISI Web of Knowledge), meaning the quality of outstanding products. Furthermore, excellence has become a central idea in public science policy and it regulates the most important processes in research. Excellence proves that applied research is helpful for society and, nowadays, the introduction of Responsible Research and Innovation (RRI) by the European Commission is aimed in this direction. However, there is a lack of critical reflection about what criteria are the best indicators of excellence (in research as well as for qualifying researchers and research centers).

The objectivity and experimental methodology of the natural and experimental sciences have dominated the configuration of excellence in knowledge since the beginning of modern science. Its methodology of validating the scientific model and prioritizing resources is imposed on the other knowledge fields. As a consequence, those areas pertaining to the tradition of humanism are relegated to a lower status (SNOW, 1961). During recent decades, researchers in humanities and social sciences have pushed for the adoption of the natural and experimental canons in order to preserve resources and reputations. However, humanities and social sciences should participate

in economic value creation (ADKINS; LURY, 2009), since technological advancement is not the only factor involved in human progress. Even when these areas are included in excellence frameworks, hybrid areas emerge which contain strengthened experimental models, such as with human paleontology. In contrast, philosophy has declined in higher education, and humanities/subjective fields are threatened in terms of funding and reputation. Therefore, as Spongberg (2010, p. 106) claims, it is time to demonstrate social usefulness and create international forums of resistance, which should be carried out by feminist, humanities and social science scholars.

The quality of every kind of research is based upon the evaluation of its methodology and outcomes. These stem from experimental and empirical observation and are apparently neutral and objective. Nevertheless, the history of science has amply proved that no objective knowledge is neutral, but rather, it is guided by main theories and fixed prejudgments (LONGINO, 1990). Social and political contextualization drives knowledge production (KUHN, 1962; LAKATOS, 1978; FRIEDMAN, 2001) and even decides about scientists' authority (CODE, 2014). Furthermore, not all that is brought by new discoveries and technological advancements is to the benefit of society; some historical examples have caused disasters to humanity (e.g., the H-bomb and the impact of the Green Revolution in Africa and India), and most of them had not proven ex-ante the positive or negative direction they would take. However, the goodness of objectivity and neutrality rules the principles of research activity.

Natural science has been historically constructed by a majority of male actors who have shaped a male conceptualization of research. Women's perspective has been long disregarded in research as their voices and approaches were obscured by the male dominant role (HARDING, 1986; HARAWAY, 1991). Moreover, when women are included as researchers, they primarily reproduce the same schemes as their male colleagues as they need to adapt their vision and manners to the predominant and hegemonic discourse. The inclusion of sex and gender approaches in research has been emphasized more recently by some authors (SCHIEBINGER, 2001; CODE, 2014), however, we must recognize that feminist approaches are still pending. As Code (2014, p. 17) affirmed, we need an "epistemic agency that cut generically across the category of 'woman' and specifically across diverse, intersecting groups of women". We definitely need to introduce subjectivity into the epistemic terrain and into the collective construction of knowledge where subjects are included in the process of making science.

Meanwhile, the universality of the concept of excellence also entails homogenization in scientific institutions, thus modifying the reality of local contexts, diversity of knowledge and contextualization.

Lorenz-Meyer (2012, p. 242) states that the hegemony of excellence in research has a geographical impact on scientific institutions. Fassa (2015) also explains how the pursuit of excellence has profoundly changed the local and regional configuration of academia. According to Griffin (2004), different conceptualizations of 'excellence' appear concerning the geo-political context: enterprise excellence, citation excellence, global/local excellence and the (non)feminization of excellence (LORENZ-MEYER, 2012). Taking into account the geographical context, Lorenz-Meyer describes different types of evaluation in research labs. Laboratories and departments are agents that evaluate research outputs (MOSCOWITZ et al., 2014); they control their own rules, propose priorities and set values for researchers and their students. In contrast, the European policy reinforces excellence as a universal principle, therefore, in opposition to local dynamics.

As Griffin (2004, p. 127) states,

> [...] although it is widely acknowledged that there is no gold or absolute standard in terms of which to measure excellence, scientists, academics and evaluators alike, who are involved in its measurement, act and talk outside the assessment context as if such a standard existed, even if it is blatantly obvious that we are dealing with situated decision-making.

Griffin proposes a definition of excellence entirely dependent on context. She even defines "assessment criteria" as a situated concept because subjects cannot be erased from the process of knowledge production. This calls for a feminist approach to excellence in which the traditional male model is not the only one (SCHIEBINGER, 2001; KREFTING, 2003). We need to disrupt pre-established categories in institutional organizations. We argue that "science-and-gender-in-the-making" (BARAD, 2007) can only produce excellence in science which aims to improve the conditions of life (RRI is an opportunity to reinforce this position in the European Research Area). Thus, we will approach three different material changes that will be further developed in the following sections. First, we will overcome the ontological separation between researcher and research, which Barad (2007) calls "representationalism", a separation that produces constraints on the creation of knowledge. Second, we will focus on the entanglement between methodology and object of research in order to observe how scientific merits are always subject to particular conditions that reinforce scientific gendered materialization. And third, we will advocate a qualitative shift in terms of assessment basis, i.e., a shift from individuals to critical mass, in order to produce knowledge oriented to human concerns and social quality of life.

THE MYTH OF OBJECTIVITY IN SCIENTIFIC EXCELLENCE

There are different approaches to the concept of excellence which relate to the subjects involved and refuse objectivity as its sole organizing principle. Some examples are the exploration of the socio-political context of knowledge production (TICKNER, 2006), the strategies developed by institutional organizations (NIELSEN, 2015) and the career paths of scientists, which imply multiple social factors (REES, 2011). Considering objectivity as a rule and taking certain social factors as separated from each other results in 'structural bias' (NIELSEN, 2015). Therefore, we propose to deal with the diverse contexts of all these elements and actors related to subjectivity in producing situated knowledge (HARAWAY, 1991) and global/local knowledge of excellence (LORENZ-MEYER, 2012).

Objectivity seems to drive the definition of research problems, but political context and oriented policy lead scientists to investigate some areas rather than others. Tickner (2006) explains that international relations have been marked by the political context emerging from September 11 and the global terrorist threat. The author demonstrates that subjective and political decisions affect the content of research and the direction of research questions. In this respect, the content of science itself responds to a hierarchical distribution of knowledge production (FOUCAULT, 1976). Tickner (2006) defines this process as the result of the classical division between object and subject in science, which is largely criticized in feminist theory (HARDING, 1986; HARAWAY, 1991; BARAD, 2007). As a consequence, taking a feminist position on this issue requires questioning the traditional hegemony, thus bringing about relativistic, subjective and non-factual (or, rather, embodied) approaches.

Excellence rises in parallel with neo-liberal managerialism, which operates under the principle of effectiveness and efficiency (TROW; CLARK, 1994; DEEM, 2001, 2009). Under meritocracy, only a group of scientists is able to obtain funding from research gatekeepers, and the most prestigious scientists get both reputation and resources, thus creating unequal conditions for research and innovation as well as for advancement in academic careers. Elitism is inherent in hierarchical structures as it regulates access to higher positions through peer recognition and, in the end, only a few researchers receive the majority of resources (MERTON, 1968). Promotion depends on social networks and subjective evaluation of merits. Kanter (1977) explains the extent to which women face difficulties to achieve high positions due to what she denominates the "boys' club".

Thus, excellence is not only presented as the repetition of a dominating research profile but it also values the recognition

of individual subjects rather than an aggregate of subjects solving a problem. In spite of interdisciplinary discourses, it mainly rewards individual over collaborative achievements, even when these are very likely the result of collective work. Across Europe, excellence emerges from the creation of prestigious local centers through the attraction of national research talent. Outstanding research leaders usually move a lot through temporary destinations, so that their connection to local environments may be a poor one. In fact, contrary to national governments' intended strategy, neither innovation nor resources are transferred because patenting and funding are linked to the centers where such leaders work. Even the creation of new talent may disappear if the leader eventually decides to undertake mobility with his whole team. The elitist talent attraction model can cause policy-making bodies' agentiality to disappear, since there is no creation of critical mass embedded in the local socio-geographical space. From a feminist perspective, this critical mass should integrate a diverse group of people where the female perspective would be incorporated.

Moreover, the objective and neutral character of universal criteria for personal merits is questioned by the literature (KELLY; BURROWS, 2011), since the evaluation of people's curriculums is opaque and produced by peer-review assessments which are subject to prejudice, social stereotypes and subjectivity (PARK; PEACEY; MUNAFÒ, 2013; REES, 2011; VAN DEN BRINK; BENSCHOP, 2011). Although "successful theories are not necessarily good theories" (DAVIS, 2008, p. 78), successful goals define what to research, how to research, what to write and where to send the outcomes (KELLY; BURROWS, 2011).

In addition, excellent research careers have outlined an ideal model of progression where talented scientists would follow the same pattern and have similar profiles: male, white and young, discovering and disseminating a successful idea for mankind's advancement. However, this abstract model does not exist, since many social factors interfere with these trajectories (POWEL; MAINIERO, 1992; LONG; FOX, 1995; BAGILHOLE; GOODE, 2001; KREFTING, 2003). Accepting this idea (which is supported by legal regulation in scientific institutions) involves accepting engagement with individual scientific performance, which is related to researchers moving across countries and research centers, publishing in specific journals and applying for prestigious funding projects (ADDIS, 2004; LORENZ-MEYER, 2012; KELLY; BURROWS, 2011). Thus, the knowledge created and distributed follows a feedback system in which the same patterns are produced and reproduced. Particular journals and research projects have their own material constraints, with their preferences for a certain type of research (empirical over theoretical), theme (natural sciences over social sciences) and methodology (objectivity over subjectivity). As a result, this creates a

model of science that reinforces the dominant structure and knowledge, rather than incorporating new approaches that contribute to improving the social state of being. In other words, conservative opinions preserve hegemonic ideas and dismiss surprising findings, despite the fact that key questions remain unsolved.

The assumption of neutrality in meritocracy evaluation processes ignores the fact that the measuring criteria have already been pre-established by gatekeepers. Some merits are relevant for progression in academic life while others remain marginal (KREFTING, 2003), and the adoption of the natural science model is mandatory for every discipline, even though some researchers are reluctant to accept such criteria. Not only the decision about items, but the whole evaluation process is a social process based on symbolic and material power (SEALY, 2010). Moreover, as van den Brink and Benschop (2011) affirm, this career progression evaluation is a gender-biased construction. Both the excellence and objectivity guiding the selection of candidates are highly questionable since peer reviewers are social agents in the decision-making process. The evaluation assumes that objective criteria separate excellent candidates from the rest, i.e., non-excellent researchers, without any social or subjective interference. However, according to Van den Brink and Benschop (2011), women are at a disadvantage compared to their male counterparts when seeking specific jobs, because senior researchers judge them as less competent or unsuccessful. Likewise, the study conducted by Moss-Racusin *et al.* (2012) indicates a subtle bias against female candidates in hiring processes, as the authors found gender interaction in results of evaluation processes in the United States.

SCIENTIFIC CULTURE: SETTING THE BASIS FOR HEGEMONIC KNOWLEDGE

Meritocracy is viewed as a quality standard for guaranteeing the promotion of individuals along their career paths and creating an objective "representation" of reality, though this may be illusory. Such contradictions have been widely studied by feminism with regard to the precarious situation of women participating in science (ABIR-AM; OUTRAM, 1989; ROSSITER, 1993). Our view is that this state of affairs produces a gendered materialization that entails a hegemonic male approach based on the ontological separation between researcher (an active agent) and research (a passive reality). We affirm that a complex understanding of the signification process in empirical science (DE LANDA, 2006) is necessary. We believe, moreover, that the (in)visible reinforcement of a representative "objectivity" must be rejected as the only metricization of the object of research, the result of which

is presented as neutral knowledge of greater quality. This allows researchers to materialize a structural hegemony and power distribution in research institutions and even in society as a whole.

The scientific culture is gender-blind to structural conditions involving male and female scientists, although women clearly face more difficulties balancing professional and family duties. Firstly, male and female researchers have diverse social and family contexts, which influences the model of career progression and trajectory they are able to develop. Secondly, when scientific organizations are male-dominated environments, women's progression is harder because of invisible, yet serious discrimination (AUGUST; WALTMAN, 2004; FAULKNER, 2009). This is reflected in women's dropout rates, slow progression and scarce representation in influential positions in organizations. The fact that few women reach top positions contributes to women's feeling discouraged from pursuing scientific careers and it negatively affects expectations by both researchers and gatekeepers in science with regard to female competence and possibly excellent work. Many institutions have introduced policies to improve women's retention, including programs and positive actions such as vocational training, mentoring programs and equality units and observatories. The impact of these, however, is generally limited (LEE; FAULKNER; ALEMANY, 2010). This failure proves that we need a new paradigm concerning how research is conducted and how the evaluation of worthy knowledge is organized.

A life course approach reveals the problems women are faced with throughout their trajectories. It shows that many important events in career progression (doctoral dissertation, postdoctoral mobility and first permanent positions) intersect at a crossroads with family formation and motherhood. Powell and Mainiero (1992) confirm the unpredictable sequence in women's careers over time, as women must manage both professional goals and work in the home. Even when scientists have managed to sort their work-life balance out (e.g., when they hold a high position and housekeeping is carried out by someone hired, or when couples take on co-responsibility), other questions persist concerning the time they plan to fulfill the merits necessary to advance in scientific careers according to structured standards in science (GONZÁLEZ; VERGÉS, 2013).

There is an assumption that women are strongly family-oriented and this biases superiors' and evaluators' judgements about women's ability to perform in their professional careers. This becomes an excuse for women to be held at a disadvantage – e.g., women are reported as less favorable to mobility in multinational companies, although their mobility rates are similar to those of their male counterparts (ADLER, 1984; FORSTER, 1999). Kanter (1973) coined the concept of the "old boys club" to reflect the homosociability of groups enacting influential

decisions in organizations. In male-dominated scientific institutions, positions and awards were offered to their "equals", i.e., senior white males. Frequently, women's outstanding results are rejected because they are not supported by the decision-making group. It is very rare for women to hold gatekeeper roles in scientific institutions, which prevents young women from being promoted and creates a hostile scientific culture (ETZKOWITZ; KEMELGOR; BRIAN, 2000). Female networking, or the constitution of an 'old girls club', is a recurrent suggestion in order to strengthen female representation in committee boards, evaluation committees and other influential institutions in science.

Research on academic cultures shows that men and women have different perceptions and ambitions. Fels (2004) found that women's innate modesty makes them more likely to give up their professional goals than their male counterparts. This "modesty" fosters prejudice against women concerning both women's opportunities and their superiors' decisions, drawing an invisible, yet material line between male and female excellence in heading research in departments. In addition, socialization in strongly male-dominated environments at scientific institutions encourages women to keep a low profile. Ambition is a social construction typically associated with brilliant men. Thus, women with ambitious plans in academia diverge from the norm and are judged very harshly, when their opinions are espoused at all by other women. Moreover, hegemonic values impose standard criteria that affect men and women, as Heilman and Chen (2005) show in a study on altruistic behaviors. The authors conducted three experiments to validate that altruistic behavior would enhance men's favorable image but not women's. They demonstrated that violating such norms caused women to be judged as non-altruistic, and they tended to be punished for breaking gender stereotypes assumed to be universal (HEILMAN; CHEN, 2005).

This social expectation affects female performance in areas such as engineering, a strongly male-dominated context. The (in)visibility paradox (VAN DEN BRINK; STOBBE, 2009; FAULKNER, 2009) explains how women are extremely visible as women but invisible as engineers. Thus, they try to act like "one of the boys" to fit in the male environment. The social dynamic of organizations confirms the existence of a patriarchal order where the "One" is the opposite of the "Other". The One is the model of the elite male scientist whose performance is based on objectivity and empiricism, while the Other is the female, non-elite candidate. Dual compositions rule every dimension of science from the determination of result validity to the selection and recognition of excellent trajectories (those who develop a linear career).

Feminist research has widely denounced the creation of a dual system that includes a hegemonic figure, or normative structure, and

the rest. This has translated into many different approaches, such as those of the one and the other in post-colonial theories (SPIVAK, 1988), of difference as a negative property that is "less than" in feminist contemporary philosophy (BRAIDOTTI, 2006), of normative and outside the norm in post-structuralist approaches (BUTLER, 1990), and of hegemonic genealogies of knowledge production and minor traditions of knowledge (HEMMINGS, 2011). Although widely criticized in feminist knowledge of very different traditions, this dual pattern continues to pervade every sphere of socio-cultural life and knowledge structures. Thus, for the phenomena under study in this article, the One includes the researcher profile and type of knowledge described earlier, i.e., white, upper class, male and working in natural sciences, whereas whoever/whatever does not fit this profile/type of knowledge is defined as the other or "less than." Women who wish to pursue successful careers should adapt their personal and professional strategies to the hegemonic values of the One, which corresponds to a model shaped by gatekeepers who are traditionally men.

A CRITICAL AFFIRMATIVE RESPONSE TO EXCELLENCE

The previous section suggests that research organizations were created by male traditional values, and that excellence is constructed as the norm. The shift in higher-education and research institutions towards new managerialism, marketing and entrepreneurialism (TROW; CLARK, 1994; DEEM, 2001) reinforces excellence and meritocracy in order to legitimize inequality, while producing a hierarchical distribution of power (SCULLY, 2002). The universalism of excellence erases diverse approaches concerning contents and socio-geographical context. In this section, we focus on how knowledge production reproduces a hierarchy of knowledge based on the distance between subject and object in conducting research, a distance we affirm is a fictional one (BARAD, 2007; HARAWAY, 1991) as researchers are always involved in their object of research. Moreover, scientists are subject to personal, social and political aspects related to the research object.

In order to produce a shift in the conceptualization of excellence, we propose considering an "agential realist framework" (BARAD, 2007). According to agential realism, objective elements of nature are always interrelating with the research project. This ethic-onto-epistemological framework addresses the need to revise the "classical worldview: the Cartesian subject-object dualism" (BARAD, 2014, p. 173). Karen Barad explains that a primacy of the relationship between the different elements entangled in the scientific process replaces the primacy of the isolated object of research. In her words (2014, p. 175): "[s]ubject and

object […] do not exist outside of specific intra-actions that enact cuts that make separations – not absolute separations, but only contingent separations – *within* phenomena". Barad's ontology proposes that any object is dependent on the *intra-actions* of the dynamic elements partaking of phenomena. She uses the neologism 'intra-actions' instead of 'inter-action' to focus on the primacy of relationships, which, in this work, includes a focus on the relationship between methodology, researcher and the kind of research producing the materialization of meaning.

In the present work, our affirmative critique of excellence states a similar process that can be found in the contextualization of research bodies and in the ancestral relations between social structures, control artifacts and subjects. Excellence works combined with the theoretical concept that rules science and agential actions involving the production and reproduction of science. Despite its blurred conceptualization, excellence is increasingly reinforced in today's world. Who can refuse the goal of pursuing excellence? However, what different aspects should form its principles, considering the many views and sensibilities that it entails?

As Thiele (2014, p. 205) suggests,

> […] ethic-onto-epistemologically, it will matter at all times *which* knowledge gets produced, *which* thinking populates the world and *which* cuts are made because cuts necessarily will (need to) be made in dis/continuous becoming or "worlding".

Peer review is an example of the many cuts made while dis/continuous operations are processed in a simple action in an evaluation process. The review is the reviewer's empirical evidence for the author in a given time and geographical situation. Therefore, the limits between subjective and objective processes are not only blurred, but connected with each other through an indivisible bond. Thus, excellence in the production of knowledge emerges as a dynamic movement that re-turns, in that it is iteratively re-worked and always a blurring condition between pieces of empirical evidence *always already* subjected.

Feminist theory is pressing for developing diverse strategies in order to produce new orders in knowledge production (SPONGBERG, 2010; ASBERG et al., 2011; KAISER; THIELE, 2014). Birgit Kaiser and Kathrin Thiele (2014, p. 165) argue that we need "to move our images of difference/s from oppositional to differential, from static to productive, and our ideas of scientific knowledge from reflective, disinterested judgements to mattering, embedded involvement." Thus, following this suggestion, knowing how excellence matters to science would also

include knowing how the embodied nature of the subject matters to research. In this respect, Barad (2011, p. 3) affirms:

> Of particular importance has been the imperative to engage with science, not from a distance, but up close with a focus on the materiality of practices and of matter itself. From a feminist position, to do otherwise is to exclude in principle that which has been coded feminine – namely, nature as agent rather than as passive blank slate awaiting the imprint of culture.

Besides, with regard to organizational purposes, we need to include an international forum "for discussing feminist scholarship, lobbying the academies or developing relations with other research institutions or community groups, in order to achieve greater visibility and support" (SPONGBERG, 2010, p. 106).

Therefore, considering how gender and science are engaging in a permanent re-working of themselves through their relationship (CODE, 2014), as well as *gender-and-science in the making*, we need to reformulate excellence as an agential practice in order to accurately evaluate this process. We define agential excellence as a path or a movement – "a way of balancing, of mitigating duality" (ANDALZÚA[2] as cited in BARAD, 2014, p. 175). The present organization of science splits knowledge into an oppressing hierarchy between knowledge fields. It legitimizes duality instead of mitigating it, subordinating subjective and qualitative to objective and experimental production. This type of duality harms the creation and distribution of knowledge that advances towards quality of life, common interests and the collective construction of knowledge.

Therefore, we propose that, in order for excellence to be *agential*, gender and movement must be considered as *cutting-together-apart* elements: "Entanglements are not unities. They do not erase differences; on the contrary, entangling's entail differentiatings, differentiatings entail entanglings. One move – *cutting together-apart*" (BARAD, 2014, p. 176). This means introducing plurality, diversity, and relational processes between elements and object and subject of research. It describes all this in relation and *always already* embedded with different gender practices in a movement that contextualizes every single process of science in the making. Besides, knowledge must become excellent, and its universality is always problematized through working and re-working it. Excellence in science is always subject to a "re-turn" (BARAD, 2014) that allows thinking about it as the locus of resistance, so that it can be politically significant in feminist terms. That is why we propose to revise the concept of excellence not as a move beyond it but as a re-turn to it. This section of the genealogy of science allows us to create an affirmative response opposed to the

2 ANZALDÚA, Gloria. Borderlands/La Frontera: the new mestiza. San Francisco: Spinster/ Aunt Lute, 1987.

hegemonic order of excellence that impedes women's incorporation and defines what kind of research must be done for pursuing excellence (i.e. natural sciences over humanities, certain journals over the rest of journals and international production of knowledge over local production of ideas). By defining research excellence as an agential process, we also refer to how differences have different effects – e.g., diverse careers and non-linear trajectories. Acknowledging different career paths allows the diversity which creates new approaches to structural problems, as this acknowledgement requires a significant change in the methodological strategy of assessment. Therefore, we need to think differently in order to create a map of possibilities rather than raise obstacles to singular creativity. Following Thiele's (2014) argument, we should stop replicating the hegemonic idea of excellence and stop recreating dominant knowledge; rather, we should maintain standards and evidence of excellence based on multiplicity and diversity. We also need to consider located and situated knowledge as a political starting point. Subjects and objects are individually and politically linked in an inherent way; therefore, we need a broader definition of excellence towards collective benefits and practical effects. Excellence should support an entanglement with a politically engaged knowledge created around critical mass, rather than mere elite subjects. The criteria and technologies for research assessment are part of the concept of excellence (LORENZ-MEYER, 2014). As much as we need to distinguish between excellence and non-excellence, we also need to propose a critical affirmative definition of excellence that is sensitive to multiplicity. This would increase the visibility of outstanding results and scientific products for the society (though these might be less prestigious for scientific journals), thus revaluing other researchers' works. We need to focus on the effects that situated standpoints and mass critical researchers can have on "located excellence". To that end, we should include a gendered approach to research content and methodology as well as an evaluation process intended to overcome barriers against female researchers.

Londa Schiebinger (2001) suggests that the inclusion of gender in science transforms our knowledge and understanding of reality. Consequently, we produce innovative methodological approaches and helpful findings to face common problems. The website Gendered Innovations[3] indicates the impact of research based on gender innovation in various disciplines. According to this project, including gender and sex categories in the definition of research questions and methodology yields positive and important impacts on the generation of knowledge and the resolution of problems. Research on gendered materializations demonstrates the additional value of research when we consider these variables in a vast number of cases. Gendered innovation also increases

3 <http://genderedinnovations.stanford.edu/>.

the visibility of research produced by women concerning social responsibility in research (RRI). In our opinion, this example shows that other types of excellence in knowledge production are possible.

CONCLUSIONS

While excellence is a blurred concept linked to a single model of knowledge construction, the present work shows that there are plural practices and aspects that should be part of its conceptualization. Many traditions in various disciplines, as well as multiple researcher profiles and methodologies, are possible for research advancement. Objectivity-based excellence needs to be revised to incorporate the relational features that research practices entail and to consider how gender-and-science in the making affect the relationship between researcher and research. Recognizing the social processes involved in scientific standards may eliminate inequality and unfair play for female researchers. The present notion of objectivity reinforces prejudice and gender stereotypes. In this paper, we have proposed a critical affirmative response to the present model of excellence based on the aspects below.

- Dualism in science should be revised since it produces subordination and wastes knowledge from other traditions. In contrast, progress in knowledge production comes from different approaches and hybrid disciplines. We aim at blurring the dichotomy between objective, valuable knowledge and subjective, less valuable knowledge. Humanities and social sciences (as well as different approaches) are unique. Therefore, natural sciences cannot be *the* only model to follow; we need to re-value methodologies that should be implemented. The subordination of social sciences and humanities is negative to the advancement of knowledge production; a combination of their virtues will benefit the advancement of knowledge. It will also reinforce interdisciplinary research practices by situating knowledge relating to social problems from different viewpoints.
- Regimes of homogenization operate in evaluating both merits and trajectories. Certain journals and the number of citations become the only standard observed by researchers, as their careers depend on accomplishment in these terms. However, other ways of creation are also producing brilliant ideas even if not based on previous forms of accumulation of merits and recognition. Social impact should be considered with regard to advancement of knowledge and merit recognition, and RRI guidelines aim to establish this as a goal for European research. However, hegemonic regimes

still produce an unequal distribution of resources that limits the capacity for knowledge creation and advancement for most researchers when they are not considered to possess excellence.

- Social conditions and representationalism compose the evaluation by peer decision-making. Transparency in the evaluation process will always benefit not only women but also knowledge advancement in science. The inclusion of multiple criteria for evaluating the diverse traditions of knowledge, as well as the process of transparency, create advantages for all. With regard to female careers, peer reviewers should eliminate prejudice about non-linear women's careers. The history of science has demonstrated that not until the final stage of their careers (or, sometimes, not until their death) are women described as having had an outstanding career – until then, they were mostly rejected or neglected. Moreover, there are multiple options that can produce diverse career models aimed at excellence in results.
- Regulation of science is constructed under the conception of elite and influential networks in which feminists should intervene by creating a new model of science. The new managerialism legitimized by the pursuit of excellence reinforces individualism in scientific organizations. In contrast, critical mass is essential for advancement in science, as its collaborative and relational outcomes can generate more inputs to core research questions. A multiplicity of careers and trajectories should be part of the model of pursuing success in research.
- The empowerment of female scientists requires the creation of an 'old girls club' where women's viewpoints will be heard extensively, as well as a number of problems related to gender issues. Increase in female networking is an opportunity to modify predominant cultures based on competition and the exclusion of oppressed groups. With a view to this working style, we propose collaboration and solidarity among female researchers.

REFERENCES

ABIR-AM, Pnina G.; OUTRAM, Dorinda. *Uneasy careers and intimate lives.* Women in Science, 1789-1979. New Brunswick: Rutgers University Press, 1989.

ADDIS, Elisabetta. Gender in the publication process: Evidence, explanations, and excellence. In: EUROPEAN COMMUNITIES. *Gender and Excellence in the making.* Luxembourg: Directorate-General for Research, 2004. p. 93-100. (Science and Society).

ADKINS, Lisa; LURY, Celia. Introduction: What is the empirical? *European Journal of Social Theory*, v. 12, n. 1, p. 5-20, 2009.

ADLER, Nancy J. Women do not want international careers: and other myths about international management. *Organizational Dynamics*, n. 13, p. 66-79, 1984.

ASBERG, Cecilia et al. Post-humanities is a feminist issue. *NORA: The Nordic Journal of Women and Feminist Studies*, v. 19, p. 4, p. 213-216, 2011.

AUGUST, Louise; WALTMAN, Jean. Culture, climate and contribution. Career satisfaction among female faculty. *Research in Higher Education*, v. 45, n. 2, p. 177-192, 2004.

BAGILHOLE, Barbara; GOODE, Jane. The contradiction of the myth of individual merit, and the reality of a patriarchal support system in academic careers: a feminist investigation. *European Journal of Women's Studies*, v. 8, n. 2, p. 161-180, 2001.

BARAD, Karen. *Meeting the universe halfway*: quantum physics and the entanglement of matter and meaning. Durham, NC: Duke University, 2007.

BARAD, Karen. Diffracting diffraction: cutting together-apart. *Parallax*, v. 20, n. 3, p. 168-187, 2014.

BRAIDOTTI, Rosi. *Transpositions.* Cambridge & Malden: Polity, 2006.

BUTLER, Judith. *Gender trouble:* feminism and the subversion of identity. New York: Routledge, 1990.

CODE, Lorraine. Feminist epistemology and the politics of knowledge: questions of marginality? In: EVANS, Mary et al. (Ed.). *The SAGE handbook in feminist theory*. London: Sage, 2014. p. 9-25.

DAVIS, Katy. Intersectionality as buzzword: a sociology of science perspective on what makes a feminist theory successful. *Feminist Theory*, v. 9, n. 1, p. 67-85, 2008.

DEEM, Rosemary. Globalisation, new managerialism, academic capitalism and entrepreneurialism in universities: is the local dimension still important? *Comparative Education*, v. 37, n. 1, p. 7-20, 2001.

DEEM, Rosemary. Leading and managing contemporary UK universities: do excellence and meritocracy still prevail over diversity? *Higher Education Policy*, v. 22, n. 1, p. 3-17, Mar. 2009.

DE LANDA, Manuel. *A new philosophy of society*: assemblage theory and social complexity. London: Continuum, 2006.

ETZKOWITZ, Henry; KEMELGOR, Carol; BRIAN, Uzzi. *Athena unbound*: the advancement of women in science and technology. Cambridge: Cambridge University Press, 2000.

EUROPEAN COMMISSION. *Horizon 2020*: the Framework Programme for Research and Innovation. Brussels: European Commission, 2011. (COM (2011) 808)

EVANS, Mary. Editorial response. *European Journal of Women's Studies*, v. 13, n. 1, p. 309-313, 2006.

FASSA, Farinaz. Excellence and gender. *Equality, Diversity and Inclusion*: An International Journal, v. 34, n. 1, p. 37-54, 2015.

FAULKNER, Wendy. Doing gender in engineering workplace cultures. II. Gender in/authenticity and the in/visibility paradox. *Engineering Studies*, v. 1, n. 3, p. 169-189, 2009.

FELS, Anna. Do women lack ambition? *Harvard Business Review*, p. 1-11, April, 2004.

FORSTER, Nick. Another 'glass ceiling'? The experience of women professionals and managers on international assignments. *Gender, Work and Organization*, v. 6, n. 2, p. 79-90, 1999.

FOUCAULT, Michel. *Discipline and punishment*: the birth of prison. London: Penguin, 1976.

FRIEDMAN, Robert M. *The politics of excellence*: behind the Nobel Prize in Science. New York: W.H. Freeman, 2001.

GONZÁLEZ, Ana M.; VERGÉS, Núria. International mobility of women in S&T careers: shaping plans for personal and professional purposes. *Gender, Place and Culture*, v. 20, n. 5, p. 613-629, 2013.

GRIFFIN, Gabrielle. Tackling gender bias in the measurement of scientific excellence: combating disciplinary containment. In: EUROPEAN COMISSION REPORT. *Gender and excellence in the making*. Luxembourg: Office of the European Union, 2004. p. 127-135.

HARAWAY, Dona. *Simians, cyborgs, and women*: the reinvention of nature. London: Free Association Books, 1991.

HARDING, Sandra. *The science question in feminism.* Milton Keynes: Open University Press, 1986.

HEILMAN, Madeline E.; CHEN, Julie J. Same behavior, different consequences: reactions to men's and women's altruistic citizenship behavior. *Journal of Applied Psychology*, v. 90, n. 3, p. 431-441, May 2005.

HEMMINGS, Clare. *Why stories matter*: the political grammar of feminist theory. Durham: Duke University, 2011.

KAISER, Birgit; THIELE, Kathrin. Diffraction: onto-epistemology, quantum physics and the critical humanities. *Parallax,* v. 20, n. 3, p. 165–167, 2014.

KANTER, Rosabeth M. *Men and women of the corporation*. New York: Basic Books, 1977.

KANTER, Rosabeth M. Utopian Communities. *Sociological Inquiry*, v. 43, n. 3-4, p. 263-290, 1973.

KELLY, Aidan; BURROWS, Roger. Measuring the value of sociology? Some notes on performative metricization in the contemporary academy. *The Sociological Review*, v. 59, n. 2, p. 130-150, 2011.

KREFTING, Linda A. Intertwined discourses of merit and gender: evidence from academic employment in the USA. *Gender, Work and Organization*, v. 10, n. 2, p. 260-278, 2003.

KUHN, Thomas S. *The structure of scientific revolutions.* 1st ed. Chicago: University of Chicago Press, 1962.

LAKATOS, Irme. *The methodology of scientific research programmes*. Cambridge: Cambridge University, 1978. (Philosophical Papers, v. 1).

LEE, Lisa; FAULKNER, Wendy; ALEMANY, Carme. Turning good policies into good practice: why is it so difficult? *International Journal of Gender, Science and Technology*, v. 2, n. 1, p. 89-99, 2010.

LONG, J. Scott; FOX, Mary F. Scientific careers: universalism and particularism. *Annual Review of Sociology,* v. 21, p. 45-71, 1995.

LONGINO, Helen E. *Science as social knowledge*, Princeton: Princeton University Press, 1990.

LORENZ-MEYER, Dagmar. Locating excellence and enacting locality. *Science, Technology & Human Values*, v. *37, n. 2, p. 241-263, 2012.*

MERTON, Robert K. The Matthew effect in science. *Science*, v. 159, n. 3810, p. 56-63, 1968.

MOSCOWITZ, David; JETT, Terri; CARNEY, Terri; LEECH, Tamara; SAVAGE, Ann. Diversity in times of austerity: documenting resistance in the academy. *Journal of Gender Studies*, v. 23, n. 3, p. 233-246, 2014.

MOSS-RACUSIN; Corinne A.; DOVIDIOB, John F.; BRESCOLLC, Victoria L.; GRAHAMA, Mark J.; HANDELSMAN, Jo. Science faculty's subtle gender biases favor male students. *PNAS*, v. 109, n. 41, p. 16474-16479, Oct. 2012.

NIELSEN, Mathias. Gender inequality and research performance: moving beyond individual-meritocratic explanations of academic advancement. *Journal Studies in Higher Education*, v. 41, n. 11, p. 2044-2060, 2015.

PARK, IN-Uck; PEACEY, Mike W.; MUNAFÒ, Marcus R. Modelling the effects of subjective and objective decision making in scientific peer review. *Nature*, n. 4, December 2013.

POWELL, Gary; MAINIERO, Lisa. Crosscurrents in the river of time: conceptualizing the complexities of women's careers. *Journal of Management*, v. 18, n. 2, p. 215-237, 1992.

REES, Teresa. The gendered construction of scientific excellence. *Interdisciplinary Science Reviews*, v. 36, n. 2, p. 133-145, 2011.

ROSSITER, Margaret W. The Matthew Matilda effect in science. *Social Studies of Science*, v. 23, n. 2, p. 325-341, 1993.

SCHIEBINGER, Londa. *Has feminism changed science?* Cambridge: Harvard University Press, 2001.

SCHIEBINGER, Londa; SCHRAUDNER, Martina. Interdisciplinary approaches to achieving gendered innovations in science, medicine, and engineering. *Interdisciplinary Science Reviews*, v. 36, n. 2, p. 154-167, 2011.

SCULLY, Maureen A. Confronting errors in the meritocracy. *Organization Commentaries*, v. 9, n. 3, p. 396-401, 2002.

SEALY, Ruth. Changing perceptions of meritocracy in senior women's careers. *Gender in Management: An International Journal*, v. 25, n. 3, p. 184–197, 2010.

SNOW, Charles Percy. *The two cultures and the scientific revolution*. New York: Cambridge University Press, 1961.

SPIVAK, Gayatri. Can the subaltern speak? In: NELSON, C.; GROSSBER, L. (Ed.). *Marxism and the interpretation of culture*. Urbana: University of Illinois, 1988. p. 271-313.

SPONGBERG, Mary. Feminist publishing in a cold climate? Australian Feminist Studies and the new ERA of research. *Feminist Review*, v. 95, p. 99-110, 2010.

THIELE, Kathrin. *Ethos* of diffraction: new paradigms for a (post)humanist ethics. *Parallax,* v. 20, n. 3, p. 202-216, 2014.

TICKNER, Ann. On the frontlines or sidelines of knowledge and power? Feminist practices of responsible scholarship. *International Studies Review*, v. 8, n. 3, p. 383-395, 2006.

TROW, Martin; CLARK, Paul. *Managerialism and the academic profession*: quality and control. London: Open University; Quality Support Centre, 1994. (Higher Education Report, n. 2)

VAN DEN BRINK, Marieke; BENSCHOP, Yvonne. Gender practices in the construction of academic excellence: Sheep with five legs. *Organisation*, v. 19, n. 4, p. 507-524, 2011.

VAN DEN BRINK, Marieke; STOBBE, Lineke. Doing gender in academic education: the paradox of visibility. *Gender, Work and Organisation*, v. 16, n. 4, p. 451-524, 2009.

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