

Final report 4<sup>th</sup> internship.

*Boundaries between science and non-science*

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In this internship, the main goal was to develop a critical attitude toward the reading of scientific publications around a certain topic. My master thesis is about power relationships between systems of knowledge, questioning who defines what is science and what is not, on which avenues does this classification happens and how. The concept of boundary perfectly grasps this process of delimitation. In this context, the main challenge is to select crucial works that discuss such a broad and complex phenomenon. In the first phase of the internship, I read a multitude of papers from different sociological fields, approaching the topic from different perspectives. This was a phase in which the definition of the topic went hand in hand with the ideas emerging from the reading. In the end, the papers I decided to select focus on a fundamental distinction, that between core and periphery of science. It is important to realize how this distinction is constructed in order to understand where the boundary lies.

The questions guiding the review helped me focusing on the elements of similarity and dissimilarity between the selection of works, as well as on the specificities of each. The main challenge, in this phase, was to construct a coherent and comprehensive framework in which to insert these works in a meaningful and generative way. The works by Harambam & Aupers problematize the classificatory language used to define supporters of conspiracy theories, focusing on the periphery of science because science and conspiracy theories rarely interact in their content; those by Shuval & Mizrachi, on the other hand, provide a core perspective, where bio- and alternative medicine are studied in their daily interactions in Israeli hospitals.

The most important aspect of this internship, for me, has been the development of a thorough reasoning behind the idea of boundary between science and non-science. Dissecting the strengths and weaknesses of these papers, inserting them within a broader literature, and searching for a coherent thread among them helped me settling the theoretical scaffold of my master thesis. Moreover, these efforts fostered deeper reasonings about the political sides of science, especially in a time where online communication has strongly gained momentum.

### **Boundaries between science and non-science**

Science is a project whose boundaries could be divided in two fronts: a core (values, methods, epistemology) and a periphery (relationships with society, institutions). While the former is more

impermeable to external attacks, the latter is frequently the subject of contestation, especially from what is defined, by scientists, as non-science – a catch-all term composed by many different subjects. The selection of five papers that I will present (Harambam & Aupers 2015, 2016; Shuval & Mizrachi 2004; Mizrachi & Shuval 2005; Mizrachi, Shuval & Gross 2005) has been chosen because of their capacity to talk about two different instances of non-science, namely conspiracy theories and alternative medicine, and their relationships with official science.

### **What is the position of the papers in the field? How do the papers stand out vis-à-vis other papers in the field?**

One of the main problems when talking about the conflicts at the peripheral boundaries of science, is that, most of the time, it is done from a partisan perspective, that is by scientists on scientific platforms (journals, blogs, magazines). In fact, the two papers by Harambam & Aupers stem from a critique of the mainstream approach toward conspiracy theories (CT), which reduce them to dysfunctional products of society, focusing on possible causes, solutions, and their (ir)rationality. In the same way, the three papers by Mizrachi & Shuval start from the same assumption, the irreducibility of the relationship between science and non-science to a matter of (ir)rationality, in order to study how alternative medicine and biomedicine coexist in hospitals.

What is commonly agreed by these five papers is the reason for which these phenomena are tackled with a partisan attitude, something that takes the name of boundary-work (Gieryn 1999). With this concept, the authors want to stress the constructivist nature of science, that is how its peripheral boundaries are bargained between science and, in this case, non-science. The debate over the (ir)rationality of CT becomes clear when considering the distinction between core and periphery: for a scientists, every position that does not agree upon the lynchpins of science (core) is irrational. On the other hand, the peripheral boundaries are continuously bargained, and these papers have the main merit of introducing this distinction in this stream of literature.

### **What are the essential parts of the papers?**

In the two papers by Harambam & Aupers, the crucial parts are the deconstructive approach adopted for a critical reading of the existent literature about CTs, backed by constructive ways with which to solve certain limitations. In particular, the starting point is that social scientists have studied this topic with preconceived categories, without any effort to understand the reasons, the composition, and the goals of conspiracy theorists, treating them as a homogeneous whole. In order to cope with this problematic insufficiency, they first investigate the motivations guiding CTs' boundary construction

against science (2015) and then delve into their internal composition, highlighting worldviews, beliefs, and practices.

Contrary to Harambam & Aupers, the three papers from Mizrachi & Shuval focus on a specific boundary, that between alternative medicine and biomedicine, constructed in a specific setting, Israeli hospitals. In the first study (Shuval & Mizrachi 2004), they investigate the distinction between epistemological and organizational boundaries (a distinction that could be translated with core/periphery), finding that the boundary-work in these two areas differ. The second study (Mizrachi, Shuval & Gross 2005) focuses on how the different processes of boundary formation hold in formal and informal settings. This is a crucial study, since it is the only one in this series that directly tackle the formal (legal) definition of the boundary between science and non-science. As shown in Abbott (1988), the bargaining turf between professions takes shape in three different arenas: public opinion, the law, and workplace. While Harambam & Aupers (2015, 2016) focus on the public opinion dimension, and Mizrachi & Shuval (2004) on workplace, this work studies both the construction on workplace and in the law. The last study by Mizrachi & Shuval (2005) considers a wide variety of ways in which the boundary between alternative medicine and biomedicine is constructed, focusing on overt and veiled mechanisms, as well as on the categorization of the reactions of biomedicine to the emerging field of alternative medicine.

**What has been done well? What are the new contributions and/or the essential conclusion presented in the papers? What are the most interesting points that the author(s) make(s)?**

The first paper by Harambam & Aupers (2015) shows that CTs stem from a very critical stance against modern mainstream institutions, and are “fueled by personal encounters with medical specialists, doctors, university teachers, and other academics.” (p. 471). In other words, they are *prosumers*, not passive believers but active producers of critical positions. In fact, the main position held by the interviewees is the critical thinking guiding their critique against the cultural authority of science, without “in any way deny or dismiss [its] relevance.” (p. 473) Moreover, they fight against the purported neutrality of science, something which is critically approached considering scientists “an untouchable elite exerting social power over ‘ordinary people’ and are thought to operate in alliance with other elitist members of society: politicians, multinationals, and medical industries.” (p. 476) One of the main achievements of this paper is showing the real crux of the matter: CTs are “especially criti[cal of] the materialist foundations of the scientific worldviews [...]. They emphasize how these ‘parapsychological’ phenomena are discarded not on the basis of research or counterfactual evidence – as proper scientists would have it – but simply because their materialist worldview does not allow for the existence of such phenomena. They are, hence, left unexplained.” (p. 471)

These findings are further explored in Harambam & Aupers (2016), where the authors study the self-identification that people in the Dutch conspiracy milieu provide of themselves. What most strikingly emerges is the dissociation with the definition of *conspiracy theorists*, described as irrational and with a tunnel vision: “they only see what they want to see.” (p. 6) Instead, they define themselves as *critical thinkers*, whose goals can be classified in three distinct groups: activists (willing to enact their beliefs to change the world), retreaters (represented by the motto “transform the world by changing the self”, p. 10), and mediators (who mediate between the other two). The main conclusion is the variegated composition of this milieu, with different goals and ways to reach them.

The main contribution of the papers by Shuvel & Mizrachi (2004) is the explanation of *how* boundaries are constructed. First of all, the authors explain that the boundary between official and alternative medicine has recently become an area of contestation because of the increasing demands on the labor market of alternative practitioners. Hence, acupuncture, chiropractic, reflexology, and a wide variety of other disciplines have entered many hospitals, flanking biomedical doctors (in fact, it is also called complementary medicine, another instance of terminological boundary-work). In the workplace, it has emerged that the scientific core (i.e. epistemological assumptions) is never discussed, while many are the instances in which the periphery is contested. In order to acquire legitimacy, alternative practitioners enact different forms of isomorphism, from the dress code to the furnishing and décor of their clinic settings. Moreover, there is the tendency of presenting themselves as *specialist* in a specific field, even though the main characteristic of alternative medicine is its holistic approach. On the other hand, biomedical doctors establish power relationships through their presence with the patients (they conduct the diagnosis, the treatment in case it is a lifesaving procedure, or the suggestion to go to the alternative practitioner if interventions to alleviate pain and suffering are needed). What most evidently defines the distinction between bio and alternative medicine is that while the former addresses problems related to *diseases* and *cure* (lifesaving procedures for irreducible cellular and molecular processes), the latter has the scope of treating *illnesses* with *care* (attention paid to the wealth and the quality of life of the patient). Not every biomedical doctor, though, has the same attitude toward alternative medicine. Opinions range from *negation and degradation*, something that is present also in legal frameworks and that depicts alternative practitioners as unscientific and unreliable, to *cautious approval*, recognizing effectiveness as long as it is sure that it does not cause harm to the patient. A relatively recent phenomenon is that of *reconciliation*, where biomedical doctors are also specialized in alternative practices, adopting both the roles in the same hospital. These figures act as gatekeepers and mediators

between the two fields, providing legitimacy and bargaining power to the weaker field of alternative medicine.

**How can the papers be applied to practice or how do they extend current academic knowledge?**

In my opinion, even if not explicitly mentioned by the authors, the main achievement of these papers is not only that of a better understanding of CTs and alternative medicine, but also the possibility to reach better ways to know and explain the world surrounding us, to find new solutions to apparently unsolvable problems, or new ways to improve what we already have. In the homogeneous depiction of CTs, for example, what is mostly detrimental, for me, is the impossibility to distinguish between what can be helpful in the content and what in the message. In other words, the main role of CTs, from the perspective emerging in Harambam & Aupers (2015), is a metacritique about the epistemology of science: it is not as neutral as it purports to be, and it is only focused on what is material, leaving aside the rest. This critique can be put forward in two ways: with claims that address the first issue, the neutrality of science, and with those addressing the second, the exploration of what is not material. Of course, most of the CTs mingle these two poles: without interrogating the self-understanding they have of themselves, though, it is not possible to shift from a *pars destruens* to a *pars costruens*. As an example to explain this point, it is worth using the contraposition between the Flat Earth Society and alternative medicine. While both employ both content and meta critiques against science, the first can be constructively employed to think about the non-neutrality of science, reflecting about possible conflict of interests when large scientific endeavors are carried out (such as those by NASA). Given the weakness of their core critique, it can serve the purpose of a check and balance mechanism. On the other hand, alternative medicine embodies the possibility of studying what is generally dismissed by official science, principles that has been shown to work, but based on individual situations, instead of on large populations (another problem is the impermeability of science to the conduction of experiments for fields not already established), and guided by principles alien to science, such as “vitalism, holism, naturalism, humanism, and therapeutic conservatism.” (Shuval & Mizrahi 2004, p. 676) We will never know if these fields can give us some benefits if we never try to explore them.

Of course, as for every controversial field, the distinction is not as clear-cut as depicted here. What about those CTs that have not only individual but also social consequences, such as the anti-vax movement? The conundrum is real when it comes to conspiracy theories; nevertheless, I think that dismissing these fields on the basis of prejudices and fears, and especially without any deep and sound exploration of their inner dynamics, is even more problematic. As some of the interviewees in this study reported, CT aims at maintaining openness and skepticism alive. The evaluation of this

boundary, on the side of the content, is something negotiable between disciplines. Without studies like these, though, the first step toward this negotiation, the dialogue between different systems of knowledge, would not even be possible.

**Which assumptions or arguments are debatable and have a negative overall effect on the quality of the papers? What are vital issues the papers misses or misrepresents? How can the papers be further improved to advance practice and/or research.**

What emerges as most problematic in Harambani & Aupers' papers is the lack of differentiation among possibly different CTs. Without the distinction I have proposed between content and meta forms of critique, it is not possible to satisfactorily come to a conclusion about differences between different CTs. A possible solution for this problem could be a closer examination of the reasons and internal differentiations of specific CTs, focusing on the antivax movement or the Flat Earth Society, for example. Moreover, these works do not show how the process of boundary bargaining is carried out, focusing only on one side (that of non-science), and considering only academic literature as the other side of the coin. This choice does not account for the different nature of these sources: while the former (members of CT) express informal perspectives (gathered through face-to-face interviews), the latter (academic studies about CT) constitute a formal, codified, and collective perspective. What is missing, is a balancing position: either a study focusing on both the sides in an informal way (scientists and CT members' personal opinions), or a study of the formal ways in which these two poles present themselves to society (for example, studying academic publishing and official manifestos). A methodological issue regards the explanation of how and why certain respondents have been selected for the interview. In particular, the authors argue to have "theoretically selected [their] respondents (N = 20) on the basis of diversity and their prominence in the Dutch 'conspiracy milieu.'" (2015, p. 470) What does *theoretically selected* and *diversity and prominence* mean is left unexplained and it represents an important gap in the understanding of who these interviewees are, and why they have been selected.

For what concerns the papers by Mizrahi & Shoval, the main point that should be raised (which is not an issue, rather a specification that has to be stressed) regards the context. These studies have been carried out in Israel, a country where demands for alternative medicine have vastly increased in the last decades. This might not be true for other countries, for which medical market conditions as well as cultural opportunities should be assessed before embarking in a study similar to those conducted by these authors. Moreover, in Mizrahi & Shoval (2005), the authors point to "laboratory experiments, a list of scientific methods used to establish causal relations and predictive power, on-going research, and the scientific ethos of skepticism" (p. 1652) as main difference

between bio and alternative medicine. I do not agree with this point, for two reasons. First of all, as highlighted by Harambam & Aupers, skepticism is not an exclusive value of science. Secondly, the lack of laboratory experiments and predictive power is not necessarily a *defining characteristics* of alternative medicine; rather it could be seen as a contingent situation (i.e. lack of funds and infrastructure). What the authors are missing here, in my opinion, is the distinction between core and peripheral characteristics. I think that what distinguishes bio and alternative medicine in their core are the epistemological assumptions (dualism vs holism, see Agassi 1964) and the focus (statistical populations vs patient-centered approach). In other words, what the authors portray as core features (methods, values, etc.) could be seen as peripheral turf of bargain. A final, methodological point, regards the description of the methodology employed. It is only in the last paper of the series (Mizrachi, Shuval & Gross 2005) that the authors describe the justification for their methodological choices, something that is missing in the previous two studies. For example, in Shuval & Mizrachi (2004), it is not clear what type of questions they asked in their interviews, something that could be easily solved rendering the data openly available.

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