Controversies and Interdisciplinarity

Beyond disciplinary fragmentation for a new knowledge model

Edited by Jens Allwood, Olga Pombo, Clara Renna and Giovanni Scarafile

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Controversies and Interdisciplinarity

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Volume 16

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Crossing borderlines

Beyond the structure of parallel world views

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On 18 November 1987, a disastrous fire broke out at King's Cross St. Pancras station in London; thirty-one people died in the fire and more than a hundred were seriously injured. In the months that followed, an investigation was initiated, which lasted from February to June 1988, to understand the causes and dynamics of the incident.

The investigation concluded that the fire was caused by a lit match thrown by someone while on the escalator. The small outbreak of the fire that had resulted suddenly increased to the point of projecting a tongue of fire towards the upper floors where the ticket office was located. This was the so-called trench effect, not known until then, capable of causing an increase in temperature of as much as 150 degrees, in half a second.

The final report of the investigation (Fennell 1988)[1] highlighted the responsibilities of the London Underground for fire prevention and management. Subsequent investigations have highlighted a number of issues which closely intercept the themes of this book:

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1. In addition to the already mentioned official investigation, the details of the accident are derived from several sources: P. Chambers, *Body 115: The Story of the Last Victim of the King's Cross Fire* (New York: John Wiley and Sons, 2006); K. Moodie, "The King's Cross Fire: Damage Assessment and Overview of the Technical Investigation," *Fire Safety Journal* 18 (1992): 13–33; A. F. Roberts, "The King's Cross Fire: A Correlation of the Eyewitness Accounts and Results of the Scientific Investigation," *Fire Safety Journal,* 1992; "Insight: Kings Cross," *The Sunday Times,* November 22, 1987; "Relatives Angry Over Tube Inquest; King's Cross Fire," *The Times,* October 5, 1988.

1. A few minutes before the fire became unmanageable, a passenger noticed a burnt handkerchief near an escalator and reported it to a subway employee. The man, however, did not follow up on the report. He didn't tell anyone about it, nor did he call the fire department. In fact, he was well acquainted with the strict internal regulations of the London Underground, and he was aware that no rules should be neglected. However, even if he had wanted to intervene, the chain of command of the Underground would not have allowed him to contact another department without the direct involvement of a superior. There was also a sort of tacit rule within the workplace, that it was better not to use the word "fire," so as not to cause panic among the passengers;

2. Inside King's Cross subway, no one understood how to use the fire extinguishing system and no one was allowed to use fire extinguishers, controlled by another department (see Duhigg 2014);

3. One of the factors that led to the rapid acceleration of the combustion process was the different layers of paint on some of the subway walls. It seems that, in the past, the director of the subway had suggested that all that paint could represent a danger in case of fire. However, the painting of the walls was outside his specific competence and, for this reason, he withdrew his suggestion, to avoid it being understood as an interference in the work of others;

4. The firefighters who arrived onsite could not connect the fire trucks to the internal hydrants, since none of the metro employees were aware of their location. But even if this information had been available instead of being locked in an office, it could not have been used, since the fire brigade's regulations required them to use fire hoses at street level;

5. King's Cross employees had not been trained in the use of fire extinguishers because the equipment was under the supervision of another division. In addition, the station's safety officer had never read a letter previously sent by the London Fire Brigade to inform about fire hazards. That letter had in fact been sent to another operational unit, which had not considered it appropriate to circulate the information.

It should be stressed that no procedure or activity, mentioned in the five previous points, was arbitrary or without reason. Each of them was the result of rules or practices adopted for a reason. What happened therefore cannot be attributed to negligence of rules or practices but possibly of the lack of harmony between them. However, in the list of the five issues mentioned we see elements that have in much common with our aim in this book: to examine the disciplinary versus interdisciplinary problems in diverse contexts.

On the one hand, it is true that specialization and the appreciation of one's own discipline in combination with the rejection of any interference are important

values. On the other hand, it cannot be denied that these very elements are capable of erecting walls of incommunicability that do not allow us to see beyond disciplinary boundaries.

When we look for a matrix of interdisciplinarity, that is to say, a primary basis or an essential dimension of all the complex phenomena we are surrounded by, we see the need to break with the disciplinary self-restraint in which, often completely inadvertently, many of us lock ourselves up, remaining anchored to our own competences, ignoring what goes beyond our own sphere of reference.

Disciplinary self-reclusion gives rise to self-referential parallel world views in which it is entirely plausible that laws and/or regulations are in force that can be ignored in another parallel world view.

Now, in the case of the King's Cross fire, self-confinement within disciplines led to a disastrous outcome that is all too easy to stigmatize. If there had been real communication between the different departments of the London Underground, there would probably not have been such a dramatic outcome. At any rate, in hindsight, this conclusion seems warranted.

What we are interested in pointing out is how today, often silently and insidiously, that same type of reasoning is still functioning in the most varied contexts. That is, fragmentation and walls are still in operation. Invisible though they may be, they nonetheless hinder real collaboration between those engaged in working on the same task or project. The deleterious results of such an absence of interdisciplinary interaction are not always easy to grasp.

Disciplinary rootedness has several justifications and a respectable history. It would be unwise to ignore its scope. However, we cannot close our eyes today to the fact that many of the problems we face require us to abandon the reassuring way of reasoning that locks us within established boundaries. We need real and sincere cooperation between experts from different disciplines. For this to happen, we need a deconstruction of the very idea of the border between disciplines, behind whose idealization we have constructed our sense of false security, thinking we no longer risk confrontation or contamination or need collaboration.

For this to happen, we need courageous theories and new engaging practices that give a renewed basis and stability to the theme of interdisciplinarity.

It is with these convictions that we are pleased to present this volume, which brings together a selection of the best contributions presented at the IASC *Crossing Borderlines: Controversies and Interdisciplinarity* conference held in the University of Lisbon in June 2017.

To paraphrase what we wrote in the call for this conference:

As a reaction to the problems that humanity is facing today, more and more deep collaboration between scholars of different disciplines is necessary.

Problems like deprivation and war cannot be faced by only one disciplinary domain. They are too big and too complex and require an interdisciplinary approach.

However, *interdisciplinarity* is still a vague concept and a much demanding practice. It claims not only a mere juxtaposition of theoretical positions, in which a scholar is isolated in her/his own language. Interdisciplinarity presupposes the continuous search for convergent theoretical perspectives and methodologies, and the definition of common spaces and languages, as well as a true dialogical and open mind of several scholars.

For these reasons, the interdisciplinary domain is closely connected to the *ethics of communication*. Before proposing any hypothesis, a scholar must adopt a *listening* attitude. This is not obvious, but is one of the fundamental Requirement of the needed form of interdisciplinary communication.

As one of the forms of interdisciplinary communication, controversies are a special mode of discussion that can show the way to new and innovative solutions to all kind of problems. In fact, controversies are both a philosophical and practical phenomenon. They are distributed among different areas, both in theoretical and in practical life, both in academia and in ordinary daily life. Inevitably, the proper study of controversies is interdisciplinary, requiring the cooperation of scholars focused on the art of controversies as well as researchers in communication, mediation, diplomacy, linguistics, logic, rhetoric, history, anthropology, psychology, etc.

Finally, let us recall that "Crossing Borderlines" was not only the title of the IASC Conference in Lisbon, but also the title of the introduction to volume 4 of the series of books *Controversies* (see Dascal and Zhang 2007). That introduction was written not only by Han-liang Chang, but also by Marcelo Dascal, to whose memory this volume is dedicated.

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Controversies in public and private on-line communication

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This study tried to deepen the gamification dynamics' effects on on-line interactions, by adopting a graph theory approach for quantifying controversies.

By using as a case study a unique, collected dataset of conversations exchange and interactions from users of FolkTure mobile app, designed and developed for the folk music Festival "La Notte della Taranta", we adopted an interdisciplinary approach to data analysis, to verify the hypotesis that the gamification logics implemented inside the app had influenced the rise and progress of controversies within the on-line community.

Network analysis' results has been verified through both the analytic point of view (the graph theory) and the observation of the pragmatic aspects of communication.

Keywords: interdisciplinarity, mobile app, gamification, graph theory, controversy, semantic analysis, social network, interaction, gameplay

Introduction

In the last decade, the spread of mobile devices has been faster than prior communicative means, like the internet, leading mobile communication to rapidly increase and significantly complement face-to-face interaction. Therefore, this kind of relations (Kalogeraki & Papadaki, 2010) has acquired great importance in the analysis and interpretation of social phenomena such as controversy (Garimella, De Francisci Morales, Gionis, & Mathioudakis, 2016).

By drawing on graph theory, this study tried to shed lights on on-line social interactions' behaviours, identified within the conversations exchange of people using a mobile app chosen as a case study, FolkTure app. This mobile app was

designed and developed for providing on-line features closely related to the italian touring folk music Festival "La Notte della Taranta".

FolkTure aimed at fostering interactions between festival's audience and promoting the creation of a thematic on-line community around the local cultural heritage underlying the towns hosting the stages of the event. The design and development of the gamification dynamics and mechanics aimed at facilitating the achievement of specific goals.

As soon as the users began to populate the on-line community with messages and comments, usage analytics began to disclose interesting patterns and trends in their behaviours.

By using an interdisciplinary approach, this study focused on FolkTure online social community's evolution, focused on the impact of the gamification strategy and from a graph theory perspective.

We represented on-line discussions with a conversation graph. In such a graph, vertices represent users, and edges stand for on-line interactions, such as messages and comments.

We hypothesized differences in means users communicate both in private and public channels.

We also tried to explain unpredictable behaviours observed within a specific group of users within the theoretical lens of game design.

Furthermore, we examined a gradual splitting of such group into two subgroups, which possibly hid a controversy within the on-line community.

The main contributions of this study were to test these hypotheses.

The methodology applied for this study can be summarized into a three-stage workflow:

(i) analysis of usage data analytics of the on-line community, looking for unpredictable users' behaviours, (ii) building of conversation graphs among the users who contribute to community discussion, both in public and in private channels, in order to unveil different ways of communication, and (iii) identification of the potential controversy from the graph structure or the textual contents of posts and comments, which could be traced back (directly or indirectly) to the implementation of the designed game strategy.

Firstly, this paper explains the theoretical frameworks underlying the present study, in section <u>Background</u>; then, in section <u>Case study</u>, provides a deep-level description of the FolkTure mobile app and its application context.

In section *Working hypothesis* and in section *Methodology*, the workflow for formulating hypotheses and reaching results are covered in details, then related findings are presented in section *Main findings*. Afterwards, the discussion of our results can be found in section *Discussions*.

Eventually, a short conclusion is presented in the last section *Conclusions of this document.*

Background

Interdisciplinarity

This study was built upon the analysis and interpretation of data extracted from the on-line community within the FolkTure mobile app. In the design and implementation of such application, an interdisciplinary approach was adopted, since a team of academics and professionals from different research fields was involved from the beginning. Moreover, the gamification strategy implemented represents an interdisciplinary approach to the issue of the users' engagement.

Finally, for analysing on-line communication data results we used the combination of the graph theory (an analytic approach) and the pragmatic real-time observation of the gamification effects on the online community. This double point of view constituted an innovative interdisciplinary approach to the data analysis.

As as outcome of such approach, the study presented in this article involved graph theory and gamification point of view as an interdisciplinary method to catch and explain controversies. Such an approach allowed us to take advantages of graphic representation of data for a better comprehension of on-line community behaviors' evolution.

We exploited both disciplines' perspectives in order to enrich and foster a deeper integration of such theories, graph theory and pragmatic observation of gamification dynamics, although respecting both their theoretical and practical approaches.

Team

Academics from different research fields, in particular cultural heritage, game design, user experience design, statistical analysis and network science, from University of Salento, and professionals in software engineering from the Italian software house ZeroDD, worked together, fostering the creation of a concrete breeding ground of ideas. This collaboration, by exploiting and merging updated research achievements and latest available technology solutions, led to the creation of a new model for the valorisation and fruition of both tangible and intangible cultural heritage, and the building of an online cultural community.

Gamification

In the last years, Gamification theory and serious games arouse the interest of both academic and business world. It is defined as an approach that translates game design elements, like Points, Badges, Levels etc. in not-playful contexts, with the purpose of making people more engaged in completing a specific task or reaching a goal, and promoting specific positive behaviours (Deterding, Dixon, Khaled, & Nacke, 2011).

According to Deterding et al. (Deterding et al., 2011), *gamification* is an informal term that comprises a range of strategies to exploit the power of these elements in different systems, to improve user experience (UX) and user engagement. The introduction of "gamified" applications to large audiences, during the last years, will enable the enhancement of the existing rich research on the heuristics, design patterns and dynamics of games and the positive UX they provide.

Although the word has been coined recently, the idea of making heavy actions or activities, not in itself attractive, more bearable or engaging through play, is much older. Unlike the actions that we are forced to perform in everyday life, play is a voluntary action, carried out with the specific objective of deriving pleasure from it. It is therefore clear that the application of the elements that make the game so fascinating to everyday activities can totally change the way itself to conceive those activities.

In 2013, Gamification obtained a scientific recognition from the University of Basel (Mekler, Brühlmann, Opwis, & Tuch, 2013), which supports its benefits and results, establishing its function as a guide in enhancing user performance. Scholars of the Swiss university conducted experiments, examining the effects of three specific elements of game design: points, rankings, levels. The results suggest that the implementation of these game elements has significantly increased the performance of users.

The mechanism behind Gamification works because it creates a strong motivation in the user, going to act on his needs and natural inclinations, and exploiting the main elements of the game: points, levels, badges, challenges, rewards etc. The concepts related to the game are modulated to enhance the meaning and experience desired by the user, while it carries out its actions. Gamification can be imagined as a pyramid, where at the top we have the experience perceived by the user. Werbach talks about three levels of Gamification: dynamics, mechanics and components. The "Pbl" (Points, Badges, Levels) are the components useful to build those dynamics that allow the user to live his gaming experience (Werbach & Hunter, 2012). Those mechanisms that in the games create rules, environments, game systems, and above all motivation, are now "dismantled" by the purely playful contexts, to enter into other contexts. Earning points, achieving a goal, is a

personal challenge and has a particular effect on competitive players, while levels stimulate the challenge of obtaining status and social recognition. Finally, the reward is a testimony of victory, of passing a test.

A *gameplay* (i.e. the feature of a game, the way it is played)[1] can be cooperative or non-cooperative. In a cooperative game, players work together, as a team, to reach an aim, or to overcome a quest. In this logic, the users have to gain a mutual understanding and be willing to sacrifice for the success of the team (Wolf, 2012). Players win or lose not as an individual, but as a group.

On the contrary, a non-cooperative game stresses competition more than cooperation. In fact, a game is non-cooperative if players cannot form the structures required to enable cooperation or if there is no incentive for them to do so, because of the nature of the game they are playing (Turocy, 2001).

Different professional figures need to collaborate, for designing an effective gamification strategy: game designer, interaction designer, sociologist, psychologist, storyteller, etc. The interdisciplinarity is the basis of gamification approach to the complex issue of motivating and engaging people to non-ludic actions.

Graph theory

In recent decades, social network and the methods of social network analysis (SNA) have attracted considerable interest from the social and behavioral science community. According to Burt (Burt, 2009), a social network is a group of collaborating entities (i.e., actors) that are related to one another. Mathematically, a social network can be represented as a graph, wherein each participant is called an actor and depicted as a node in the network. Actors can be people, organizations, or groups, or any other set of related entities. Relations between actors are depicted as links between the corresponding nodes.

In this case, the Graph theory is applied to the relational data and, consequently, the is obtained the description of the structure of the interactions through various indices derived from the matrix algebra (Scott, 1997), (Wasserman & Faust, 1994).

Starting from the topology of the mobile users communication network (a directed graph that represents the communication relations among the different user nodes), many considerations can be done about the position of a node inside a network. The position of the node with respect to the other relations in the network, characterizes the role and the importance of the node for the information and opinion flow across the network. In agreement with the literature, the SNA metrics can be used to characterize the node position and importance (Hanneman & Riddle, 2005).

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1. https://en.oxforddictionaries.com

The results of these analyzes are a series of indicators that offer a quantitative representation of the analyzed properties and that can refer to the entire virtual community or to the individual members of it. These indices are calculated by applying complex mathematical algorithms to relational data, so it is advisable to use appropriate software that, in addition to the various types of analysis, also offer the relative graphic representations (graphs) of the analyzed network (Mazzoni & Bertolasi, 2005). Softwares as Ucinet, Jung, Pajek, Condor, Gephi and Krackplot provide a graphic picture of the relationships of people, teams, and organizations. Moreover, they allow the user to create visual maps, movies and adjacency matrices. These permit to calculate indicators of collaboration between actors or groups within a communication network (Hanneman & Riddle, 2005).

In the last years, great interest has attracted the application of the SNA to data extracted from the web, from social networks and from mobile conversations.

Every day, millions of users share opinions, information and ideas about their lives, the events in which they participate, the services and products they use, etc., providing an inexhaustible source of data to which it is possible to apply network and text analysis.

The web and the social networks, like Twitter or Facebook, reveal an ever more extensive and widespread involvement of users. They allow automatic interception of topics or key conversation. Specifically, analyses of user' opinions are crucial for understanding issues relating to cultural events, like "La notte della Taranta", case of study of this work, in order to support the decision-making process in order to facilitate growth and innovation, thereby improving the daily life of the community.

This enables the event management institution to acquire, identify, organise, and analyse the "noise" surrounding an event. It also highlights the quantitative and qualitative aspects that determine a positive or negative sentiment and image among the users, thereby yielding insight useful for improving management activities.

Recently, numerous studies have focused on social network messages related to events. Zubiaga et al. (2012) (Zubiaga, Spina, Amigó, & Gonzalo, 2012) present a method to facilitate the analysis of the torrential flows of Twitter streams concerning football matches by means of sub-event detection, which determines whether something new has occurred, and tweet selection, which picks a representative tweet to describe each sub-event.

Situational information is extracted from microblogs during disaster events in order to identify tweets that may provide useful information from a disaster management perspective (Buscaldi & Hernandez-Farias, 2015), (Rudra, Ghosh, Ganguly, Goyal, & Ghosh, 2015).

Case study

As a case study for this research we analyzed a unique, collected dataset of conversations exchange and interactions from users of an on-line platform of web and mobile services, named FolkTure, designed and developed by University of Salento and the software house ZeroDD, aimed at the audience of an itinerant folk music Festival called "La Notte della Taranta", settled in the inland area of "Salento", a South-Est sub-region of Italy.

As mentioned before in this article, FolkTure aimed at fostering interactions among the participants in the Festival and promoting the creation of a thematic on-line community around the local cultural heritage underlying that event. The FolkTure model for the valorisation and fruition of cultural heritage was enforced by designing a gamification strategy, mainly aimed at promoting the visits to the cultural Points of Interests and creating an on-line community of users sharing cultural contents related to the Festival and the Salento region.

Festival and mobile app

The itinerant Festival "La Notte della Taranta" this year is in its twentieth edition. It is used to last one month in summer, generally August, with about fifteen stages around the Salento. It was chosen as case study, since it was a suitable environment for testing our research on the on-line social communication. FolkTure mobile app was developed for the 2015 edition of the Festival: it was available on August, on Apple Store and Play Store, and downloaded by thousands of users.

It aimed at enhancing users' experience in both enjoying the festival and discovering local cultural heritage. For these purposes, the built-in Mobile integrated service was designed for geolocalizing points of interest and users, integrating browsing technologies for immersive reality. Hence, it provided users a quick and interactive territorial guide fostering exploration of and learning about local historical artistic attractions. At the same time, it encouraged users in generating contents related to their own festival experience and sharing their knowledge about near cultural heritage.

Mobile app also fostered one to one interactions between its users, since it was possible to play an augmented reality game in order to find on-line people nearby, meet them in person or start private chats through the app, according to the instant messaging model.

Mobile app community collected from users compelling moments related to the festival and local cultural itinerary, turning several single experiences into a collective tale of the territory in such period of time. For a more detailed description of the Folkture mobile app IT architecture, please refer to the Appendix A – FolkTure IT Architecture.

Gamification logics and on-line community

The gamification strategy rewarded several actions users could do inside the mobile app, all related to the FolkTure main objectives: the valorisation and promotion of the local heritage and the creation of an online cultural community.

These specific actions were rewarded with points and dedicated Badges that enabled users obtaining bonus points. In fact, the Badges system enabled users to increase their score through these bonus points, by both making one-off actions and repeating some others, transversal to the various sections of the FolkTure app. It also gave to users the opportunity of receiving a concrete feedback on their personal profile of the successes obtained, because badges unlocked were available on it. Each Badge had a specific name and connotation. Some were unique, like the actions users made to get them (for example, the registration to the app). Others, on the other hand, increased incrementally as users repeat certain actions a defined number of times (for example, visiting a cultural point of interest identified by the app).

Users with highest score won VIP passes to back-stage of the closing concert at the end of Festival: the user on top of the ranking won four passes, the one in second position won three passes and the third one won two passes.

Regarding the social platform, the mobile app featured two means of interaction among its users, a public thread and private channels, as social channels fostering the creation of a thematic on-line community around the festival.

The public thread allowed users to share messages, pictures and comments on a same virtual place, as the main social network platforms; the private channels employ a one-to-one instant messaging model for private chats between users, by implementing a detached Messenger, related to the main mobile app (like Facebook app and Facebook Messenger). The one-to-one communication did not fall within the cultural scope of the app, thus this kind of interaction was not rewarded by the gamification strategy.

Only the communication on the social platform was reinforced by gamification dynamics, in order to lead users in sharing contents related to local culture and traditions. In order to encourage the creation of relevant contents within the community and increase the messages exchanging, we chose to gamify actions related to the approval expressions. Unlike the traditional social networks, FolkTure social platform enabled users to express not only "*like*" on a post, but also "*dislike*", if the post does not fit their taste or expectations. Once a user published a post on the FolkTure social platform, for each *like* received, he / she gained 2 points. On the contrary, each *dislike* received penalised him / her of 1 point. The user could gain points also giving *likes*, in order to encourage a positive use of the rating tool. In this way, cultural and interesting posts would be rewarded and the community

would be able to regulate itself. In addition, the user could unlock badges, gaining additional points, by repeating some actions a specific number of times: giving and receiving *likes* and *dislikes*, and publishing posts.

As it is clear, the gamification strategy designed for FolkTure app was based on a non-cooperative gameplay, even if the development of players behaviors led to a different situation.

In fact, we noticed unexpected users behaviours, whose causes could be guessed through to gamification point of view, leading us toward hypotheses indicated in the following section. Moreover, such hypotheses needed further investigation through graph theory, focusing on a smaller cluster of active users, as described in section <u>Methodology</u>.

The rise of controversies: Working hypotheses

As data were collected, it was clear that relying solely on quantitative analysis of app usage data wasn't enough to give back a relevant picture of the on-line community's evolution. Hence, we broaden the analysis methods, also involving graph theory perspective.

We posited that unpredictable users' behaviours within on-line community were in some degree related to gamification logics and imply a controversy among two sub-groups of users. Thus, we built three working hypotheses.

H1: Users ways of communicating within a thematic on-line community vary in public or private channels according to presence of gamification rewards.

As observed from data analytics, both public and private communication exchanges between users were constantly increasing during community life's span, also endorsements and other reactions chase the same trend. Towards the end of the contest numbers of *likes* and *dislikes* almost decoupled in comparison to previous period.

H2: Users behaviours within the thematic on-line community was affected by gamification logics.

Implemented gamification was meant to add a non-cooperative game into on-line community, establishing rules according to which every user had to compete for her / his own victory. Conversations exchanges, instead, suggested users splitted into two recognizable sub-groups, lining up with one party or other side, and try convincing others to do the same.

There seemed to be a self-organization into two groups of users, which gamification itself wasn't enough to explain, due to non-cooperative nature of underlying logics.

H3: Users within the thematic on-line community pushed the boundaries of the designed game logics towards a cooperative gameplay.

Methodology

Data collection

After the festival ended, we begun the data collection phase, extracting and analysing data from on-line community's users messages exchanges.

The analyzed corpus include texts and pictures extracted from the app database. In particular, we used a dataset consisting of 2123 post, written by users during August 2015.

The capture of controversy

Controversies are identifying and characterizing social-media platforms, such as Twitter (Mejova, Zhang, Diakopoulos, & Castillo, 2014), (Morales, Borondo, Losada, & Benito, 2015), blogs (Adamic & Glance, 2005) and opinion fora (Akoglu, 2014). Numerous references in the literature analyses nature and quantity of communication exchange, in: – public (social network, forum, blogs) – private (instant messaging) (Utz, 2015), (Manago, Taylor, & Greenfield, 2012, p. 400), (Jones et al., 2013), (Memic & Joldic, 2010).

A controversial topic entails different sides including individuals with opposing opinions, each side tend to endorse and amplify its own point of view (Adamic & Glance, 2005), (Conover et al., 2011). In these terms, controversy, according to Dascal theory, seems to occupy an intermediate position between a discussion and a dispute (Dascal, 2001). It isn't due to errors or conflicts, but to a variety of position of the controversialists. It could fulfil a positive role, leading controversialists to collaborate in some ways, in order to overcome hurdles.

Our study followed the protocols outlined by Garimella et al. (2016) (Garimella et al., 2016), with some adaptations and limitations due to available dataset, in order to identify a controversy inside the studied on-line community.

Social communication exchanges can be represented as a network chart. Thus, we represented on-line discussions with a conversation graph. In such a graph, vertices represent users, and edges stand for on-line interactions, such as messages and comments.

Then, we used the off-the-shelf algorithm METIS (Karypis & Kumar, 1995) to identify two partitions of graphs. The graph-partitioning algorithm produced two

partitions on graphs visualizing communication networks of users focusing on the same topic, both in public and private conversations.

Then, we used graph theory's outcomes as an aid to visually identify the presence of a controversy within the conversations exchange, and analysed it from the perspective of gamification logics underlying the on-line community. The integration of the two approaches was aimed, therefore, at an analysis of the controversy by applying an interdisciplinary logic (Klein, 2010):

– Graph Theory tried to visualize the presence of a controversy within the conversations exchange of people inside the FolkTure mobile app;
– Correlation Analysis helped evaluate how much the gamification strategy implemented inside mobile app affected the user's' behaviours.

Data analysis

Before proceeding of the identification of the controversy in communication exchanges, it is interesting to know the trend of the communication occurred via the Folkture mobile app.

In particular, a scatter plot regarding the trend, during the traveling festival, of the messages sent via the public channel and the private channel is proposed, in order to identify the presence of any trends.

The Cartesian diagram shows, on the abscissa the interval time object of analysis and on the ordinate axis the percentage of public messages registered in the same timeframe. In a similar way we will proceed to understand the temporal trend of the communication on the private channel.

Interesting is also the graphic about the likes and the dislikes that users have assigned to different posts on social Folkture platform.

Also in this case, to understand the temporal evolution of the likes and dislikes, Cartesian diagram with the indication on the axis of the abscissas of the analyzed time interval and on the ordinate axis the percentage of likes and dislikes recorded will be proposed.

In the first phase of the identification of the controversy in communication exchanges, graph theory represented the social communicative exchanges as a network graph, where vertices represent people who communicate and edges represent conversations, then applied mathematical approaches to model and understand the network structure dynamics.

In particular, the index used in the present case study is the density index that describes the aggregation of a given group or community and is represented by a value that varies between 0 and 1. The density is calculated as the number of edges divided by the maximum possible number of edges in a network.

Finally, to verify the presence of the controversy in both the interactions, instead of manually sampling and checking texts, a graph-partitioning algorithm to produce partitions on the conversation graph has been used.

The partitions correspond to disjoint sets of users who possibly belong to different sides in the discussion. To do so, METIS algorithm (Karypis & Kumar, 1995) has been used. This algorithm present a controversial conversation graph with a clustered structure. For this reason, the presence of two opposite sides occurs with different points of view, and individuals on the same side tend to endorse and amplify each other's arguments (Garimella et al., 2016).

The partitions are depicted in blue or red. The graph layout is produced by Gephi's ForceAtlas2 algorithm (Jacomy, Venturini, Heymann, & Bastian, 2014), and is based solely on the structure of the graph, not on the partitioning computed by METIS. In the conversations that are controversial, the partitions returned by METIS can be well separated in the layouts provided by Gephi (Garimella et al., 2016).

On the other hand in the second phase, correlation analysis measures the strength and direction of association that exists between two variables. In particular, Spearman's rank correlation coefficient has been used (Kendall & Ord, 1990), (Cohen, Cohen, West, & Aiken, 2013), (Bishara & Hittner, 2012). This coefficient has been used to verify correlation between several metrics, and it is defined by:

$$p = \frac{\sum(x_i - \bar{x})\,(y_i - \bar{y})}{\sqrt{\sum(x_i - \bar{x})^2\,(y_i - \bar{y})^2}}$$

with i being the paired score, where x_i and y_i are the ranks of users based on two different influence measures in a dataset of N users. The coefficient ρ is in the range $[-1; +1]$, in particular, if $\rho = 1$, it means that the two variables have strong positive correlation and they increase or decrease simultaneously. On the contrary, when $\rho = -1$, the two variables have strong negative correlation, indeed the variables increase or decrease in opposite directions. If ρ is near 0, it means there is no evident correlation between two variables.

To compare the correlation strength of different attribute pairs and since the sample dataset is large, a threshold value between 0.5 and -0.5 has been set and the correlation is significant at the 0.01 level (2-tailed).

The correlation analysis has been carried out by using the Statistical Package for Social Science (SPSS) (Field, 2013).

Main findings

This section presents the results of the study conducted on on-line interactions collected data between the users of mobile app, as described by the abovementioned methodological section.

Both private and public messages exchanges followed a regular oscillation during the festival life's span.

In particular, Figure 1 shows an increase in communication both private and public channel around the weekend.
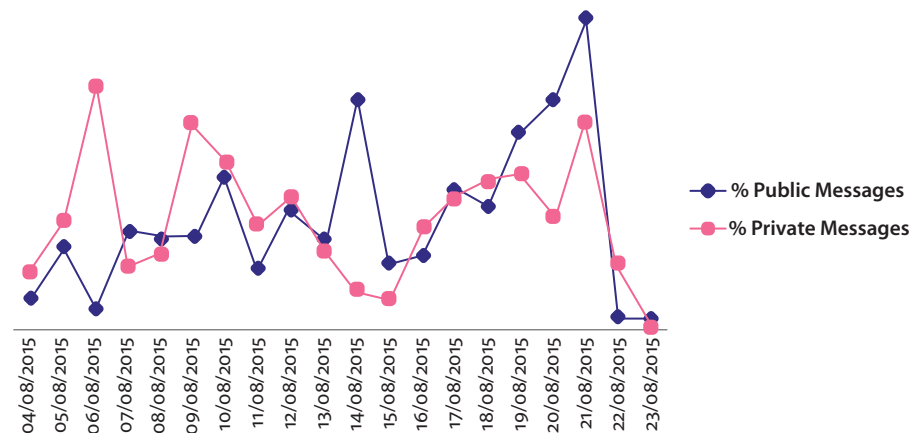
Figure 1. Communication exchanges trend

On the other hand, the numbers of likes and dislike were comparable to the messages daily posted on the public social mostly the time.

Note that Figure 2 shows an exponential increase in the number of dislike in correspondence with the approach of the final event, the "Concertone of Taranta".

However, this user behaviour will be explained in detail in the following paragraphs.

Toward the end of the festival, instead, the number of likes and dislikes wasn't anymore comparable to messages daily posted on the public social. Even the oldest post received a dislike weeks away from their publish date.

Representing both the public and the private conversations as a network graph, the density of both networks was calculated Figure 3. We found that the public communication network is significantly denser than the private one. A paired sample t-test confirms statistically this result ($t = 4.197$, $P < 0.001$).
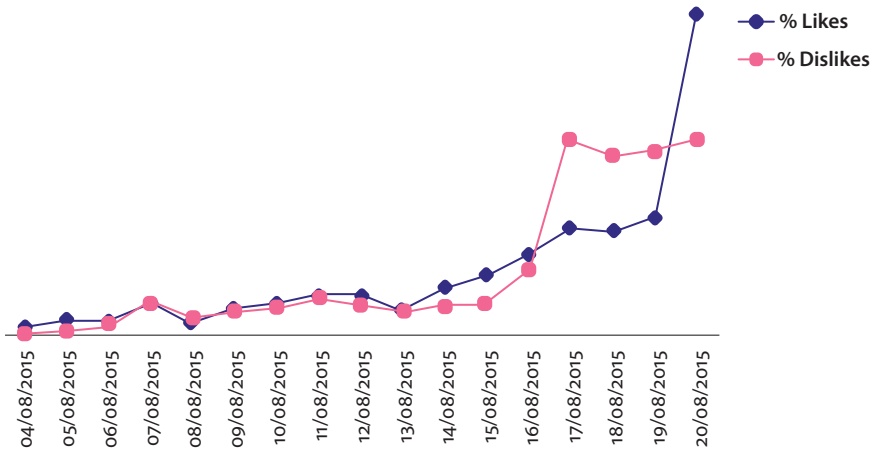
Figure 2. Likes and dislikes trend
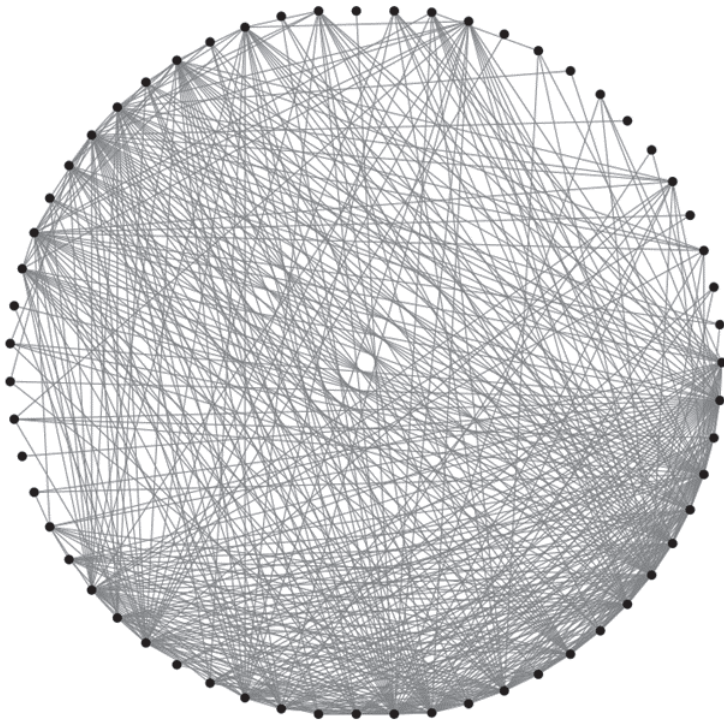
a.
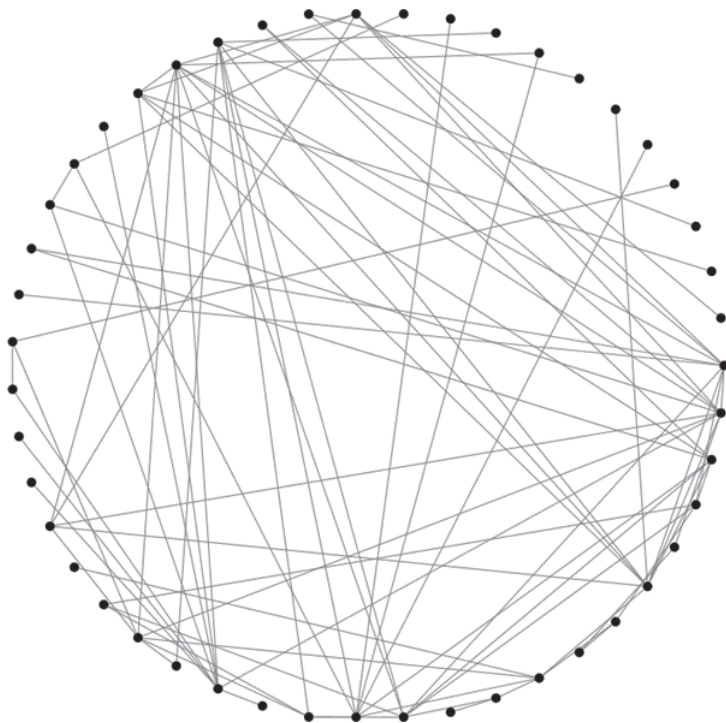
b.

Figure 3. Network graph of public (a) and private (b) communication network

As shown in the graphs, users preferred to interact on the public social platform, rather than on the private Messenger.

The presence of the controversy in both the interaction channels has been verified by a graph-partitioning algorithm, that produce two partitions on the conversation graph. The conversation topic in both graphs was the festival topic.

Following the approach of (Garimella et al., 2016), the METIS algorithm (Karypis & Kumar, 1998) was chosen to identify two partitions of graphs Figure 4.

According to the graph results, it was found that the social network conversations result non-controversial (the partitions returned by METIS are not well separated).

Instead, the private Messenger conversation shows a little hint of separation of the two partitions.

It is clear that gamification dynamics underlying the FolkTure app has successfully encouraged the cultural environment of the Social. Users on the Taranta Social proposed a self-image of culture, tradition and folk enthusiasts, mitigating potential controversies related to the Contest. Users had to visit points of interest (monuments, churches, squares) near the event location, in order to gain points.

a.   **b.**
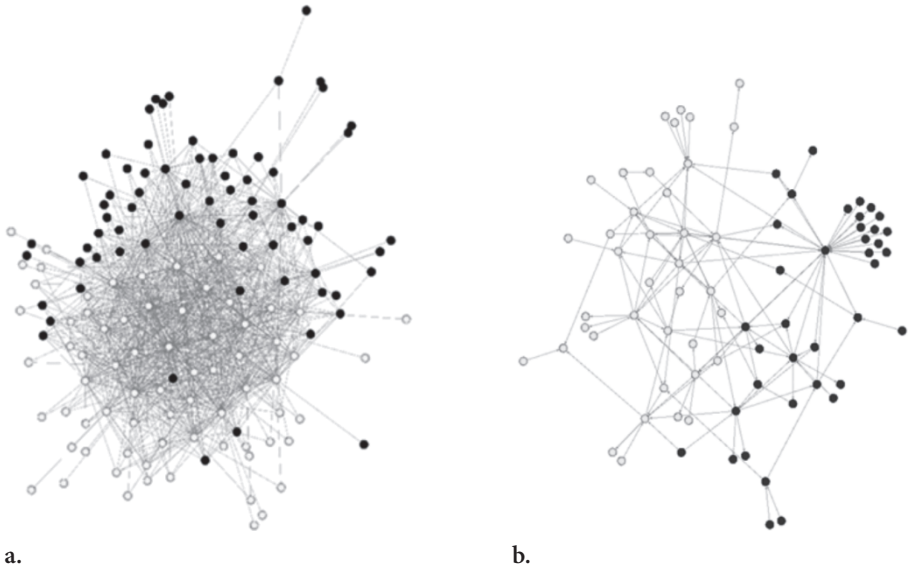
Figure 4. Public (a) and private (b) conversation graphs visualized using the force-directed layout algorithm in Gephi

This result is evident, also, by analyzing the correlation among "local knowledge", derived from the sum of check-ins at interest points, and "number of pictures posted into the App", "number of texts published into the App" and "number of texts published into the Msg". In fact, Spearman's rho (Gibbons & Chakraborti, 2011) highlights in all cases a high correlation. Furthermore texts and pictures that users have posted with check-in demonstrate that they really visited points of interest, in spite of the weather conditions Figure 5.

Discussions

This study highlights aspects of social interactions, most of all linked to the gamification logics implemented, demonstrating that they have deep implications for the study of more general controversies dynamics.

As shown in the graphs, users preferred to interact on the public social platform, rather than on the private Messenger.

One reason could be that users potentially preferred app already installed on their mobile phones, such as WhatsApp or Facebook messenger.

The other reason, conferming the **Hypotesis 1**, can be found inside the FolkTure app itself. In fact, it was designed to respond to requirements of innovation in cultural fruition and creation of a thematic community around the local heritage. Hence, gamification logics implemented inside the app were studied

and defined to these aims. On the contrary, as explained before, the private interaction among users does not fall within the gamification scope. This addressed people's behaviour towards actions "reinforced" by the gamification dynamics. In this sense, the gamification strategy was successful, because users have continually interacted on the social platform, talking about local culture and traditions.

Besides, the success of the gamification strategy is also confirmed by the fact that the FolkTure app has successfully encouraged users to gain points, by visiting the cultural points of interest and sharing georeferred texts and pictures, which prove they really enjoy the local heritage, even if out of the Salento main tourist circuits and, in some case, in spite of the weather conditions, as shown in the Figure 5.
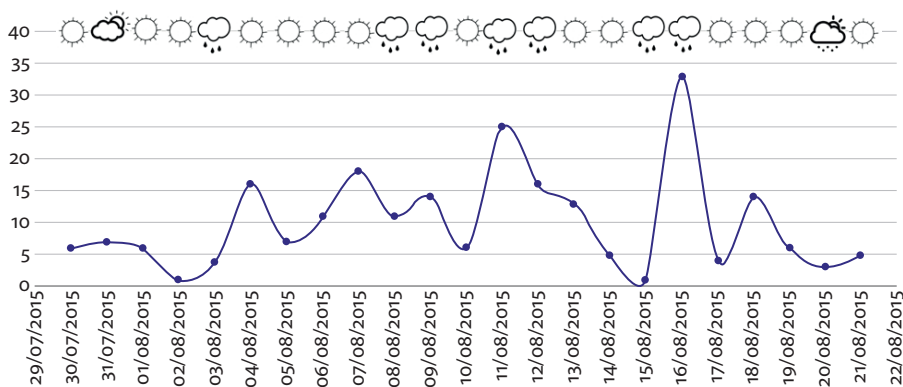
Figure 5. Daily number of check-in made by users near a point of interest, during August 2015

The analysis of the graph shows that the social network conversations result non-controversial. This is due to the gamification dynamics underlying the FolkTure app, that have successfully encouraged the cultural environment of the Social. Users on the social platform preferred to propose a self-image of culture, tradition and folk enthusiasts, mitigating potential controversies related to the Contest.

On the other hand, the reward related to the Contest was extremely coveted. This caused the rise of controversies among the high rollers, absolutely determined to win. As the end of the Contest was approaching, users defined increasingly sophisticated strategies to gain points and, especially, to take points off their rivals.

In the last week of the Contest, some players carefully analysed the rules of the game, with the purpose of finding new manners to overcome the other players. The daily and global rankings, available on the mobile app, by giving visibility to the best players, enabled the other users to identify the most dangerous adversaries. Thus, some of the users decided to resort to unorthodox tactics, unforeseen during the definition of the gamification strategy: these players started to use the "*dislike*" button not to express disappointment, but only for deducting points to

the best players. They went on the personal page of the highest ranked (that were also the most active users of the community) and systematically put "*dislike*" on all their posts. Their aim was not gaining points, but damaging the best opponents.

This unexpected behaviour, taken by a minority of users, surprised the community, provoking a series of reactions, that confirm the **Hypothesis 2**: at the beginning, some players started to delete their own posts, to avoid receiving "*dislike*". This was a pity, and a damage for the community, because many interesting and precious "bottom-up" evidences of the local culture got lost. Thus, shortly after, the community understood by itself the importance of preserving their posts, and decided to react in another way: they chose to keep their posts and unite against the "unfair" minority. Then, they start to systematically put "*like*" between them and "*dislike*" to the opposite party.

This situation was called, by the community itself, "*dislike war*", a "war" started by the "unfair" users, that the other players fighted constructively, preserving the value of the community.

The private Messenger conversation, shows a little hint of separation of the two partitions. Therefore, although the Messenger was not directly affected by the gamification logics, in these interactions we have proof of the "war", because players used private chat to define their team strategies, aimed at defeating rivals. In these terms, the controversy, according to Dascal, seems to occupy an intermediate position between a discussion and a dispute (Dascal, 2001).

In contrast with the minority behavior, that used only an individualist and "destructive" tactic, the "fair" party acted like a team, by helping one another and saving the "good" side of the community: they kept on posting cultural contributions and giving "*likes*" to the good posts. The controversy arose was faced in the best way. Finally, the best players of the "good" party won the Contest, and demonstrated their gratitude and affection for the other teammates by sharing with them the reward, the VIP passes. This was the best demonstration of the real switch of the game, from a non-cooperative to a cooperative one and the evident confirmation of the **Hypothesis 3**. Moreover, this also demonstrated that the gamification strategy succeeded in the creation of a positive cultural community, aware of its identity and ready to self-regulate and protect itself against the disturbing elements.

Limitations and further research

There are some limitations associated with this investigation. First and foremost, the measures used to catch the controversy may have been influenced by the dataset scale, as it seems that a more comprehensive scale is required in order to best capture a neat partition.

Although the dataset in this study was broad enough to allow us to observe interesting behaviours, it involves a single discussion topic. Thus, specific discussion characteristics could have influenced results. The subject of the cultural heritage could, however, be further investigated by targeting samples of users involved in other cultural events and discussion topics.

Moreover, the METIS algorithm, chosen to identify two partitions of graphs, has enabled us to examine the phenomenon, outcomes could be improved by weighing links between the network nodes. Such a result could be pursued by evaluating also the endorsements two users exchanged as weight for each edges of the graphs.

Our methodology builded upon the definition of Garimella (Garimella et al., 2016) doesn't involve sentiment analysis.

The findings are therefore limited in these respects.

Nevertheless, other studies can take advantage of this work for building a domain-agnostic framework for capturing a controversy.

Conclusions

To sum up, gamification dynamics implemented inside FolkTure mobile app has deeply influenced users behaviors, both in foreseen and in unexpected ways. On one side, it has successfully reached its purposes, by encouraging the user to visit the local heritage and sharing his/her experience with other users. Moreover, it succeeded in the promotion of online cultural interactions among users and the discussion on cultural topics.

On the other hand, gamification dynamics unintentionally allowed an hacking of its rules by some users, which adopted unorthodox tactics leading to the rise of controversies inside the online community. However, the positive reinforcement designed by the gamification, aimed at the creation of the cultural community, has proved stronger than the hacking attempt: the community react in a propositive way, by acting as a team for preserving the cultural spirit and contents and isolating the disturbing users.

Such structures can be visible thanks to graph theory. Nevertheless, graph theory outcomes needed a pragmatical interpretation to get to a real understanding of users behaviours.

Therefore, we chose to adopt an interdisciplinary approach, involving graph theory in connection with gamification logics and pragmatic analysis, that hopefully could be interesting for studies on Interdisciplinarity.

Gamification explained FolkTure's users unexpected behaviours, visible through the analytics, as a result an unexpected change of gameplay, from

non-cooperative to cooperative. Graph theory allowed the discovery of the organization into two groups of the private communication network, which pragmatic observation itself wasn't able to check.

Building upon the idea that such analysis cannot rest solely on semantic, but also on pragmatic aspects of communication, we disclosed a controversial topic entailing these groups of users, verifying the gamification and graph theory analysis.

This case study could inspire further investigations in order to enrich and foster a deeper integration of theories belonging to both disciplines, gamification and graph theory. Respecting both theoretical and practical approaches.

Funding

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Appendix A. FolkTure IT architecture

Figure 6. FolkTure Platform IT Architecture
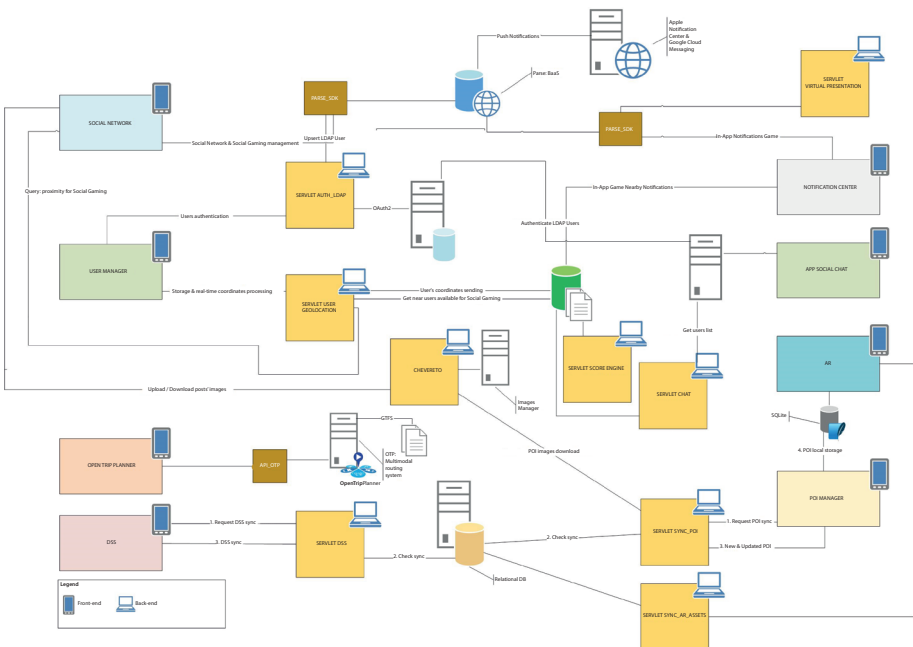
In order to make this study more complete and scientifically valid, it is necessary to add an Appendix presenting the technological platform of the case study, which the whole analysis built on.

The Figure 6 shows the IT architecture of the integrated system related to the FolkTure mobile app. The platform architecture is based on a set of back-end and front-end servlets and

a series of relational and non-relational databases, designed and developed on the basis of the type of information to be processed.

The entire integrated service architecture is based on 7 relational and non-relational databases of 5 types: PostgreSQL, MySQL, Mongo DB, LDAP and SQL-Light.

For the joint access to the platform services by users, a database based on LDAP technology was used, on which servlets were designed to implement authentication mechanisms based on the oauth2 protocol. The LDAP database contained the authentication data.

A database was designed to contain the subsystem of Points of Interest (POI)of all the stages of the Festival.

At the database level, a POI is representative of a physical structure, which can be a place of worship (churches, abbeys, religious monuments), a museum, an artistic structure, a monument and all that is considered "of interest" for the reality under consideration, and that it is geo-referenced.

The set of POIs is also characterized by geolocation information (geographical coordinates and city or country of belonging and address) in which the POI is located, a category (this means that the totality of the POIs can be divided into subgroups) and from multimedia elements accompanying the text description for each one. This DB connects a specially designed Servlet for the management and exposure to the clients of the POIs, also through Augmented Reality.

Finally, in order to implement caching logic in the App, the structure of a SQL light database has been designed, hosting the data related to the points of interest, synchronized with the remote database.

On the client side, a module in the App that optimizes the sending of the user's coordinates was designed, in order to ensure the best possible performance both in terms of the use of the device's computational resources and in terms of battery consumption.

The servlet were able on the one hand to receive and save in real time the position sent by connected users, on the other hand to respond to queries made by users through the mobile app, returning a list of users ordered by proximity to the user who has made request.

A special database preserves the detected positions. Given the high performance in writing and reading required by the servlet, a no-SQL technology has been chosen that guarantees the management of a high number of simultaneous sessions in real time.

The Augmented Reality module, through position data, allowed users to "see" other users nearby, so they were able to socialize with them.

Another Database, Cloud Parse, is used for Social communications. It was based on Mongo DB technology, and described the entities and relationships underlying the third-party "Parse" backend framework, chosen as a basic solution for the management of Social communications. Parse is a multiplatform remote service (including WEB application, iOS and Android) of the "Backend as a service, BaaS" type. It constitutes a basis for the development of Social Networking solutions.

The integration of Parse and Cloud Parse in the architecture of the Folkture platform, the necessary customizations, the clients of the WEB and mobile devices that have to interact with the Parse DataBase Cloud.

In Cloud Parse the social interactions, the users of the system and their settings, the multimedia material published by them (intended as a text element and relative multimedia element), the comments posted on the multimedia material, the tags to be applied to the multimedia material, flow together.

The real time communication requirements between users, provided in the social module (instant messaging) have been answered in a third-party solution, whose customizations have

been appropriately designed in this period of activity, named "E-jabberd". This is an open source XMPP server. The architecture required the use of an additional database for this service. XMPP has been preferred to a peer to peer because it allows to centralize data and keep a copy, in order to be able to use them for scientific analysis purposes.

Another database was designed to manage users' photographic material, through an open source script called "Chevereto". This script allowed users to create their own file hosting, by using a MySQL database, and did not require particular and complex installation processes. The customizations necessary for this script have been designed. By taking a photo through the platform, a rough resize of the same was done in the app. This was then sent to Chevereto, who worked the image by resizing it, applying filters where necessary and saving it on a remote folder, from which the photos were then read.

Two DBs were used for the calculation of scores on a daily basis, provided within the Gamification model used in the Folkture platform. The calculation is done through a suitably designed PHP script, which extracts all the information necessary for the calculation of the score and the calculation of the general and daily rankings, saving them in a first DB and processing them on it. The results of processing are stored in the second DB. A specifically designed servlet implemented an API service, exposing the processed information to the Clients (results, rankings).

The Paks Pact

Topoi in Hungarian nuclear energy discourse

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Hungary's only nuclear power plant in Paks can operate until the 2030s which prompted a discussion about an expansion. The first section of this paper identifies the eight most common *topoi* of the expansion: economy, finance, energy supply, safety, environment, legality, ethics and relationship with Russia. *Topoi* are considered subject-matters of argumentation with which participants of a controversy convey their standpoints. In the second section, *topos* analysis is used to explore the argumentation of two political bodies, an environmental protectionist organization and two scientific institutions. Results show that the argumentation style of the examined actors differ in the openness of their standpoints, in their calls to action and the frequency of the employed *topoi*.

Keywords: nuclear energy, Hungary, argumentation, topos analysis, political discourse, scientific discourse

Introduction

Nuclear energy production is an essentially controversial issue. The construction or expansion of a nuclear power plant touches on many issues, such as energetics, economics, politics, the protection of the environment, safety and security. Countries around the world have different attitudes towards this interdisciplinary issue which defines their nuclear energy policies. Although in Europe, France has the highest number of reactors, producing 78% of their total energy production, they are planning on reducing that ratio to 50% by 2025 (International Energy Agency, 2016a). Germany has long been working on a similar reduction, but the 2011 accident in Fukushima solidified their aim, and they are closing down their nuclear power plants (International Energy Agency, 2013). In Europe, Austria has been pursuing an anti-nuclear energy strategy since 1978, when due to a referendum their first and only completed nuclear power station was shut off

(International Energy Agency, 2014; Müller, 2017). Conversely, Poland has determined that nuclear energy would play a significant role in their future energy mix, replacing fossil energy sources (International Energy Agency, 2016b).

In Hungary, the only nuclear power station is in Paks, a city south from the centre of the country. Currently there are four nuclear reactors functioning which account for 50% of Hungary's energy production (International Energy Ageny, 2017b). Due to the approaching shutting off of the old reactors, the construction of new ones was proposed. The building of the fifth and the sixth reactors, named Paks II, would be one of the main pillars of energy production in the 2030's next to renewable and fossil energy (International Energy Agency, 2017b).

In Hungary, the expansion generated a debate, structured by the following questions: *Could the new nuclear power plant guarantee the energy supply in the future? Which country would be the contractor for the project? Would Paks II be profitable? How high would electricity prices be? What dangers does nuclear energy production entail or is it a safe technology? Could the radiation and radioactive waste cause harm to the environment? Who has the rights to make a decision in the expansion? Citizens, politicians or experts? How does the commitment to nuclear energy production conciliate with the international trends and climate protection goals?*

This paper examines the argumentations of different actors employing the methodology of *topos* analysis. *Topoi* mean places from which arguments are developed and are in the rhetorical approach the subject-matter indicators of discourse. Argumentative moves by the various actors can be classed under *topoi*. We analyze every available article on the websites of various stakeholders in the Paks controversy, such as two political bodies (the Hungarian Government and LMP, the green political party), the Hungarian organization of the environmental activist group Greenpeace and two scientific actors, the Hungarian Academy of Sciences and Energy Club Climate Policy Institute and Applied Communications. The results show that there are notable differences in the discourses of the examined actors in terms of their argumentative style and the frequency of their *topoi*. We argue that none of the actors give a complete and comprehensive image about all the different aspects of the expansion of the Paks Nuclear Power Plant (henceforth Paks NPP). This proposes a further question: How can people be informed in such a complex and large-scale controversy in which actors who shape the discourse are governed by different interests and argue contradictorily?

The timeline of Paks II

The construction of the old reactors was voted in 1966, at a time where Hungary was a socialist country in the Eastern Block, therefore they were built by the Soviet

Union. The reactors began functioning in the 1980's with a planned 30-year operating time. After prolonging it, the reactors will eventually need to be shut down in the 2030's (International Energy Agency, 2017b). In 2009, the Parliament provisionally accepted the possible replacement of the existing capacity with new reactors (Decision No. 25/2009. (IV. 2.) of the Hungarian Parliament, 2009). The decision was based on the 2007 Teller Project which concluded that nuclear energy production would be the most appropriate solution for securing the energy supply in the future. In 2009, the Lévai Project was started to substantiate the construction of Paks II. The lack of publicity of the documents was criticized and the MVM Paks Nuclear Power Plant Ltd.[1] was prosecuted for the details of the Teller and Lévai Projects.

The litigations finished in 2013 when the classified data were made public. In the same period, news articles appeared again and again about a tender, detailing which country (USA, France, Russia or South-Korea) would be the contractor for the new reactors. In January 2014, the public was shocked when a few of the cabinet members decided that Russia would be the contractor. Few months later, a contract between Hungary and Russia was announced about a 10 billion EUR credit financing 80% of the expansion costs. The fact that both agreements were ratified by the Parliament only after signing the deals with Russia deepened the confusion about the project.

Two opinion polls (index.hu, 2014; hvg.hu, 2015) revealed that the majority of Hungarians did not support the expansion, while a third one (vs.hu, 2014) argued that 58% of people supported the construction of new reactors.

Legal considerations were raised concerning both Hungarian and international laws. Firstly, the lack of publicity of the previously mentioned contracts and the 30-year classification voted by the Hungarian Parliament of certain additional agreements did not abide by the Act CXII of 2011 on the Right of Informational Self-Determination and on Freedom of Information (2011). Secondly, the European Union started an infringement procedure against Hungary because of the missing public procurement procedure (tendering procedure) and an inquiry because of the state aid which could distort the competition. In 2015, both procedures have come to an end, but another legal complication appeared. According to green organizations, in terms of the Aarhus Convention, the environmental impact assessment was unjustified concerning the access to information and the public's participation in the decision-making process (Greenpeace Hungary, 2014).

In the beginning of 2017, the last legal proceeding of the European Union was finished, thus, Hungary in cooperation with Rosatom (the Russian contractor responsible for the construction of several nuclear power stations around the world) got the green light to build Paks II.

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1. MVM Paks Nuclear Power Plant Ltd. is the proprietor of the Paks NPP.

Research design

1.   Research material

In our paper, we examine the argumentation of the following actors: political, environmental protectionist and scientific. For our analysis, we collected every article pertaining to the expansion of the Paks NPP from 2009 until March 2017, when the European Union gave the green light to the project.

The first political actor is the Hungarian Government which has been in power since 2010 and has a right-wing party for majority. In recent years, they have been strongly campaigning with their program of utility cost reduction. For the analysis, 111 articles were collected from their website (http://www.kormany.hu/hu/hirek) relating to the expansion, but it is important to note that we could find documents only after 2014.

From the opposition, we have chosen the political party which has been in the forefront of the debate and made the expansion a major point of their political program. It is LMP, a green party supporting transparency and campaigning against corruption. From their web page (http://lehetmas.hu/hirek/), we analyzed 184 articles about Paks II.

Our third actor is an environmental protectionist group, Greenpeace Hungary which was established in 2002 as the Hungarian agency of the international organization. On their website (http://www.greenpeace.org/hungary/hu/hirek/), 38 news were found describing their stance.

The examined scientific actors are Energy Club and the Hungarian Academy of Sciences (henceforth HAS). Energy Club was established in 1995 as an NGO but it became a policy institute (Energy Club Climate Policy Institute and Applied Communications), so that *"discussion about energy processes get presented in the public sphere"* (energiaklub.hu, 2012). They claim that they *"impartially synthesize the newest international results"* and work *"as a source of independent and credible information"* (https://energiaklub.hu/en/about-us). The goals of the organization is *"to promote efficient and environmentally friendly energy production and end-use to change citizens' habits and mentality"* (Energia Klub Statutes 2.§ (5), 2010) and in the case of Paks II, its *"function is to judge the decision professionally"* (energiaklub.hu, 2014). They are in the forefront of public discourse as scientific experts. From their website, 69 articles were collected (https://www.energiaklub.hu/hirek).

The Hungarian Academy of Sciences was established in 1825 and today it is held as the main organization of scientific research in Hungary representing a wide range of sciences. HAS defines itself as an institute *"to guard the purity of the scientific public sphere and the freedom to express scientific opinion"* (Department

of Communications of Hungarian Academy of Sciences, 2016: p. 2). It is in accord with the Academy Law:

> (1) The Hungarian Academy of Sciences […] shall be an independent public-law association based on the principle of self-government and functioning as a legal entity. As such it shall perform public responsibilities related to the cultivation, support, and representation of science.
>
>   (Aggregate of Academy Law XL of 1994 As Amended by Parliament 2009, 2010 and 2011, 2011: p. 1)

> (1) It shall be the public duty of the Academy 3. § e) when asked by Parliament or Government, to formulate its professional judgment on issues within its competence, i.e. issues mainly of science, education, the environment, and the economy.
>
>   (Aggregate of Academy Law XL of 1994 As Amended by Parliament 2009, 2010 and 2011, 2011: p. 3–4)

They published ten articles about nuclear energy and the expansion (www.mta.hu/hirek).

2.   Research methodology

2.1   Topos *theory*

The term *topos* dates back to Aristotle who laid the foundations for the concept as a place from which arguments are developed (Culler, 2015). However, Sara Rubinelli (2009) noted that Aristotle did not provide a clear and detailed definition of the term. She identified two different strategies in argumentation theory as two interpretations of the term *topos*: process of inference and proposition. The dialectical tradition views *topoi* as products of analytical examination when argument schemes are identified, e.g. argument from the contrary. The rhetorical tradition focuses on invention, the process of finding arguments in particular contexts and considers *topoi* to be subject-matter indicators which rhetors can take into account when constructing their argumentation (Eriksson, 2012). Rubinelli also points out (2009) that the rhetorical usage can be traced back to pre-Aristotelian times when the term *topos* meant subject-matter indicator. Modern approaches brought even more interpretations to the term (Culler, 2015). Miller (2000) remarks that *topoi* can be viewed as conceptual building blocks or vantage points. Prelli points out (1989) that in order to find arguments, the rhetor needs a strategy of inquiry, a heuristic procedure.

2.2   Topos *analysis*

Following the rhetorical approach and Prelli's interpretation (1989) of discovering *topoi* as a heuristic procedure, the analysis of the research material began with a pre-established list of *topoi*. Our initial classification of *topoi* was constructed based on previous literature (Sarlós, 2014; Schweitzer, 2011; Negrul, Trubchenko & Lemeshko, 2016) and our familiarity with nuclear energy discourses. Originally, the *topoi* of economy, environment, safety and Russian dependency were named. Hereafter, in an iterative process, the list of *topoi* was refined and the corresponding argumentative moves within the *topoi* were identified.

Results

1.   List of *topoi*

The analysis resulted the following eight *topoi* which we found the most common in the Hungarian discourse about nuclear energy and the expansion: economy, finance, energy supply, safety, environment, legality, ethics and relationship with Russia. Table 1. details the argumentative moves that were classified into each *topos*.

Within the *topos* of economy, the prospective change in electricity prices and employment are debated. The argument about the cost-effectiveness of the new power station and its resulting in Hungary's competitiveness is countered by the country's indebtedness. The next move pertains to the distortion of competition, whether the investment would divest renewable energy sources of development and dissemination. As a more general move, the actors dispute whether the expansion is economical.

The *topos* of finance details investment costs, the amount and conditions of the credit the country took out. The question of further costs also counts as an argumentative move, e.g. the modifications in the energy supply system and the typical rise of costs. The move of corruption is detected only on the opposing side. Again, a general argumentative move can be identified about the expansion being financially sound or risky.

Table 1. List of identified *topoi* and argumentative moves

Economy	Pro	Contra
General	–	not economical
Cost-efficiency	cost-efficient	not cost-efficient / indebtedness
Electricity prices	low	high / not known
Distortion of competition	not considerable	considerable
Employment	created	not as much

Table 1. List of identified *topoi* and argumentative moves (*continued*)

Finance	Pro	Contra
General	–	risky
Cost of expansion	manageable	too high to finance
Credit conditions	good	bad
Further costs	covered by credit	not covered by credit
Corruption	–	high risk
Energy supply	**Pro**	**Contra**
General	–	–
Supply security	secured	not secured / not only solution
Energy demand	higher than current	not higher than current / not known
Safety	**Pro**	**Contra**
General	safe	unsafe
Accident / incident	safest reactor on the market	nuclear energy production can never be safe
Intentional damage	safest reactor on the market	nuclear energy production can never be safe
Environment	**Pro**	**Contra**
General	not pollutant	pollutant
Radioactive waste disposal	solved for 20 years	unsolved
Temperature of Danube water	will rise, but not too much	will rise too much
Climate protection / CO_2 emission	contributory	not contributory
Legality	**Pro**	**Contra**
General	abided	broken
Hungarian laws	abided	broken
European and international laws	abided	broken
Ethics	**Pro**	**Contra**
General	–	–
Sustainability	sustainable	not sustainable
Public deliberation / support	sufficient/ supported	did not happen / not sufficient
Expert debate	sufficient	not sufficient
Political debate	sufficient	not sufficient
Relationship With Russia	**Pro**	**Contra**
General	appreciated	–
Russian dependency	not increasing	risk sovereignty
Rosatom	good partner	bad partner

The *topos* of energy supply refers to energy demand and supply security. The pro side argues that the energy demand of the country will rise and the expansion entails less imported energy which can guarantee supply security. The opposite side counters that energy demand will not rise or is only speculated. They discuss that the supply security of the country should be guaranteed in an alternative way, considering the nature of nuclear power production: centralized (localized to a few power stations, therefore cannot be substituted easily in case of emergencies), inflexible (cannot adapt to needs in an efficient quickness). Actors also argue in a broad sense whether the expansion is a good idea in terms of energy economics.

Within the *topos* of safety, the generic safety argument can be distinguished. The first argumentative move details the possibility, probability and effects of accidents and incidents (including mentions of Chernobyl and Fukushima). Those in favor of the expansion argue that Hungary will get the safest reactor on the market, while those who oppose claim that nuclear energy production can never be safe. The second move pertains to the risk of intentional damage.

The *topos* of environment involves the following moves: the problem of radioactive waste disposal, the rising temperature of the Danube water and the rate of CO_2 emission. The pro side argues that Russia will transport and store the radioactive waste for 20 years which is countered by the fact that after 20 years, Russia will transfer those back to Hungary and that the existing repository is almost to its maximum capacity, while the new one is only in its planning phase. As for the Danube water, the question is if the rise in temperature is still within acceptable limits. Considering the rate of CO_2 emission, the debate is about whether the two new reactors contribute to climate protection and help meet climate protection objectives. Only the opposing side mentions generic arguments and how the power plant is pollutant.

The *topos* of legality discusses if the plans and regulations abide by Hungarian or European Union and international laws. Considering Hungarian laws, actors discuss if the classification of the Paks II documents was legal and the provisional acceptance by the Parliament in 2009 gave grounds for the expansion, whether the Teller Project and the Lévai Project were well-founded. The move of EU and international laws pertains to the debated status of the state aid, missing the tendering procedure and the soundness of the environmental impact assessment.

The *topos* of ethics firstly accounts for sustainability. Sustainable development signifies a development that *"meets the needs of the present without compromising the ability of future generations to meet their own needs"* (United Nations General Assembly, 1987). The examined actors debate whether nuclear energy production and specifically the building of the new reactors counts as that. As for the moves of public deliberation and support, expert debate and political debate, the opposing parties discuss if the involvement of these parties in the decision-making process

has been adequate and their opinions bolster the expansion (opinion polls). No generic arguments were identified within the *topos* of ethics.

The *topos* of relationship with Russia describes the desirability of Hungary's political ties to Russia and Rosatom as contractor. The pro side argues that the contract with Russia does not increase the country's dependency, it is in fact beneficial to strengthen ties with such a powerful country, as well as entering into a deal with a renowned contractor such as Rosatom. The opposing side counters that Hungary will lose its sovereignty. Arguing against the expansion, the move of Rosatom discusses that the workings of the Russian contractor is state-controlled, not transparent, not adequately regulated nor safe. The generic argumentative move within this *topos* is about Russia as a good collaborator.

2.   Frequency of *topoi*

2.1   *The Hungarian Government*

The Hungarian Government argues in favor of the expansion. Figure 1. summarizes the results of the *topos* analysis of the Government's articles.

In the Government's texts, the most frequently identified *topos* is the *topos* of economy. They predominantly employ arguments about cost-efficiency and anticipated electricity prices (*"the expansion will result in a 1% GDP increase"*,[2] *"cheap electricity equals Paks"*). They also mention how the expansion would create jobs (*"can mean jobs for 10 000 people"*). They do not raise any counter-arguments about the distortion of competition.

The second most commonly detected *topos* is the *topos* of legality. The Government stands by the fact that the project abides by international laws, more specifically that it will not require a state aid (*"the Paks II investment does not include any state aid"*).

The third most frequently identified *topos* is the *topos* of energy supply. For the most part, the Government argues that the expansion would guarantee the energy supply security (*"with the Paks project the Government has secured energy supply"*), therefore Hungary will not need to import energy. They also mention that the two new reactors are necessary because the energy demand would increase (*"electricity consumption will increase in Hungary"*).

As for Hungary's relationship with Russia, the Government argues that the country's dependency will not increase and that Rosatom is a good business partner (*"the Russian technology [Rosatom] meets European Union and international safety requirements in every aspect and the [Russian] nuclear experts are remarkable"*). They also discuss the advantages of making a deal with Russia in a general

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2. All quoted arguments were translated by the authors.

sense (*"the Hungarian Government made the best possible decision when making a deal with Russia"*).

Within the *topos* of ethics, the most frequently detected move concerns public deliberation and the public's support for the project. The Government argues that they provided the public with opportunities to discuss the expansion and make their opinions known (*"public fora and discussions were held in recent years about the planned expansion"*). Also, expert debates were held and political debates occurred in the Parliament, therefore the Government's decision was not a unilateral decision. They argue that the power plant is a sustainable form of energy production as well (*"with the expansion of the Paks power station, Hungary decided on the sustainable energy source"*).

The sixth most commonly identified *topos* is the *topos* of environment. The Government compares the CO_2 emission of the power plant to that of fossil energy production and concludes that deciding on the expansion would help reduce pollutant emission (*"the operation of the new reactors would be CO_2 emission-free"*). They also argue that the rising temperature of the Danube water will not reach critical levels and that the radioactive waste disposal is solved since Russia will transport and store the waste for 20 years.

Concerning safety issues, the Government argues in a general sense that nuclear energy production is safe. They mostly employ generic and short arguments about the safety of the new reactors (*"it is safe"*) instead of arguing against the risk of accidents, incidents or intentional damage (*"the potential effects of the potential accidents are much lower with this type of reactor"*).

Financial issues in the Government's rhetoric are rarely discussed. They mostly argue that the credit the country took out from Russia had favorable conditions
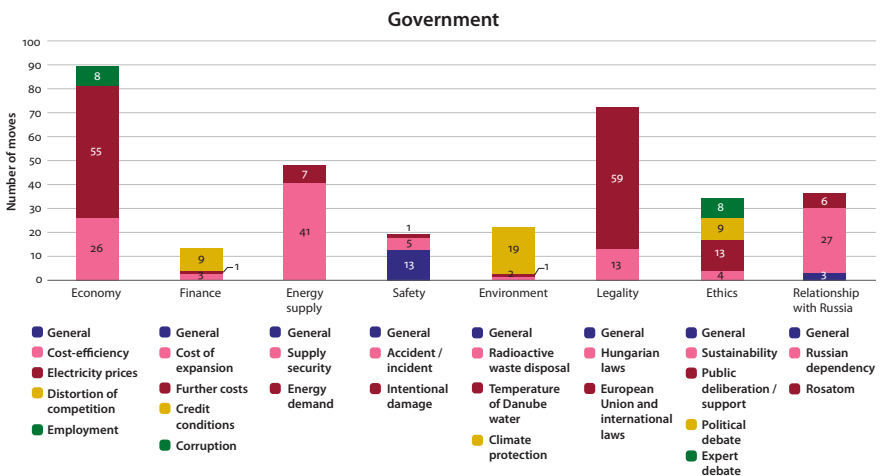

Figure 1. The number of *topoi* and argumentative moves of the Government

(*"the country will get the credit with better than market conditions, with a 30-year maturity"*) and would cover all costs (*"the whole 12.5 billion Euro budget will cover the investment under any circumstances"*).

2.2   LMP

LMP argues against the expansion, the numbers of their *topoi* and moves are shown on Figure 2. In their texts, the *topos* of ethics is the most frequently identi-fied *topos*. For the most part, they discuss the lack of public deliberation (*"with the exclusion of the big part of society"*) and refer to opinions polls (*"according to opinions polls, the expansion is objected by 2/3 of the questionees"*). LMP also raises concerns about sustainability and the effects on future generations (*"the expansion of the power station is not sustainable"*), as well as the lack of expert and political debates (*"not soundly justified by experts"*, *"the contract only made it to the cabinet after it has already been signed"*).

The second most common *topos* is the *topos* of finance. LMP equally protest to the cost of the expansion (*"financially unsupportable"*) and the risk of corruption (*"money can be shoveled out uninterrupted"*). They claim that the credit the coun-try took out from Russia was too high, had unfavorable conditions (*"the credit proposed by the Russian partner is a faulty product"*) and would entail further and hidden costs which the Government has not calculated in (*"based on experiences, the final bill is double the originally calculated amount"*).

Within the *topos* of economy, LMP primarily discusses cost-efficiency and how the expansion would result in the country's indebtedness (*"completely bank-rupts the country"*). As a green party, their arguments about renewable energy come up in relation to the distortion of competition, meaning that the state aid would hinder the financial support given to renewable energy production on the long run (*"sets back the bigger role renewable energy sources could play in domestic energy production"*). As for the expected electricity prices, LMP remarks that the price reduction is untrue (*"electricity prices will not only not decrease, but could actually double"*). They insist that the potential to create jobs is much higher in renewable energy production (*"she [Bernadett Szél, Co-President of LMP] deemed the proposition that it will create 40,000 jobs a bluff"*).

The fourth most commonly discussed aspect is the legal one. First and fore-most, LMP discusses how the project does not abide by Hungarian laws and that should be enough of an indication to cease any and all plans (*"contradicts the Fundamental Law of Hungary"*). LMP also argues how the expansion does not abide by international laws either (*"the Hungarian-Russian deal breaks an interna-tional contract"*).

Discussing Hungary's relationship to Russia, LMP with an overwhelming ma-jority refers to the dependency and the loss of sovereignty (*"increasing defenselessness*

against Russia"), and they rarely mention Rosatom as a business partner (*"it sheds light on the deficiencies of the Russian nuclear technology [Rosatom]"*).

The sixth most frequently identified *topos* is the *topos* of safety. Similarly to the Government's rhetoric, the green party mostly employs general expressions about the safety of the new reactors (*"the Government's nuclear adventures are dangerous"*) and rarely discusses them in detail, however they do pay attention to the risk of accident and incidents based on Chernobyl and Fukushima (*"that catastrophe [Fukushima] should have been the last warning that nuclear energy was dangerous and a dated technology"*). The argument for the danger of intentional damage only comes up once (*"centralization increases terrorist threats"*).

The *topos* of energy supply is mainly discussed in terms of supply security. LMP maintains that the country's supply security will not be guaranteed (*"energy dependence will not decrease"*). The change in energy demand is rarely discussed (*"he [the President of the Committee on Sustainable Development, also a member of LMP] called the priorities incorrect according to which the energy demand is continuously increasing"*).

Despite LMP being a green party, the *topos* of environment is the least frequently identified *topos*. For the most part, LMP mentions how the problem of radioactive waste disposal is not solved and the fact the Russia will transport and store the nuclear waste cannot be considered a pro argument (*"their containment after usage is one of the most serious environmental problems"*). Similarly to safety issues, speaking generally about the pollutant nature of the power plant characterizes the party's rhetoric (*"Paks II destroys the environment"*). The concern with the rising temperature of the Danube water is only mentioned once (*"the Government needs to report what they are planning to do with the Danube"*).
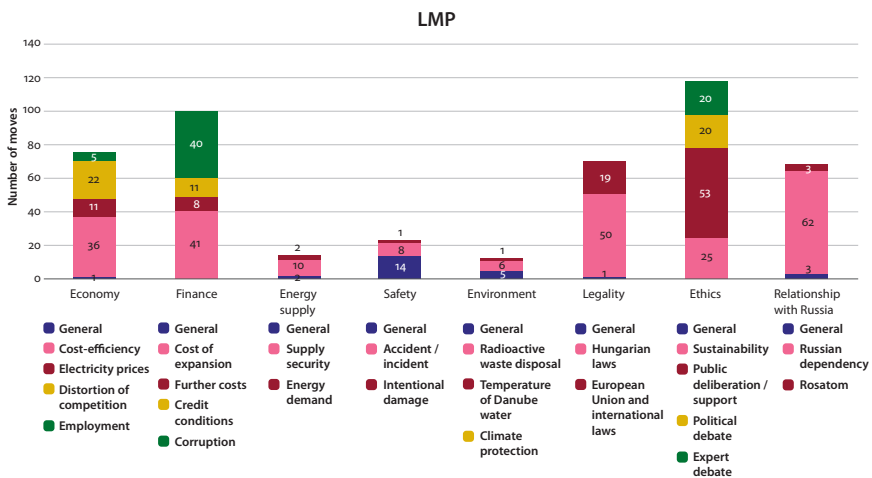

Figure 2. The number of *topoi* and argumentative moves of LMP

2.3   *Greenpace*

Greenpeace as an environmental protectionist organization argues against the expansion and Figure 3. shows the ratio of *topoi* and moves. It can be seen that emphasizing economic risks is the most common. Their most frequently identified move is about cost-efficiency (*"there is no scenario in which Paks II would be profitable"*). Every other economic aspect gets less attention in their argumentation: the distortion of competition (*"they are giving nuclear energy an advantage which cannot be made up"*), the change in electricity prices and the opportunity to create jobs (*"the potential to create jobs of renewables is multiple of nuclear energy"*). There are three general mentions about the expansion being uneconomical (*"the economic risks of the expansion are grave as well"*).

Legality is the second most commonly discussed aspect. The project breaking EU and international laws is mentioned twice as frequently than the violation of Hungarian laws (*"it was created illegally, without justification and in complete secrecy"*, *"the expansion of the Paks Nuclear Power Plant goes against the laws of the EU on procurement, state aid and energy regulations"*).

The *topos* of ethics in the argumentation of Greenpeace mostly pertains to the lack of public deliberation and support (*"history has proven that decisions taken without wide public consensus would not live long"*). The effect nuclear energy production would have on future generations also gets multiple mentions (*"even our grandchildren will be paying for the Paks expansion"*). Greenpeace only once discusses the lack of political debate, however they make remarks on the absence of expert examinations (*"a decision like this without expert debate is unacceptable in a democratic country"*).

Safety issues are again discussed in general terms. The risk of accident and incidents (*"since Fukushima it is more certain than ever: there is no safe nuclear energy"*) as well as intentional damage (*"we cannot see any guarantees that the power station can still function safely in case of a terrorist attack"*) rarely come up in their texts.

The environmental risks are debated in generic terms, just like in the case of safety. The problem of radioactive waste disposal gets only five mentions (*"there is still no solution for the problem of permanently depositing nuclear waste"*), while concerns with the rising temperature of the Danube water and the rate of CO_2 emission of the power plant are completely omitted from their argumentation.

As for Hungary's relationship with Russia, Greenpeace mostly protests the decrease in sovereignty (*"Paks II only makes Hungary more dependent on Russia, not more independent"*). The argument about Rosatom as an unfavorable business partner and contractor is only identified three times (*"the participation of Rosatom in the project raises further great risks"*).

The *topoi* of finance and energy supply are the least frequently identified. Greenpeace focuses on the high cost of the expansion (*"too expensive"*) and supply security (*"investment that causes energy dependence"*). The possible change in energy demand is not discussed, while further costs, the conditions of the credit, further costs and corruption get one mention each.
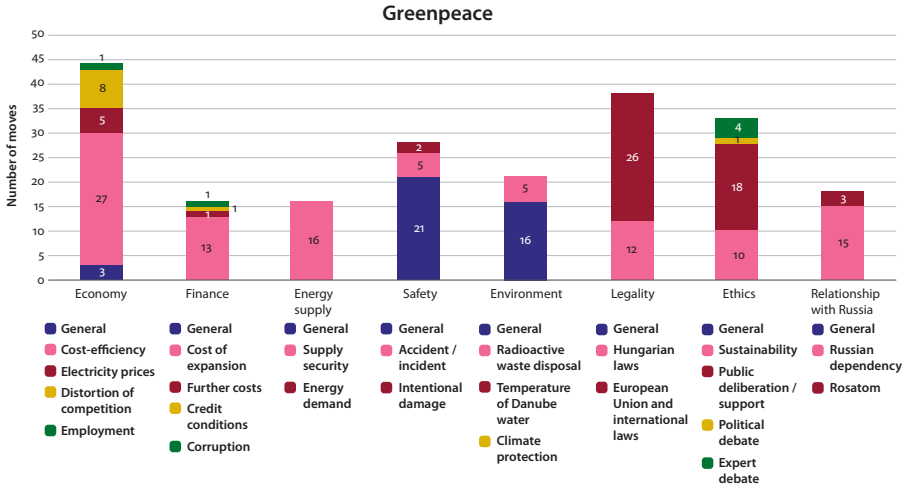
Figure 3. The number of *topoi* and argumentative moves of Greenpeace

2.4   *Energy Club*

Expectations from Energy Club as a scientific actor were that they would present a balanced argumentation and would predominantly discuss safety and environmental aspects. Contrary to that, the results show that Energy Club as a research institute has a unified and explicit standpoint against the building of the new reactors. The ratio of their *topoi* and moves are presented in Figure 4.

The most frequently identified *topos* is the *topos* of legality which can be attributed to the fact that Energy Club together with the Hungarian Civil Liberties Union sued for the declassification of data for multiple years. They argue that the unavailability of information should entail the ceasing of the expansion project. In terms of EU laws (*"violates European laws in multiple ways"*), they argue that the environmental impact assessment is unsubstantiated, the investment contains state funds and the lack of tender is illegal (*"does not abide by European laws about the integrity of the market"*).

The second most commonly detected *topos* is the *topos* of ethics. Energy Club focuses on the absence of public deliberation and support (*"does not intend to be accountable in front of the public"*), however the need for expert debate is more often articulated in their argumentation than in other actors' (*"there is no expert*

basis"). The scientific research institute also notes that the extent to which the project was deliberated in the Parliament is not sufficient (*"the decision about the new power station should have been made in the Parliament first, not in a dacha next to Moscow"*). Sustainability concerns are raised as well (*"the application of nuclear energy cannot be compatible with sustainable development"*).

The economic and financial aspects of the expansion are also discussed at length. Energy Club focuses on long-term economic disadvantages (*"nuclear energy is a dying energy which will not be profitable"*). The risk of financial support for nuclear energy production hindering the development and permeation of renewable energy production gets mentioned fewer times than in other actors' discourses. According to Energy Club, the cost of the expansion, additional or hidden costs as well as the risk of corruption are all too high to continue with the plans (*"Paks II as an unbelievably expensive giga-investment"*).

As for the country's dependency on Russia, Energy Club argues that the contract with Rosatom would result in loss of independence (*"serves Russian interests for the most part"*). Rosatom as an unsuitable business partner only gets three mentions (*"because of the application of a new technology, the investment implies informational distortions which can be easily abused by the contractor [Rosatom]"*).

As the *topos* of environment, Energy Club is mostly concerned with radioactive waste disposal. They argue that the cooling of the new reactors is problematic (*"the temperature of the river will increase and that will affect the aquatic flora and fauna"*). There is only one argument found about climate protection (*"it does not contribute substantially to climate protection"*).

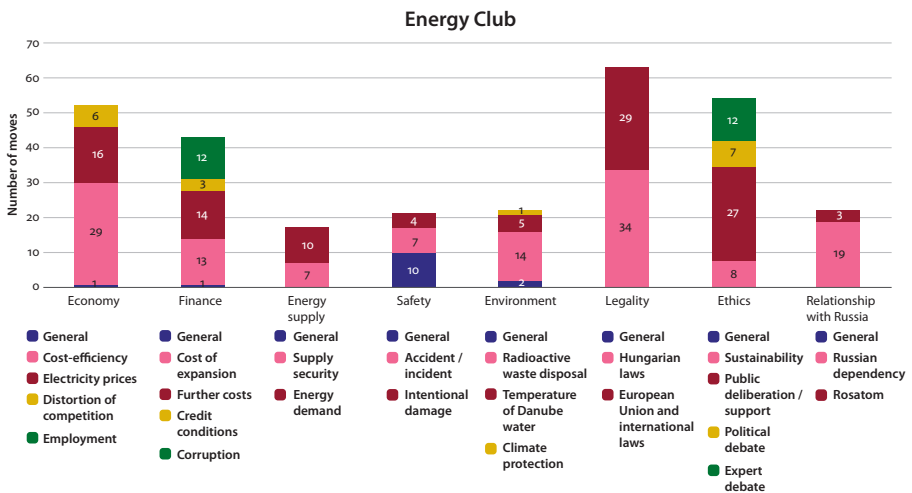Energy Club mostly discusses safety in terms of generic arguments.

Figure 4. The number of *topoi* and argumentative moves of Energy Club

The least frequently noted *topos* is the *topos* of energy supply. The more common argumentative move is about energy demand (*"the electricity produced by the new power station will not be needed"*), supply security (*"it makes the electricity system inflexible"*) is discussed to a lesser extent.

2.5   *Hungarian Academy of Sciences*

The Hungarian Academy of Sciences published ten articles on their website about nuclear energy and the expansion of the Paks NPP. Seven of the articles were summaries of conferences and symposia and three of them were news articles.

As expected, HAS does not have a unified standpoint, however the lecturers of the conferences and the speakers commenting in the news items present predominantly pro arguments. Most of those are articulated by Attila Aszódi, the Government Commissioner for the Maintenance of the Performance of the Paks Atomic Power Station. He has a doctorate from the Faculty of Mechanical Engineering at the Budapest University of Technology and Economics where he later worked at the Institute of Nuclear Techniques. He appeared in eight of the ten examined articles.

The most frequently identified *topoi* are environment and energy supply with ten arguments each. The followings with nine arguments respectively are the *topoi* of safety and economy. Four arguments were identified within the *topos* of ethics, three within finance, two within legality, and one relationship with Russia. As opposed to our previously examined actors (the Hungarian Government, LMP, Greenpeace and Energy Club), safety and environmental aspects are in the forefront of the articles of HAS. However, issues pertaining to the economy and energy supply are equally prominent.

Breaking the overall frequency of the *topoi* down to arguments in favor and against the expansion, the results show that the *topoi* of environment, energy supply, safety and economy are outstanding on the pro side (Figure 5.): *"alongside the new power station, a temporary repository will be built as well and it will be completely independent from the currently functioning temporary repository"*, *"energy demand will continuously rise"*, *"the expansion of the Paks NPP is being planned with vast nuclear safety"*, *"the credit is turned into public assets which will result in economic growth"*. Ethical concerns are mostly raised by those who oppose the building of the new reactors (Figure 6.): *"the nuclear energy industry of the present is not sustainable"*. The *topos* of relationship with Russia is identified (*"the strongest argument in favor of the Russian reactor was the financial construction"*). The *topos* of legality is detected as well (*"he [László Sólyom, academic and former President of Hungary] objected to the manner of preparation and that data about the expansion were classified for 30 years"*).
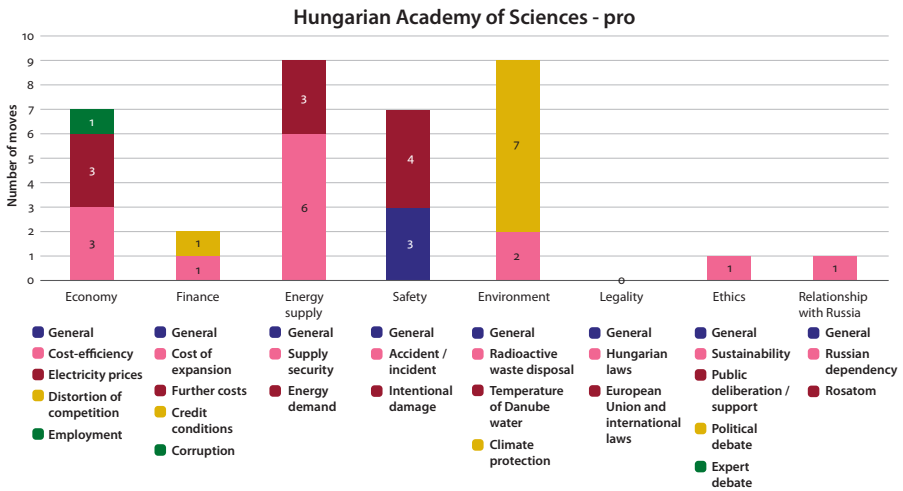
Figure 5. The number of *topoi* and argumentative moves of HAS in favor of the expansion
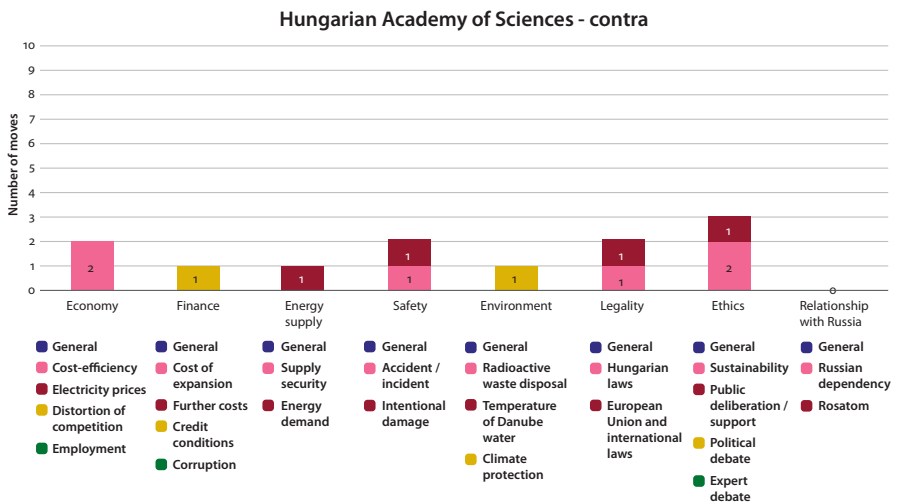
Figure 6. The number of *topoi* and argumentative moves of HAS against the expansion

We argue that HAS implies a standpoint. They do not explicitly state it, however they imply a pro stance based on the following considerations. Firstly, the number of speakers and arguments are in favor of the expansion. Secondly, in 2009, the scientific organization and the MVM Paks Nuclear Power Plant Ltd. *"agreed that the continued operation of the Paks Nuclear Power Plant and the continued use of nuclear energy in Hungary is of national interest. In line with their conviction,*

the parties promote the greatest public acceptance of nuclear energy usage possible"[3] (Cooperation agreement between the Hungarian Academy of Sciences and MVM Paks Nuclear Power Plant Ltd., 2009). Thirdly, there is a financial connection between the two: in 2016, two-thirds of the operating costs of the HAS was financed by the state (Hungarian Academy of Sciences, 2016).

3.   Call to action

As an activist group, Greenpeace made calls to action markedly often in the examined articles. However, LMP and even Energy Club presented the same types of imperatives, such as open letters and calls to protest. All three actors addressed civilians and politicians including the Prime Minister, the President of the Republic, party leaders, members of the Parliament and other political bodies. Civilians were mostly invited to various protests and politicians were demanded to repeal certain decisions, to issue a referendum, not to authorize the environmental impact assessment or make the classified information public.

Conclusion

In the first section of this paper, important events that shaped the debate about the expansion were presented. The concept of *topos*, as an ancient rhetorical term for finding arguments, was utilized to cover the subject-matters of the debate. The following *topoi* were named: economy, finance, energy supply, safety, environment, legality, ethics and relationship with Russia. Under these *topoi*, the most common argumentative moves employed by the examined actors were classed.

The second section of this paper examined the frequency of the aforementioned *topoi* and argumentative moves in the texts of two political bodies (the Hungarian Government and LMP, the green party), Greenpeace Hungary and two scientific organizations (the Hungarian Academy of Sciences and Energy Club). As expected, the frequency of the subject-matters differed in regards to the examined parties. Figure 7. demonstrates the prevalence of the eight *topoi* and shows that the economical aspect of the expansion was prominent in every actor's discourse.

The only examined argumentation that met our expectations was that of the Government. Considering their continued campaign about the reduction of utility costs, we anticipated the arguments relating to low electricity prices.

Supposing that a discourse the aim of which is human rights defense would be characterized by the co-occurrence of legal and ethical subject-matters, LMP,

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3. Translation by the authors.
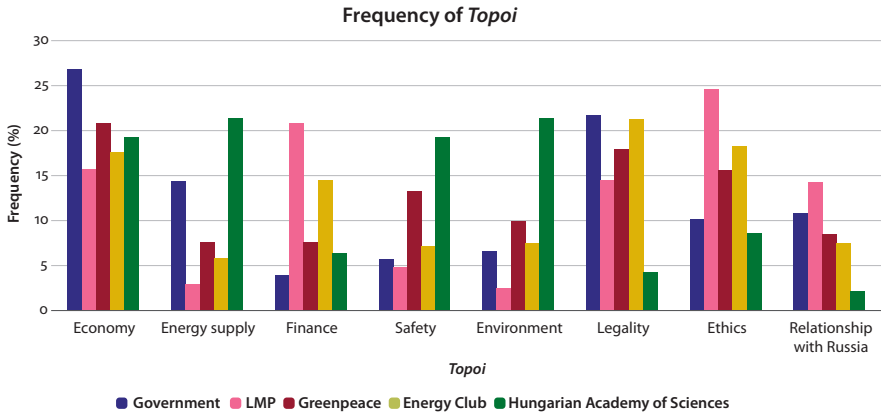
Figure 7. The frequency of *topoi* of the five actors

Greenpeace and Energy Club showed similarities. Therefore, a shift can be noted. Based on their initial political program, we expected LMP to campaign against the expansion with arguments about the protection of the environment and the risk of corruption. The results show that beside corruption and investment costs, they focused more on legal and ethical issues. Similarly to LMP, before conducting the analysis we expected Greenpeace to argue mostly about the protection of the environment, however, alongside their argumentation about economical issues, they stressed legal and ethical aspects as well. The most frequently identified *topoi* in the texts of Energy Club were, again, legality and ethics. LMP, Greenpeace and Energy Club showed similarities in another sense as well: in their calls to action. All of them invited citizens to protest and demanded various political actors to repeal the Paks Pact.

In regards to clear and open stances about the expansion, we expected the examined political parties and Greenpeace to have an explicit standpoint as opposed to the two scientific actors. In opposition, a clear stance could be identified in regards to Energy Club. A slight shift to the pro side could be noted in the articles of HAS based on the ratio of the supporting arguments and speakers. Additionally, there is an agreement and a financing connection between the state and the scientific organization. Taking into account the aforementioned observations as well as the equal presence of arguments about safety, environment, also economy and energy supply, HAS could be studied partly as a political actor as well. Figure 8. demonstrates the shift of the actors.
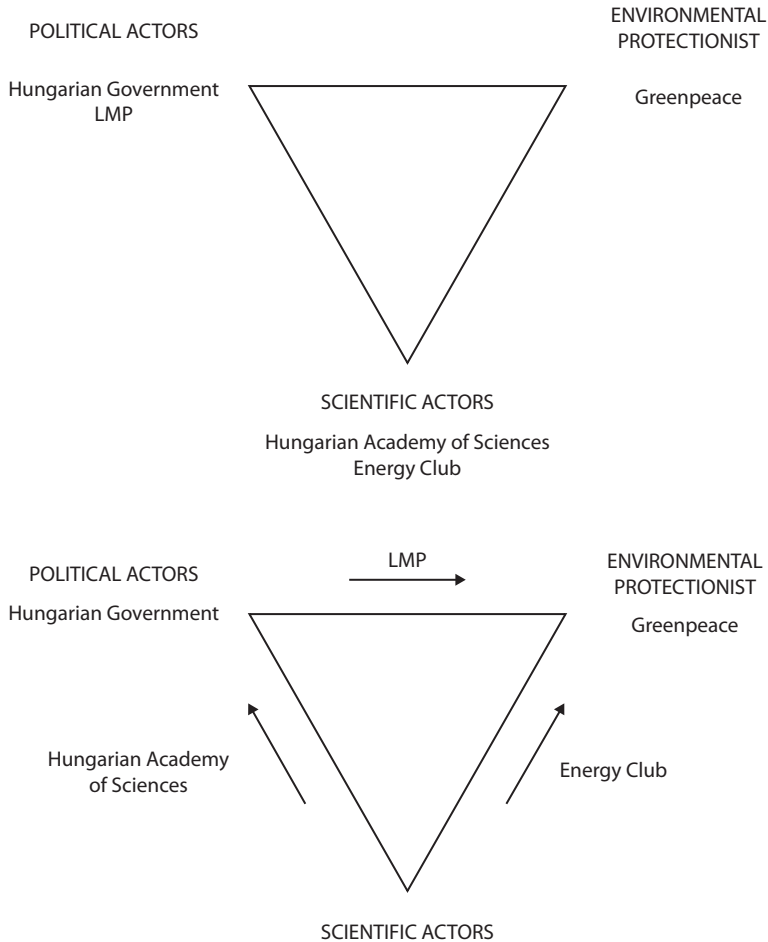
Figure 8. The shift of the actors

Discussion

The discourse about nuclear energy started approximately ten years ago in Hungary when the so-called Teller Project – named after Ede Teller, 'the father of the hydro-gen bomb' – established the potential expansion of the Paks NPP. In the last ten years, strong arguments have been presented on every side of the controversy in political, environmental protectionist and scientific discourses as well.

The noteworthy discrepancy between our expectations and results pertained to the scientific actors, Energy Club and the Hungarian Academy of Sciences. The analysis showed that Energy Club had a clear standpoint against the expansion

with regular articles about all the developments, while HAS presented pro and contra arguments without a unified stance, but only published one or two articles a year. In the previous section we argued that they imply a pro expansion standpoint similarly to the Government.

Considering the issue from the point of view of a layman, the need might arise for a regular, detailed and balanced argumentation without an apparent stance. We do not argue that anybody should rely on one source only when reflecting on an interdisciplinary issue such as the installation of new reactors in a nuclear power station. However, the absence of an actor with the previously mentioned characteristics could be articulated.

After all, the question is not whether there is such an institute or if there should be such an institute, but if it possible at all that an institute like this exists. Previous literature details that "*governments nowadays find themselves allocating very large sums of public money to various bodies for various forms of research [and] academic science is just one part of a loosely articulated R&D system*" (Ziman, 2000: p. 75). This is supported by the previously referenced 2009 agreement between the Hungarian Academy of Sciences and the MVM Paks Nuclear Power Plant Ltd. Additionally, Ziman noted (2000) that a financial connection between the state and various research bodies makes the latter vulnerable in terms of the direction their research takes. As previously referenced as well, in 2016 two-thirds of the operating costs of HAS were financed by the state.

The intertwining of politics and science is not accidental, but the method of operation, thus the existence of a scientific organization presenting a regular, detailed and balanced argumentation without an apparent stance is made troublesome. This raises questions about how to evaluate stakeholders' argumentation taking their interests and objectives into account and whose standpoint to base our opinions on.

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Particularist understanding of CSR marketing visual arguments

An applied multidisciplinary approach

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We argue that understanding visual arguments is underdetermined. We address the question concerning how controversial understandings of visual arguments can be handled only by particularism. The distinction between the generalist and the particularist stance taken from moral philosophy offers a way to answer this question. On the particularist view visual principles are incapable of that feat because the visual meaning of a particular visual stimulus is always context-dependent. Instead of appealing to visual principles, the particularist would contrast different situations in a way that their relevant features resemble each other. Understanding a visual argument and the involving context requires analogical reasoning that can be accounted only by particularism. Visual arguments' valid interpretation can be grasped only within a particularist-like framework.

Keywords: moral generalism, moral particularism, visual argumentation, argumentation schemes, multi-modal visual argument, analogy, contextual framework

1.   Introduction

We argue that understanding visual arguments is underdetermined. The translations of visual arguments rely on an understanding of bare visual stimuli, which is both immediate and pre-conscious. To account for the context determining the meaning of the visual stimuli a theoretical framework is needed.

In our paper, we address one question concerning how vague and controversial understandings of visual arguments can be handled only by particularist framework. We will argue that the distinction between the generalist and the particularist stance taken from moral philosophy offers a way to answer this question.

On the generalist view visual arguments need building boxes of interpretations which may be expressed in the form defeasible generalizations. So the very possibility of visual judgments and arguments depends on the availability a suitable supply of visual principles which interpret the stimuli in a form which is appropriate input to the process of verbal translation. On the particularist view visual principles (if there are any) are incapable of that feat because the visual meaning of a particular visual stimulus (such as a specific shape) is always context-dependent. Instead of appealing to visual principles, the particularist would contrast different situations in a way that their relevant features resemble each other. In doing so they could typically accept something like Wittgenstein's 'rule-following considerations'. Different visual arguments resemble in certain limited ways, supposing a loose connection between cases.

Understanding a visual argument and the involving context requires an analogical reasoning that can be accounted only by a particularist manner. Yet, visual arguments are undetermined hence, they are subject of different interpretation creating room for conceptual controversy. In practice, given a picture might be related to different analogical phenomena. But to decide which phenomena is the closest hence, the most appropriate we shall apply, as we argue, particularist methodology. There is no fixed building blocks of interpretation of visual understanding. Vague similarities of resembling pictures create controversial interpretation of visual arguments and we are going to argue that their valid interpretation can be grasped only within a particularist-like framework.

In what follows, first we are going to briefly summarize the tradition of visual argumentation. For some, it was not obvious at all information provided by images and pictures are able to play an argumentative role. In the first section, we are provide a historical overview on how visual argumentation has been evolved. In the next section, we are going to also shortly summarize what moral generalists hold on moral principles and rules. We are going to argue that the framework used by moral generalists is perfectly suitable to grasp the way how symbols and symbolic pictograms transfer arguments. After having described generalism, we are turning to moral particularism, an opposite view on how moral cases are evaluated. We are going to shortly summarize how this framework works, then we are going to argue that complex multidimensional images can be understood by using the methodology of particularism. We further provide an other argument showing that general rules and principles are not capable of grasping the analogical reasoning used in CSR marketing campaigns. Finally, we draw some conclusions regarding to the nature of moral particularism and visual argumentation. We are going to claim that yet these seemingly far fields of research are in fact share various aspects of similarities that provides a platform for interdisciplinary cooperation.

2. The tradition of visual argumentation

In the late 1970s a group of philosophers started to separate themselves the normative study of arguments and develop "non-formal standards, procedures of analysis, interpretations, evaluation, critique and construction of argumentation in everyday language." (Van Eeemeren et al. 2014. p. 381.) Once we distinguish informal logic from formal logic the main difference is the applicability in different context. Frans H. van Eemeren asserts that the label "informal logic" covers a "collection of normative approaches to the study of reasoning in ordinary language that remain closer to the practice of argumentation than formal logic"(Van Eeemeren et al. 2014. p. 45.). In formal logic, the notion of logical form and the notion of validity play the central normative role, in contrast with informal logicians conclude that is problematic for the evaluation of real-life arguments. Key issue in informal logic is not the question of deductive validity, because the truth of the premises are often not known. They rather consider argument types, implicit premises and fallacies that give a framework to judge the arguments. This special aspect makes it possible to consider visual elements as arguments. In 1996 Birdsell, Groarke and Blair pose the question how nonverbal (i.e. visual) messages can contain an argument. Up to these days, there are several publications about this topic and the majority of theorists accept visual argumentation as a part of informal logic.

Providing an overview of the twenty-year history of visual argumentation is a great venture. The assumption that images can play the similar role as verbal arguments raises a great deal of questions. On one hand, we concern with the existence of visual argumentation distinguishing the arguments for and against. On the other hand, we focus on the problem of translation, which gains prominence if we intend to reconstruct pictures as arguments. Defining the term of visual argument without contradiction is a challenge, but the majority of theorists intend to do so. If we investigate the terminology of visual argumentation, we have to separate it to two parts, giving a definition to 'argument', and identifying what 'visual' means (Blair 1996. p. 24–25). According to a standard definition of an 'argument' it has to contain a linguistically explicable claim (Claim Condition, CC), and at least one linguistically explicable reason (Support Condition, SC) (O'Keefe, 1982, p. 17). This term referring to verbal argument is widely accepted, but applying to visual argumentation, some scholars criticize it. This argument, which comes from O'Keefe, has two major implications. The first is that such arguments are propositional, and the second is that arguments are not necessarily linguistic or verbal. If we examine an argument, the first step is to recognize what claims and reasons are. Only after that, can we accept or reject it. This definition is sufficient to conduct that visual arguments are not distinct in essence from verbal arguments, because

pictures also contain a visual claim and support. Fleming's main problem with this is that "it is impossible to reliably distinguish in picture what is a position, and what is evidence for that position." (Fleming, 1996, p. 2) The Claim Condition (CC) is refuted by the problem of translation, because pictures cannot express a claim without language. The Support Condition (SC) also cannot be held, because the visual cannot serve as a support for a linguistic claim (for Fleming this is not a minor role). Another definition of argument comes from Wood and Walton, which is a set of propositions that can be segmented into two categories 'premises' and 'conclusion'. In this categorization, premises (SC) can confirm a conclusion (CC). If we evaluate these definitions, we can easily accept the structure of O'Keefe's and Blair's terms that are equal and interchangeable with one another. Relatedly to Walton, Groarke raises the same concern with visual arguments that can "contain a premise-conclusion structure which is amenable to standard forms of argument analysis" (Groarke, 1996, p. 107). In our reconstruction, we apply their concept and we use argumentation schemes of Walton, Reed and Macagno that are "forms of argument that represent structures of common types of arguments used in everyday discourse, as well as in special context like those of legal argumentation and scientific argumentation." (Walton, Reed, Macagno, 2008, p. 1) We intend to highlight the end of the definition that refers to the context, if these schemes are applicable in a legal or a scientific argumentation, then it allows using them in a visual argumentation too.

If we adopt the existence of visual argumentation and this latter mentioned method to identify premises and conclusion, it is necessary to review the problem of translation. It is obvious that verbal communication is able to transmit messages visualizable, but the contrary is not evident. The objection that the deep content will be lost if we describe or translate visual into verbal is false. Pfister and Wood argue that images are received holistically, but not constructed this way (Groarke et al., 2016. p. 231). If viewers intend to understand the message of the picture, they will precisely identify every details, including the smallest visual elements, to get overall impression and understand the conclusion of the picture without losing anything.

As opposed to that, Johnson provides three points why this asymmetry between verbal and visual arguments is insolvable. He agrees with the importance of visual literacy but criticizes Groarke's suggestion. Johnson says, "they are not visual arguments (because most of the essential work is done by words and text)" (Johnson 2003, p. 9). First, every visual argument involves a verbal counterpart, but the reverse is not thinkable. Second, visual argumentation depends on verbal argumentation and the apparatus to evaluate them is all verbal (premise, missing premise, conclusion, enthymeme etc.). Last, he argues that a theory of visual argumentation depends on the tradition of verbal theory of informal logic (Johnson

2003, p. 10). In contrast, Blair asserts that visualization has its own conventions such as signs, symbols and conventionalized images. Visual communication can be as effective as verbal communication and the reduction is not necessary. Furthermore, he says that "visual arguments are not distinct in essence from verbal arguments" (Blair, 1996, p. 38.). The only problematic point is the question of interpretation if, in order to understand visual argumentation, a translation to the verbal is necessary, the primacy of verbal argumentation retains back. Remarkably, up to this day the accepted method to evaluate visual content is translation involving a disregarded problem of vagueness and ambiguity. The question of interpretation is not unique for visual argumentation. We all know that different perceivers might grasp radically different features of the provided stimuli. Amongst others, this phenomenon is also especially relevant in moral philosophy. Various agents may describe, understand and evaluate moral cases significantly differently. For some an act, for instance, is an act of freedom of speach but for others it is nothing but a hate speech. This long standing problem has been inspiring moral thinkers to come up with a solution solving morally ambiguous cases. In the later part of our paper, we are going to introduce to philosophically different views on how to properly understand ambiguous cases. These tools are not only relevant and useful for moral philosophy but as we argue, it can be also highly important to better understand visual argumentation.

Theorists used to analyze several categories of visual expression to determine their relationship with the theory of visual argumentation (dramatic painting and sculpture, magazine and other static visual ads, television commercials, political cartoons). We focus on the topic of static visual ads, because they are closely related to our research. If we analyze static advertisements, we can establish that these types of pictures are regularly combined with texts. Blair named this type 'hybrid' or 'multimodal', that always contains verbal parts, but "their successful expression depends also on their visual components" (Blair 2014, p. 2). The term 'multimodal' comes from Michael Gilbert in 1997, but its meaning is entirely different from Blair. Blair highlights that visual arguments without verbal counterparts are rare, but they are possible. Overall, the text and the context can help the viewer to understand the main message.

We can assert that visual argumentation depends on verbal argumentation and the apparatus to evaluate them is all verbal. We intend to summarize the appropriate method to reconstruct verbal texts compared to the reconstruction of visual contents. If we reconstruct verbal texts, the first step is identifying statements, but not every sentence has an argumentative role. Providing relevant information, which is clear and unambiguous, is necessary requirement for the text. Moreover, the truth-value criterion is crucial condition too. If the relevant statements are selected, then the second step is establishing the premise-conclusion

structure and identify arguments. Last but not least, it is important to take into consideration the evaluation method of arguments, that consists of eight rules. For analysis, we have to understand the message of the text, identifying premises and conclusion(s) and reconstruct the sentences. We will highlight that the transformation of the implicit content to explicit is typically verbal. Finally, once we reconstruct the structure of the texts, then we evaluate the reasoning, criticize it and seek for fallacies. (Figure 1)
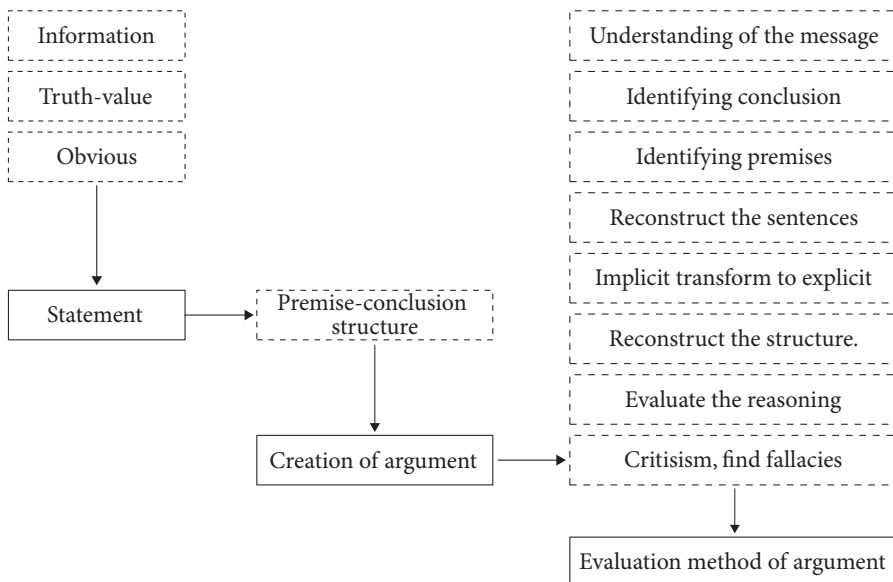
Figure 1.

We argue that the analysis of visual argumentation can follow broadly the same method as the reconstruction of texts based on informal logic. Once we see the pictures as arguments, first we have to create visual statements that is problematic, because we face the problem of vagueness and ambiguity. In this paper, we will not attend to this issue, but there are many solutions to solve this obstacle of translation. Pictures can provide information, but it is not typical for them to have truth-value conditions. If we assert, that visual statements exist, we can create premise-conclusion structures. If we draw the conclusion, it enables us to evaluate this type of argument. The former eight rules will be reduced to seven, because in pictures typically all elements are implicit, except the verbal parts, but these types of images contain multimodal-visual arguments. Overall, we can claim that the evaluation method of visual and verbal arguments are the same. (Figure 2.)

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│  Information  │                              │  Understanding of the message  │
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        │                                      ┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐
        │                                      │     Identifying conclusion     │
        │                                      └ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘
        │                                      ┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐
        │                                      │      Identifying premises      │
        ▼                                      └ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘
┌───────────────┐    ┌ ─ ─ ─ ─ ─ ─ ─ ─ ┐      ┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐
│Visual statement│──▶ │ Premise-conclusion│     │    Reconstruct the sentences   │
└───────────────┘    │     structure    │      └ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘
                     └ ─ ─ ─ ─ ─ ─ ─ ─ ┘
                             │                 ┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐
                             ▼                 │     Reconstruct the structure   │
                     ┌───────────────┐         └ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘
                     │Visual statements can│    ┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐
                     │  create visual │────▶   │     Evaluate the reasoning      │
                     │  arguments.   │         └ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘
                     └───────────────┘         ┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐
                                               │     Criticism, find fallacies   │
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                                               │   Evaluation method of visual   │
                                               │  arguments are same with verbal.│
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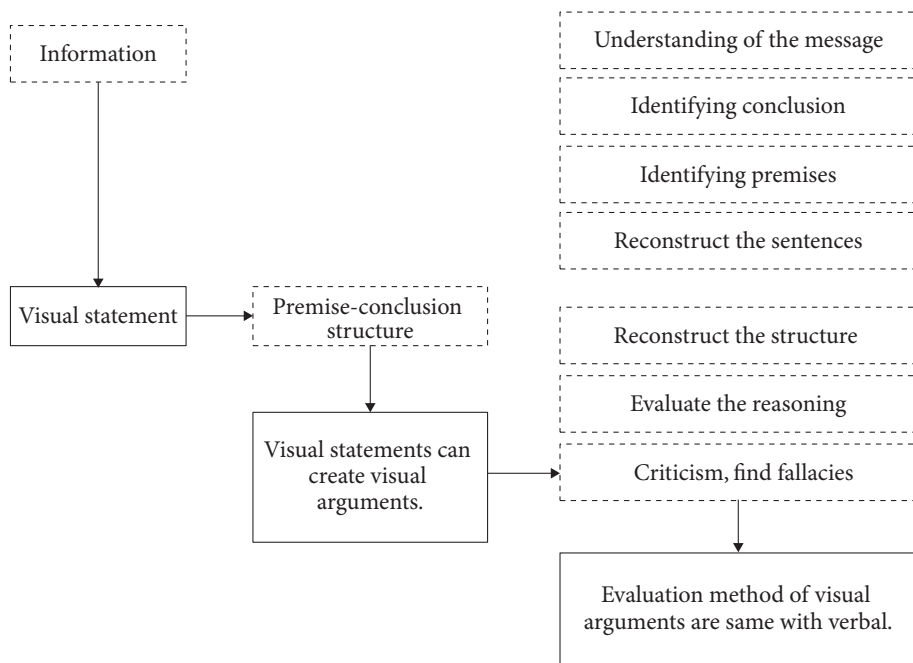
Figure 2.

In our reconstruction, we apply argumentation schemes of Walton and Macagno that are "forms of argument that represent structures of common types of arguments used in everyday discourse, as well as in special context like those of legal argumentation and scientific argumentation." (Walton et al., 2008, p. 1.) An argumentation scheme is an abstract structure which can be filled in with various linguistic elements. But filling it in with linguistic elements which make the premises true does not necessarily make the conclusion true. It makes the conclusion only presumptively true. These argumentation schemes are also constituted in parts by identical linguistic elements, but instead of logical connectives they involve non-logical expressions such as similarity, cause, sign. Here is a somewhat simplified example:

> *A* is true in this situation.
> <u>*A* is a sign of *B*.</u>
> *B* is true in this situation.

Filling in "There is green traffic light here." for *A* and "There is sign to drive a car" for *B*, we get a cogent, even if not conclusive argument for *B*. (Walton et al. 2008.)

One of the fundamental forms of argumentation schemes is the Argument from Analogy. We are argue that this form of schemes are closely related to the

particularist approach. When we identify this scheme we made a case-based reasoning (CBR) which based on the comparison of one case to another.

"CBR not only compares one case to another as similar, but also compares cases as more similar to others with respect to a given case." (Walton et al. 2008. p. 43.)

In analogical reasoning, similarities are perceived (G1 and G2) as the basis to infer some further similarity (A) that has yet to be observed.

The basic form of the Argument from Analogy

Similarity Premise: Case G1 is similar to case G2.
Base Premise: In case G1, A is true (false).
C: A is true (false) in case G2.   (Walton-Reed-Macagno 2008., p. 42.)

Walton, Reed and Macagno give a critical questions to evaluate the Argument from Analogy scheme. These questions can be used to test weak parts of the argument of the type represented by the scheme.

CQ1:   Are there differences between G1 and G2 that would tend to undermine the force of the similarity cited?
CQ2:   Is A true (false) in G1?
CQ3:   Is there some other case G3 that is also similar to G1, but in which A is false (true)?   (Walton-Reed-Macagno 2008., p. 317.)

In the Figure 3 we can see the transition from the source case to the target case. The original case in our example G1 used to set up the argument from analogy is called the source case. The case G2 is called the target case. In the next picture we can recognize how argument works as a transfer of data from one case through an argument to another case. (Walton 2014., p. 25.)
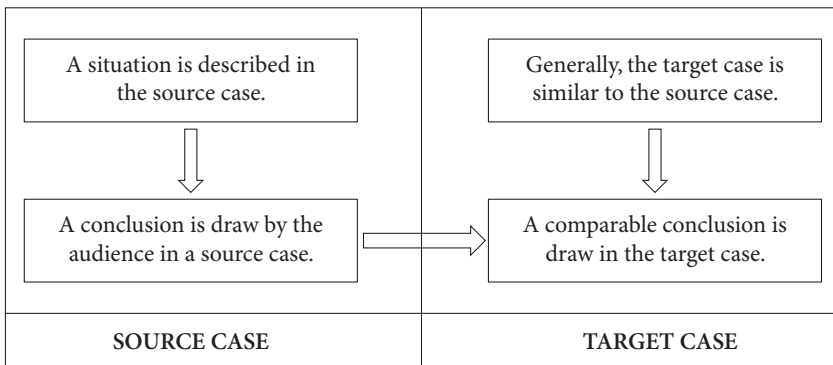

Figure 3.

In the next two chapter, we are going to argue that understanding two types of visual argument involves a generalist-like and particularist-like image realization model. Briefly, images having socially embedded and well-grounded forms are grasped by a general form but pictures – including multimodal ones – can only be realized by a step-by-step particularist-like manner.

First, we are going to briefly summarize how generalism works in moral philosophy, then we shall apply this manner to socially conceptualized images. We shall argue that the translation of these images to verbal arguments is socially precoded and socially understood by all competent member of a given society, which also involves that these understanding are context and social dependent.

Secondly, multi modal pictures, the ones that involve not only images but other forms of information like writings or audio effects, can be grasped only by a case-by-case reasoning. Importantly, it must not be an analogical reasoning because a schema of analogical reasoning can be generalized that would narrow a range of interpretation of an image. We argue that the method of particularism which has been borrowed from moral philosophy interdisciplinary opens the room to properly understand how multimodal image argumentation is processed.

3.   Broad summary of generalism

Let us start with a short summary of moral generalism. Moral generalists hold that the very possibility of moral thought and judgment depends on the provision of a suitable supply of moral principles (Dancy 2004, p. 7). "Features of such acts as promise-keeping, lying, inflicting pain, being kind are building blocks of everyday morality that entertain an intimate connection with their moral import. Those are genuinely explanatory features for the moral status of acts and may be captured into defeasible generalizations." (Potrc, Strahovnik, Lance, 2007, p. 4) Moral generalism applies generalized principles to different but relevantly similar cases that constitute types of situations. The principle 'do not steal', for example, applies to types of situations in which one is exposed to steal something. Moral generalists rely on the concept of situation types to which generalized principles can be applied.

In practice, generalists subsume a particular case under a general principle relying on classifying particular situations into types of situations. The moral content of the case can be evaluated only if the case is under a principle. There cannot be moral evaluation without a pre-existent moral principle subsuming the case under a situation type. For a generalist, in order to ascribe any kind of moral judgment, a case must have been first subsumed under a moral principle. Therefore, cases subsumed under principles precede moral judgment. If subsuming of cases involves different principles, it means that we have different types of cases, thus it

is unfair to contrast them and different moral evaluation must be applied for them. But if subsuming of cases involves the same moral principle, it means that we have a case pair and it is correct to contrast them.

Take for example two different cases (of stealing). In one case, the thief was female and stole a chocolate bar from a grocery store but in the other case the thief was male and took a bicycle from the street. Although, individual feature of cases were in a way different, no one would hesitate to call these events as steelings. In this case a moral judge realizes that some significant features and details of cases are relevant for identifying these ones as steelings. Some feature of these are the fact that neither the chocolate bar nor the bicycle belong to the person who took it. Neither of them have payed money or anything valuable in return for the chocolate bar or the bicycle. Furthermore, the original owners did not know that someone was taking their property.

The moral decision maker must have a broad understanding what stealing conceptually mean and by adjusting and balancing features of individual cases can come up with the identification of the moral principle. Importantly, the moral judge always has a free room for interpreting the cases. It means that he or she is not determined to make one particular moral judgement but can weight and balance features of individual cases. These dependences of understanding cases might account for morally ambiguous cases and the reason why different people realize moral value of cases differently. For some, stealing a chocolate bar – by a child – might not be a real case of stealing. Nonetheless, it is very important that once the moral decision maker comes to make his or her decision concerning the moral value of the case, he or she does in accordance with a general rule or law. The rule must have a certain range of moral content by which the case can be subsumed under the rule. As a matter of fact, the moral decision maker knows this range of content leading him or her to subsume the case.

Before proceeding further we are going to describe symbols in the context of visual argumentation. First, it might be important to categorize signs which is anything that creates meaning. Charles Sanders Peirce, one of the founders of semiotics, categorized signs as being one of three types. "A sign represents its object to its interpretant symbolically, indexically, or ironically according to whether it does so (1) by being associated with its object by a conventional rule used by the interpretant (as in the case of 'red'); (2) by being in existential relation with its object (as in the case of the act of pointing); or (3) by exhibiting its object (as in the case of the diagram)." (Burks, 1949, p. 674.)

Figure 4.

Figure 5.

Figure 4-5. Do not walk on the grass (left is a purely visual, right is a multi-modal version)

A symbol has no resemblance between the signifier and the signified. The connection between them must be culturally encoded. In contrast, an index shows evidence of what's being represented. A good example is using an image of smoke to indicate fire. An icon has a physical resemblance to the signified, the thing being represented. A photograph is a good example as it certainly resembles whatever it depicts. Roughly these are the types, symbols indexes, icons and photographs.

It might appear that understanding visual arguments in terms of symbols has nothing to do with generalism. It is a great mistake. We are argue that the

framework provided by moral particularism offers possibly the best conceptual schema to describe the way how we grasp meaning and visual arguments of symbols. The vivid differences amongst symbols incredibly successfully transfer not just information but sometimes they visually argue. For instance language, numbers, traffic lights and flags etc. are symbols of this kind. There is a conventional relationship between a symbol and the thing and the concept that it designates and the relationship being created and maintained only by a convention. In our case, the "No Entry" sign has got a common and generalized meaning, which is manifested in a particular visual form (red circle with a diagonal). Analyzing the picture of the "Keep off the grass" sign, it is obvious that some actions are forbidden. The above pictures (Figure 4-5.) transfer the argument that:

Premise 1:   If one walks on the grass, he or she might be punished.
Premise 2:   You walk on the grass.
Conclusion:If you walk on the grass, you might be punished.

Decoding the symbol by which one could identify the argument presented here involves the culturally universal sign of "no entry" combined with a schematic foot. The additional required information is gained from the context – more explicitly it is gained from the fact that the marker is sticked into lawn garden. Hence, it is a multi-modal argument since not only the marker itself but even the environment together determine the content and the argument. It involves that the marker itself would not be able to transfer the information and the argument, was it presented in a different context.

Importantly, just by looking at the marker a good judge instantly realizes the meaning and the content. No one would hesitate to make the conclusion in this case. The argument made here is incredibly fast and effective. Hence, the transferred argument in this case cannot be logically inferenced but instantly realized. The fact that, this symbol can be translated into a valid argument does not involve that an agent also makes the translation in every case when he or she are faced with it.

Due to the fact that the argument here is not logically inferenced it cannot be the case that the agent realizes the premises and makes the inference. In fact, it is much more plausible to think that the agent realizes a black boxed argument that is encoded into the marker with the environment. What we are stating here is that some of the visual arguments are hard wired into the symbol. It is culturally determined that in every case when a person is faced to a symbol like this he or she must conclude what it is meant for. If this is right then, the argument and the symbol are incorporated into one bit of information. Resulting that whenever one sees it he or she must inference to the conclusion. The connection must be learned and it usually becomes associated with the concept it represents over time. The meaning of symbols cannot be deduced through a certain learning process. The bit of information

must be gained socially. Therefore, there must be a general rule that determines that every symbol having the features of a certain kind must be subsumed under.

This is the point when generalism comes into play. It seems to us the framework used by particularist provides a suitable theoretical background for analyzing this phenomena. There's no logical connection between a symbol and what it represents. The argument – the bit of information – is black boxed into the symbol and every competent member of the group is able to realize not just the symbol itself but if it asked, even the argument as well. For now, we might see why generalism can grasp this process. Once the argument is black boxed, it is under a certain rule. The symbol represents the rule of "Keep off the grass" and the belonging argument. The perceiver realizes the sign in the proper environment and instantly jumps to the conclusion that "If you walk on the grass, you might be punished".

By now, you might see the close connection between how we grasp the meaning of visual arguments and moral particularism. The phenomenon in both cases are incredibly complex and can open a wide range of interpretations. Nonetheless, in both cases, agents depicts the intended argument perfectly well in spite of being the case undetermined. The socially learn rule determine the agent who subsumes the case. Very similarly to the method of generalism. Yet, the moral case is truly ambiguous and has various interpretation, the trained moral decision maker can depict the proper rule of moral. In both cases, we argue, the same mechanism seems working. Therefore, black boxed visual arguments work the same way as morally clear cut cases do. The method of moral generalism can be used for a broader sense to describe how symbols can argue.

4. Broad summary of particularism

We are going to argue that not only generalists method of understanding pictures can be used but accepting moral particularism also opens the possibility to show that complex – often multimodal images – require a comparing method of grasping visual arguments.

However, before synthesizing particularism with visual argumentation let us shortly summarize what moral particularism argues for. Moral particularists criticize generalists by arguing that moral principles are incapable of capturing the moral status of actions in different cases because the moral status is always context-dependent. Particularists argue that there are always exceptions to moral principles which are not sensitive to contexts. (Dancy 2004, p. 73). In practice, particularists contrast different situations in a way that their relevant features resemble each other. In doing so they typically accept the so-called "rule-following considerations":

> What counts as going on in the same way, and the kind of necessity that binds previous instances to a new one. Competence with a moral concept (e.g. generosity) is knowledge of a rule, not a moral rule but a rule whose grasp is simply the ability to carry on using the word 'generous' correctly in new instances. Someone who comes to a new situation knowing what generosity is is someone who has learnt a rule (here the importance of experience) and his knowledge of the rule is manifested now in his decision that this situation is another of the same sort (here again the importance of past cases). But there need be nothing one can point to in the past cases which can determine or even guide his choice; what makes his choice right is not that it is dictated or even made probable by principles created by the past instances, but simply our acceptance of the choice as an instance of carrying on as before.   (Dancy 1983, p. 545 – italics added)

Dancy demands a "contentless ability" (Dancy 1993, p. 50) "to drive us in what may seem a very simple-minded way from one case […] to another which happens to resemble the first in some limited way." (Dancy 1993, p. 82, and 2013) This resemblance, however, supposes a loose connection between cases. The good moral decision maker "sees" the ethical relevance of the particular features of an individual case due to "having undergone a successful moral education." (Dancy 1993, p. 50) So even here we may find certain commitment to a resemblance of cases, but they cannot be described with universal characteristics of cases. They can be described rather by complex but certain similarities between instances that a trained decision maker realizes. Particularists (Berker 2007; Crisp 2000; Holton 2002; Kirchin 2010; Tsu 2010) hold the *uncodifiability thesis* stating that morality cannot be codified into a true and coherent set of natural-moral principles. Particularists think that the ethical status of an action is exclusively based on the action's morally relevant characteristics in a given context. Tsu (2013; forthcoming)), in addition, argues for the *shapeless thesis* accordingly "actions to which a moral concept can be correctly applied do not have any natural shape or commonality" (Tsu, forthcoming). Tsu describes particularism in practice by using an analogy with Wittgenstein's concept of 'game';

> Suppose that G1, G2, G3, and G4 are all instances of games. According to Wittgenstein, G1 and G2 may resemble each other in that they have a common property F1, so may G2 and G3 because they have another common property F2, and so may G3 and G4 because they have still another common property F3. However, G1, G2, G3 and G4 have no property that is common to them all. They all fall under the extension of the concept 'game' because of their overlapping similarities.   (Tsu, 2013, p. 54)

So, it is argued that moral concepts are like family resemblance concepts similarly to the concept of 'game'. Actions to which moral concepts can be correctly applied have no identical features. However, it is assumed that there is a certain similarity

between G1 and G2, and between G2 and G3 etc. For our aim, what really matters is the possibility to identify relevantly similar cases and contrast pairs. As we have seen it, the particularist stance does just provide that.

In practice, particularists link two different individual situations 'in some limited way' grounded in a certain sort of similarity. The moral status of the situation can be determined only if situations are linked to each other yielding pair situations. There cannot be moral judgement without the similarity being determined previously. The establishment of linking similar pair situations need to be preceded before the moral judgment has made. Importantly, particular features of different cases play a role in connecting them to each other. After the particular linkage has been made, established on the decision made in the past the recent situation is evaluated, as Dancy suggests. It means that an individual one in the past was judged with the judgment _Y_ hence now he also can get _Y_. Nonetheless, if two different situation (_A_) and (_B_) are linked to two different (_a_) and (_b_) situations (and different similar pairs prescribe different ethical decisions according to how particularists understand morality), then the two different (_A_) and (_B_) situations request different ethical judgements. Consequently, (_A_) and (_B_) cannot be paired with one another. Nevertheless, if two different situations are paired to each other yielding a similar pair, it shows that the two different situations require the same ethical decision so that it is to be rightly contrasted.

After shortly having described how moral particularism works, let us show the linkage between particularism and analogical reasoning.

The poster series _Bycie pamiątką boli [Being a trophy hurts]_ by WWF, contains noticeable and shocking representations. If we want to understand the conclusion of CSR picture series we have to apply the particularist approach. The best scheme, which can describes the situation is the arguments from analogy. This can be very effective if viewers can establish a strong connection between the two objects being compared. In the next case, the brutality of people represented in the pictures is inverted in every field of life. (Figure 6)

Figure 6.

Visual Similarity Premise: Animals are wearing/using gloves/a jacket/a bag/a necklace/a rug/a trophy, which are made from humans.	**Implicit Similarity Premise:** People wear/use gloves/jackets/bags/necklaces/rugs/trophies, which are made from animals.
Base Premise: In order to use these accessories they have to butcher animals.	**Conclusion**: In order to use these accessories they have to butcher humans.

For now, it must be clear what is the linkage between moral particularism and analogical visual argumentation. Accounting the above visual arguments (Bycie pamiątką boli, Being a trophy hurts), we must apply the particularist, analogy based methodology. The way how we gain the conclusion from these pictures follow a particularist methodology. We compare and contrast the similarities between cases providing a resembling pair cases. These pairs connect the information: If humans were prepared, it shows shocking results. Butchering animals, for the first glance, does not seem to be so bloody but replaced by human bodies and faces transmits the information that wearing these sort of fashion accessories are highly unethical.

The reason why we need to apply a particularist methodology is the fact that for analogical reasoning there must not apply general rules or principles to grasp the content of the picture or moral case. Therefore, we will not be able to find any general rule or principle determining how one shall understand pictures like these. If we had to apply general rules or principles, then we should be able to locate general patterns of similarity. Analogy in a way cannot be codified due to its dynamically altering nature. Since, what is analogous in one case, it cannot be the same analogy in the other case. Analogy by its nature is something that cannot be regulated or generalized.

Many – if not even all – complex visual arguments rely on analogical reasoning. Now, it should not be surprising because generalized argument schemas can transmit only predetermined content of information which is simply not enough for complex argumentation like CSR marketing campaigns. CSR marketing campaigns and similar kind of visual argumentations presume a wide range of interpretation. Interestingly enough from this wide range of interpretation, people might grasp only one meaning. The same interesting fact can we get when we deal with moral questions. Though we sometimes do not agree with some detail of a moral interpretation of a situation, after discussing about the matter, usually people come up with a moral solution. We think that the same applies here for CSR marketing campaigns. Yet, there might be a range of interpretation, after translating the possible premises to verbal form, we get an argument that is shared by most of the perivers of the CSR marketing campaign. We can conclude here that complex features of phenomena like visual argumentation and morally ambiguous cases involve a particularis like framework for understanding the content of them.

Now, for the sake of the argument let us consider a possible counter example. We now provide a visual argument – more specifically an other CSR marketing campaign – that is to be understood in accordance with a generalist methodology. For some it might involve only a schematic generalist account – a triangle form – but we are going to argue that even this very well-known schema involves a particularist framework in fact.

"The stop one, stop them all" campaign:

Figure 7.

The schema found here may be very well-known for everyone who sees this campaign. The causal force of support is exemplified here. Being a regular visual argument, this one too can be translated to verbal form, accordingly:

First Step Premise:	You stop the end-user.
Recursive Premise 1:	If you stop the end-user, you will not need the reseller.
	If you don't need a reseller, the animal's carcass will not need processing.
	If the animal's carcass doesn't need processing, you will not need a hunter.
Recursive Premise 2:	If you stop any member of the supporting system, you will not need the end-user.
	If you don't need the end-user, the animal's carcass will not need processing.
	If the animal's carcass doesn't need processing, you will not need a hunter.
Bad Outcome Premise:	Because of the end-user, hunting has got horrible consequences.
Conclusion:	To sum up, stopping the end-user will stop the whole process.

Importantly, the supply chain of animal's carcass has not only a bottom to top support schema but also a top to bottom – as you may see according to the Recursive Premise 1 and 2. It is because not only stopping the end-user terminates the entire supply chain system but also any member of the chain. For example, by stopping the chef – in the middle picture – also blocks supplying the end-user and the stops his suppliers providing the raw material.

Generalist may be able to account for the bottom to up supply chain due to the fact that this sort of support is fossilized easily understandable symbol. One of the best known example of it the Maslow Pyramid:
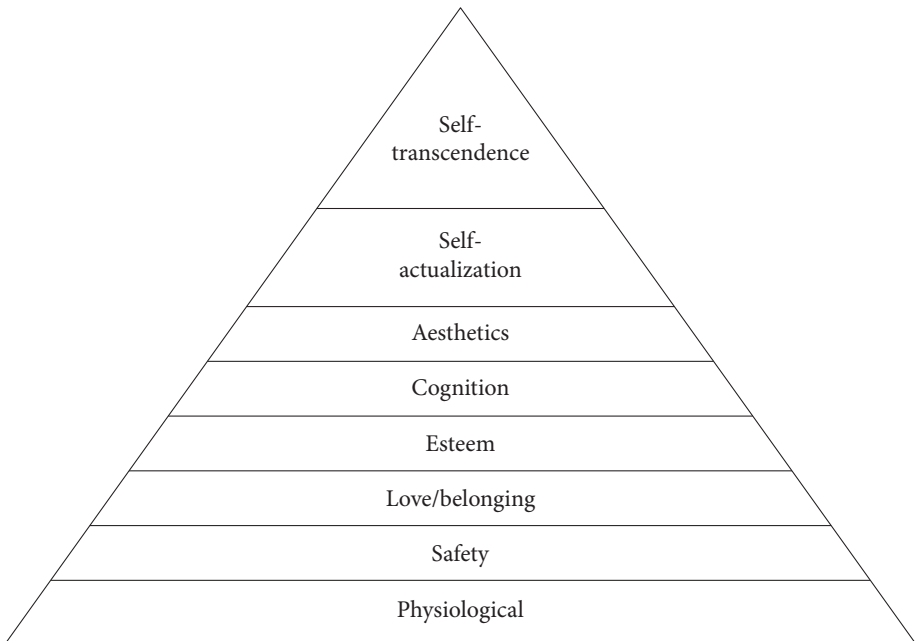
Figure 8.

We may all know the famous psychological theory of Maslow showing the hierarchy of basic needs. From the bottom to the top it shows the necessary conditions the next level of a particular need. The argument behind this pyramid is easily detectable by realizing the underlying ideas. Since, this form of visual reasoning has a long history, we just by looking at the pyramid immediately grasp the argument of it.

Crucially, however, this schema does not account for the top to the bottom schema. It is the point when the generalist account loses its simple but limited explanatory force. Furthermore, it the point when we need to apply more symbols,

complex visual interpretations and we must feature them. Therefore, this is the point when the particularist account comes into play.

In order to get the meaning of the "The stop one, stop them all" campaign, we need to apply the generalist account. The symbolic use of support chain of the Maslow pyramid needs to be synthesized with, for instance, further information about supply chain support. Consequently, to understand complex visual arguments that incorporate several different argumentative both visual and non-visual elements that cannot be done only by appealing to a generalist framework. For understanding complex images, synthesizing and incorporating several schemas are required. Complexity involves complex synthesizing.

5.   Further thoughts

For some at first glance, our results may be slightly astounding. In case we may spent more philosophical ideas on the matter we can find the relevant similarities between understanding images and the moral value of cases. The similarity of aesthetics and ethics has a long history. The similarity should not be surprising at all. Both aesthetics and ethics are forms of value. Ethics is the form of value providing us if actions of people are good or bad. Aesthetics is the form of value which is closely related to sensory qualities. Even the very phrase of 'nice act' reveals the close connection of these fields. The term 'nice' is essentially an aesthetic one while morality *per se* deals with evaluation of actions. Thus, our everyday language also demonstrates the analyzed close connection between aesthetics and ethics. If so, then it is not surprising at all that methods grasping moral value of a particular case can be used for understanding simple and complex visual stimulus. Therefore, moral generalism provides a systematic conceptual schema for grasping easy and simple visual images like pictograms and symbols while the philosophical framework of moral particularism yields a tool for identifying and evaluating complex visual images and pictures.

6.   Conclusion

To briefly sum up, grasping a visual argument and the involving context needs an analogical reasoning which is accounted only by particularism. Yet, visual arguments are unclear thus, they might be subject of various interpretation providing room for conceptual disagreement. Practically, given the fact that an image might be related to different analogical phenomena we need to decide which phenomena is the closest to it. To find the proper and the closest understanding of the visual

stimuli, we shall apply, as we argued, particularist methodology. There cannot be constant blocks of interpretation of visual understanding. In spite of the fact that similarities of resembling pictures are vague yielding controversial interpretation of visual arguments but it is still possible to find a shared consensus. Hence, the consensus and the valid interpretation of visual argumentation can be reached only within a particularist-like framework.

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CHAPTER 4

Cognitive science and the controversy of anthropogenic climate change

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This paper takes a cognitive science perspective on the controversy of anthropogenic climate change (ACC) between deniers and advocates. It argues that cognitive science is a suitable framework due to its interdisciplinarity, experience with controversies, and appeal to meta-principles of cognition. From a Bayesian perspective, deniers seem to reason irrationally (belief polarization) and from an epistemic virtue ethics perspective act viciously. Yet, their behavior can be modelled as rational when taking the factor "worldview" into account and become virtuous in terms of "mandevillian intelligence" at the collective level. Insofar as deniers' conservatism aims at stability but advocates' liberalism at change, they jointly resolve the "stability-plasticity dilemma". A number of outstanding questions are addressed at the end of the paper.

Keywords: anthropogenic climate change, Bayesian modeling, belief polarization, cognitive science, collective virtue ethics, complex societal problem, controversy, interdisciplinarity, mandevillian intelligence, virtues and vices

Cognitive Science as a framework for the controversy of anthropogenic climate change (ACC)[1]

According to the Stanford Encyclopedia of Philosophy "Cognitive science is the interdisciplinary study of mind and intelligence, embracing philosophy, psychology, artificial intelligence, neuroscience, linguistics, and anthropology." (Thagard, 2014). It is itself the result of a controversy, namely between behaviorism as the leading

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1. In the literature two alternative terms are frequently used: "anthropogenic climate change" (e.g., Ranney, & Clark, 2016) and "anthropogenic global warming" (e.g., Cook, & Lewandowsky, 2016). Both terms refer essentially to the same phenomenon. Here, I use the first term, "anthropogenic climate change" and its abbreviation "ACC" consistently throughout the paper.

psychological paradigm in the 1950ies, and a new movement consisting of a grow-ing number of more cognitively oriented scholars culminating in the "Cognitive Revolution" (Baars, 1986). A new meta-discipline was forged through this contro-versy – Cognitive Science (Bermúdez, 2020; Gentner, 2010; Thagard, 2005).

What distinguishes cognitive science is its inter- and multi-methodological perspective on the mind – natural and artificial. This interdisciplinarity makes it particularly apt at dealing with controversy. Comprising six major disciplines and various research domains, dispute is pre-programmed. Since its inception in the late 1970ies (Gentner, 2010), cognitive science has seen various controver-sies, as on the modularity of the mind, innateness of language, boundedness of cognition, or the role of rules and representations, to name just a few (Stainton, 2006). However, until very recently, controversies in the domain of ecology were not of particular interest to cognitive scientists (but see Thagard & Findlay, 2012). An obvious explanation is that ecology, ACC, and sustainability were not consid-ered relevant research domains for cognitive science itself but rather topics for some of its founding disciplines and their sub-disciplines, namely psychology, and therein ecological and environmental psychology (APA, 2008, 2011; Baron, 2006; Clayton, 2012; Clayton & Myers, 2015; Graffeo, 2017; Stern, 2000; Störqvist, 2016; van der Linden, Maibach, & Leiserowitz, 2015), psychoanalysis (Kassouf, 2017; Orange, 2017), environmental humanities (Robin, 2017), or eco-(logical) linguis-tics (Steffensen, & Fill, 2014). This disinterest is consistent with the general pub-lic opinion that ACC and the striving for sustainable development are ecological, economical, and technological problems that mainly have political and engineer-ing solutions. However, in the meantime, also the humanities, i.e., the social and cultural sciences (Elliott, Cullis, & Damodaran, 2017; Leggewie, & Welzer, 2009; Robin, 2017; Siperstein, Hall, & LeMenager, 2016; Welzer, 2008) and philosophy (Frigg, Thompson, & Werndl, 2015a+b; Lawson, 2014; Werndl, 2016) have started addressing ACC and contributing their particular expertise, providing a broader and more comprehensive analysis of the problem.

Being highly experienced with controversy, cognitive science may have a privileged access to ACC. However, according to Gentner (2010), controversy is not the main mode of resolving contentious issues in the area of mind and cog-nition. Cognitive science works according to the maxim of "converge and con-quer" (p. 331) rather than according to the (original) maxim "divide and conquer". For that purpose, cognitive scientists seek local or global strategies of integra-tion across disciplines, levels of organization and explanation (Bermúdez, 2020). Certainly there is no convergence without controversy. Before any two (or more) controversial positions may be reconciled, they have to get into contact with each other and create relations. Representatives of the contrary positions need to ex-tend the boundaries of their own interest into the domain of the other discipline.

This crossing of disciplinary boundaries and "building bridges" (Buanes, & Jentoft, 2009), however, is effortful, in terms of time, mental and emotional load. Given these additional costs, it is understandable why, until recently, cognitive science has ignored topics outside the range of its own scientific meta-domain, which, however, have great societal relevance such as ACC. But finally, also cognitive science discovered ACC as a research topic in its own right, as witnessed by a recent seminal special issue on "Global challenges and human cognition" in *Topics in Cognitive Science* (Lewandowsky, 2016; Gray, 2016 and articles therein).

The adoption of ACC by psychology, the humanities, philosophy, social, cultural, and cognitive sciences is overdue and highly desirable because the way this complex societal problem is handled concerns all of humanity: It is foremost humans who will be struck by ACC. It will affect the future life and well-being of billions of people dramatically in various crucial respects: their sheer existence, level of economical subsistence, pursuit of happiness, family planning, work, personal life-style, attitudes, etc. (APA, 2011, 2008; IPCC, 2014; UN, 2017). More importantly, whereas the causes of ACC and the projection of its development is a topic for the natural sciences, the effects of ACC are a topic for the social and cultural sciences (Welzer, 2008). Only they are familiar with the processes by which reality is "constructed" in the mind of people and how different levels of action, or collective rationality and individual irrationality (or vice versa) interact with each other (Welzer, 2008, p. 46).

On the background of the current state of affairs, the aim of this paper is to present a cognitive science perspective on the controversy of ACC. We need to better understand "why we disagree about climate change" (Hulme, 2009): why some believe in ACC and others do not. Only then can we make suggestions how to possibly resolve or at least handle this controversy. The present paper starts from the conviction that cognitive science can indeed contribute significantly to conceptualizing the controversy of climate change – due to its (1) experience in controversy and (2) expertise within and across its own founding domains. This paper takes an object-level as well as a meta-level perspective from which both sides of this controversy can be taken into consideration. To this aim, overarching principles known in cognitive science such as the stability-plasticity dilemma and in philosophy such as principles of epistemic virtue ethics will be considered.

ACC – a complex scientific problem on various spatio-temporal scales

ACC results from complex relationships between mankind and its environment. We are embedded in and affected by our environment, in multiple ways. At the same time, we represent our environment and thus "embed" it within our mind,

gaining control over it. It is from this intellectual, cognitive control that our physical and technological control over our environment derives. In the past, we were more affected by the environment than we affected it – however, recently, the picture has changed. The extent to which humans have changed the face of the earth has become so profound that Crutzen and colleagues suggested to change the name of the geological era that we live in, from "Holocene" – "the recent whole" – to "Anthropocene" – "the era of man" (Crutzen, 2002; Crutzen & Stoermer, 2000; cf. also Jones, 2011; Robin, 2017). The new label "… denote(s) the contemporary global environment dominated by human activity." (Zalasiewicz et al., 2008). Following Crutzen's article "Geology of mankind" in *Nature* (2002), other scientists adopted this informal labeling and even the members of the International Commission on Stratigraphy (ICS), a panel hosted by the Geological Society of London considered it justified to announce this new geological epoch whose beginning was defined as the beginning of the Industrial Revolution at the end of the 18th century (Zalasiewicz et al., 2008). By announcing this new epoch, scientists want to emphasize that we humans ourselves have taken over determining the course of time and the conditions on earth by our activities. This new label clearly identifies ourselves as the problem owners of ACC: it is caused by us and it is us who now have to deal with it.

ACC – a complex societal problem

It is important to locate a problem in its relevant domain(s) and at the proper level of complexity in order to handle it adequately. If the problem is mis-located (e.g., ACC as an engineering problem) or its complexity is underestimated ("buying a smaller car"), its handling is doomed to fail (Welzer, 2008). There is wide consensus that ACC is a complex societal problem (de Tombe, 2015, 2008; Hulme, 2009; Jamieson, 2014; Jaspal, Nerlich, & Cinnirella, 2014; Buanes, & Jentoft, 2009). According to de Tombe (2008, p. 236) a complex societal problem such as ACC is characterized by the following properties: It is/has (1) *a real-life problem*: ACC has different impact on different groups of people at all levels of society; (2) *dynamically changing* and has an *uncertain future*: while/whether we are acting or idling, ACC proceeds; (3) *difficult to be become aware of*: Although ACC was pointed out by Svante Arrhenius in 1896 already (Arrhenius, 1896), it took until recently that large parts of the society have become aware of it; (4) *difficult to put on the political agenda*: The history of the recurring climate summits is revealing, in this respect; (5) *difficult to handle*: Only changes, but no solutions may be possible (any more) (Jamieson, 2014); (6) *complex*: many components of ACC are intertwined with each other on various spatio-temporal scales; (7) *knowledge, power, and emotional*

components and (8) *many parties are involved* which may have divergent views on, interests in, and power over the problem.

The controversy of ACC

In the following, I want to discuss in how far cognitive science as an interdisciplinary science can contribute to understanding and possibly help to overcome this controversy through its particular insights into the human cognitive system. For this purpose, I will adduce evidence on the relation between knowing and accepting ACC, evidence of (ir-)rational reasoning about ACC from Bayesian modeling, philosophical insights in collective virtue ethics and invoke meta-principles from cognitive dynamical systems theory.

A mechanistic explanation of global warming

ACC is widely discussed in the society. Most people have a firm opinion on the subject matter. They either believe in it or not. But do we really know what we are talking about in terms of the mechanisms involved in it? In a series of empirical studies Ranney and colleagues (summarized in Ranney, & Clark, 2016) found that most people in the U.S. but also in many other countries do not know the physical-chemical mechanisms underlying global warming. Specifically, they are ignorant about *how* the temperature rises as a consequence of higher amounts of greenhouse gases in the atmosphere. This "wisdom deficit" (Ranney, & Clark, 2016, p. 55) is striking *vis-à-vis* much better knowledge of the history of ACC, the rivaling authorities, methodologies, data, or techniques involved. Ranney and Clark (2016, pp. 51f) summarize the physical-chemical mechanism of ACC in 35 words:

> Earth transforms sunlight's visible light energy into infrared light energy, which leaves Earth slowly because it is absorbed by greenhouse gases. When people produce greenhouse gases, energy leaves Earth even more slowly – raising Earth's temperature".[2]

The mechanistic explanation is special insofar as it is normative and causal. It explains normative relationships between energy, sunlight, infrared light, the surface of the earth, rise of temperature and greenhouse gases. Whoever accepts the mechanistic explanation cannot deny the anthropogenic contribution to climate

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2. For this short and longer explanations, along with supportive videos, see: http://www.howglobalwarmingworks.org/; accessed on June 14th 2020).

change. Despite the rampant ignorance of the general public the authors also found that people can learn and retain such a short mechanistic explanation over at least a delay of one month. Furthermore, this information aids reasoning and increases people's acceptance of ACC – across the whole political spectrum, from conservatives to liberals. Thus, in general, there exists a "knowledge-acceptance link" (Ranney, & Clark, 2016, p. 55). If the mechanistic explanation was supported by critical statistical evidence participants' knowledge in a "mechanism-plus" condition was retained even longer as compared to a "mechanism-only" group (Ranney, & Clark, Exp. 5). In conclusion, Ranney and Clark argue that results of a total of seven experiments speak against the so-called "stasis theory" which holds that information about ACC is ineffective if not counter-productive. On the contrary, they found that across various populations mechanistic information (combined with statistics) is reliably related with increase in and retaining of knowledge about ACC and furthermore with its acceptance.

Belief polarization and ACC denial

Yet other studies found that the acceptance of ACC crucially depends on citizens' political worldview, where "worldview" is defined as: "An integrated set of beliefs about what is real, what is knowable, what is valuable, and what it means to be human, typically learned as part of a cultural socialization." (Clayton & Myers, 2015, p. 310). This phenomenon is particularly widespread in the U.S. (e.g., Hart, & Nisbet, 2011; Jamieson, 2014) and has been dubbed "contrary updating" or "worldview backfire effect" (Lewandowsky, Ecker, Seifert, Schwarz, & Cook, 2012).

A theory of belief (and belief revision) should be able to explain why many scientists, politicians, and citizens have adopted the belief that ACC exists, but also, why some have not (Thagard, & Findlay, 2012). In this respect the observation in a subgroup of strongly conservative citizens mostly in the U.S. is surprising: when confronted with information about the reality of ACC this information backfires: rather than changing their minds in the direction of the consensus in climate change experts' opinion that ACC exists, they believe even stronger that it does not exist afterwards. Taken together, "belief polarization" occurs. Whereas one group of people updates their belief in the direction of the newly received evidence (that ACC exists) another group of people updates their belief in the opposite direction (that ACC does not exist). Contrary belief updating has been considered as "irrational", in particular in normative theories such as Bayesian theory which "surmises" that people act in accordance with basic principles of rationality (Cook, & Lewandowsky, 2016; Lewandowsky et al., 2012). Agents who may vary in their prior beliefs in ACC and who are confronted with the same unambiguous

evidence, namely that it exists, e.g., in the form of consensus information, should update their beliefs in the light of this evidence in the same direction. However, in belief polarization they update them in opposite ways. Contrary updating has been related to people's "worldviews" and political affiliation: those who (already) believe in ACC, namely Liberals/ Democrats, become more convinced but those who do not believe in it, namely Conservatives/ Republicans become even less convinced of it.

Despite its irregularity, Bayesian modeling has recently shown that belief polarization can indeed be considered as rational and modeled by a Bayes net provided that additional variables such as "worldview" and "trust in climate scientists" are added to the model. The variable "worldview" is operationalized in terms of how strong participants endorse free and unregulated markets. It is known that ACC deniers are conservatives with strong affiliation to the Republican Party who in particular subscribe to the economic model of free markets. The two additional belief components were thought to "moderate people's interpretation of the evidence." (Cook, & Lewandowsky, 2016, p. 163). The evidence was provided in the form of a short quote and a figure stating that "97 out of 100 climate scientists agree humans are causing global warming" to a sample of Australian and U.S. citizens (Cook, & Lewandowsky, Figure 3, p. 168). This consensus information is thought to act like a "gateway belief" for a whole range of beliefs about ACC. After this intervention, participants were to judge whether they believed that such a consensus existed and also whether they themselves believed in ACC. The change in belief due to the consensus information was determined in comparison with a control group which did not receive this consensus information. The authors found that, indeed, belief updating occurred in response to the presented evidence and was moderated by worldview. However, citizens from Australia and the U.S. behaved differently. Australian citizens increased their belief in the existence of global warming and that it was attributable to humans. Those conservative Australians who endorsed free markets updated their prior belief in ACC even more than those liberal Australians who had already higher prior beliefs in ACC. Thus, the evidence, i.e., consensus information, partially neutralized the factor "worldview". In contrast, among the U.S. citizens those who endorsed free markets (Liberals/ Republicans) updated their belief in the opposite direction: In comparison with the control group (which had not received the intervention), receiving consensus information led to lower beliefs in global warming as support for free markets increased. This result pattern was evidenced by a significant three-way interaction between Country × Consensus × Worldview (Cook, & Lewandowsky, 2016, Table 1, p. 170). The same pattern was observed also for the attribution of global warming (to humans). Thus, the consensus information "backfired" and resulted in a paradoxical contrary belief updating in the U.S. sample. Taking both samples – the

Australian and the U.S. sample – together, belief polarization was observed. In a second step, the empirical data were modeled with a Bayes net as well. The simulated data were in line with the empirical data – showing that even seemingly irrational beliefs can be modeled within a Bayesian framework that assumes rationality of reasoning. Yet, what is going on in the minds of these conservative ACC deniers? Cook and Lewandowsky (2016) claim that they actively distrust information on global warming and think that a "conspiracy" is going on among climate scientists who want to gain power for themselves, over the politicians and the public; alternatively, they may think that scientists strongly conform to each other in the sense of "groupthink" which does not tolerate any deviant position (Cook, & Lewandowsky, 2016, p. 161). Their expectation that climate scientists fabricate the presented consensus in concert with their distrust in them leads to a contrary belief updating and increasing distrust.

Entertaining conspiracy theories about and attributing groupthink to scientists are cognitive processes which are prone to (strong) emotions. Thagard and Findlay (2012) therefore include "emotional biases" and "emotional values" into their model of belief revision for ACC deniers (p. 72). Their model includes both explanatory and emotional coherence relations. They grant emotional elements full legitimacy in the decision process alongside consideration of the evidence, namely "as psychological indicators of the costs and benefits of the expected outcomes." (p. 72). While evidence informs the probability of an outcome (ACC exists) emotional values inform utility. Thagard and Findlay claim that when explanatory coherence relations between statements about ACC, e.g., "Humans cause global warming" and "Recent temperature increases are rapid" (see their Figure 5.4, p. 73) are infested with these values, belief revision slows down or results in resistance to belief revision, similar to contrary belief updating. In view of a desired belief change, both cognitive and emotional constraints must therefore be taken into consideration.

Despite attempts at rationalizing contrary updating of beliefs and ACC denial as observed in some strong supporters of free markets, it appears to be a kind of "intellectual vice". However, is there any way in which climate change denial can be seen as a virtue, as well?

(Collective) virtue epistemology and Mandevillian intelligence

In order to explore the possibility that climate change denial is not completely an intellectual vice, we turn to philosophy, and here specifically to "social epistemology" and to "(collective) virtue epistemology". Let us first define these notions. An "intellectual vice", in our context, is "something that hinders an agent's ability to

believe the truth." (Smart, 2018b, p. 262). "Epistemology", shortly, is "the study of knowledge and justified belief." (Steup, 2017). More specifically,

> social epistemology seeks (…) to understand the way in which issues of social structure, social organization, social practice and socio-technical interaction affect the collective generation of epistemically-relevant commodities, such as true belief, knowledge, understanding, and so on (Goldman, 2011).
>
> (Smart, 2018b, p. 253)

Finally, "virtue epistemology" is the "approach to understanding knowledge that is rooted in the intellectual virtues, where these are understood as the properties of an agent that enable that agent to track the truth." (Smart, 2018b, p. 255). For a virtue reliabilist who sees intellectual virtues rooted in the faculties of the mind, intellectual virtues are cognitive abilities such as perception, memory, reasoning, etc. For a virtue responsibilist who sees intellectual virtues as similar to personality traits, intellectual virtues are characteristics such as open-mindedness, tenacity, attentiveness, carefulness, etc. (Smart, 2018b, p. 256).[3]

Virtue epistemology can be extended to collectives as well. In this case, the same ability, namely tracking the truth, can be seen as an epistemic virtue distributed over that collective (Palermos, 2015; see Smart, 2018b, p. 270). As a first step towards bringing social epistemology and collective virtue epistemology together one may argue that a straightforward way to enhance the performance of a collective (its overall intellectual virtue) is to enhance the individual cognitive performance of its members, conceived of as epistemic agents. If, for example, the memory capacity of its individual members were enhanced, the collective might be able to perform better in an intellectual task, e.g., remembering a set of diverse items. Let us assume that these items are tacitly organized into subsets such as flowers, birds, vehicles, furniture. Alternatively, and more interestingly, there might be cases where lower memory levels of individual epistemic agents might benefit collective performance, as when individuals strategically compensate their memory restriction of random items by selectively remembering only items that have a particular valence for them, coinciding with some subset of the entire item set. In this case, each member might only remember items from a single (favored) subset (an individual intellectual vice) but, collectively (given that interest in the various subsets is randomly distributed in the sample) a greater number of items would be remembered overall (a collective intellectual virtue).

This brings us to a special form of collective intelligence dubbed "mandevillian intelligence" by Smart (2018a+b), after Bernard de Mandeville, an Anglo-Dutch

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3. In the present paper, the discussion between virtue reliabilists, virtue responsibilists, or virtue relativists is not of major concern. For a detailed comparison and discussion, see Smart (2018b).

philosopher and economist who lived in England at the end of the 17th and the beginning of the 18th century (Vandenberg, & DeHart, 2013). Mandevillian intelligence, according to Smart, is "a specific form of collective intelligence in which individual cognitive limitations, shortcomings or flaws (i.e., vices) play a positive functional role in ensuring collective forms of cognitive success." (Smart, 2018b, p. 254; cf. also Smart, 2018a). Indeed, following Mandeville himself, who thought that through the moral flaws of its individual members – self-interest and greed – a society would prosper overall, economically, Smart discusses this idea in the philosophical domain of collective virtue epistemology. He holds that individual intellectual vices such as flawed perception (a cognitive vice), or dogmatism (a personal vice) – which hinder an individual to form a true belief about some facts – may play a productive role on the collective level of the group, promoting epistemic success, i.e., help attaining true beliefs in the group (Smart, 2018b, p. 270). Here, we will extend the idea of individual vice promoting collective virtue to the situation where a particular subcollective displays that vice which nevertheless promotes the overall collective's virtue. In doing so, we try to capture the case where ACC deniers – displaying reverse updating due to dogmatism and distrust (both vices) – possibly benefit the overall collective whose members are predominantly ACC advocates.

Mechanisms of attaining collective epistemic virtues

There is a variety of mechanisms and scenarios how a collective may benefit from its individual members' (or subcollectives') intellectual vices (cognitive- and/or trait-wise). In order to understand these mechanisms, we have to consider the scenario of "collective search" for truth in a certain epistemic (i.e., knowledge) domain. Suppose a group of epistemic agents (knowledge seekers) is tracking a phenomenon, in our case ACC, whose true nature is not (yet) known. An important condition for finding the truth is to explore the "belief space" widely and deeply enough such that the chances are high to hit upon the true belief. If, however, all epistemic agents search in the same part of the belief space, it is less likely that they will encounter the true belief as compared to the situation where there are multiple opinions in the collective to the effect that the proponents of those various opinions search a wider area of the whole belief space. This "diversity maintenance mechanism" at the collective level, instantiated by alternative, opposing, and even contradicting views of individuals (or subcollectives), is beneficial for the entire collective, such that the community will get an "appropriate cognitive grip on reality" in the end (Smart, 2018b, p. 259).

How could such cognitive diversity be attained? One way of enabling collectives to find the truth is to tune the parameters of the information network

within which they communicate. If the communication opportunities are limited structurally, e.g., through limiting feedback among communicative agents in the network, it is guaranteed that agents explore greater areas of the entire belief state because they have not been prematurely directed to any part of the state space as happens when agents inform each other about their individual searches. As a consequence, a high degree of diversity of beliefs is maintained. However, such a structural parameter – sparse feedback – is not an individual vice. Besides such structural parameters there are agent-based characteristics that have a similar effect, such as (1) low trust between communicative agents (or between subcollectives); (2) the tendency to hoard (and not share) information; (3) unwillingness to cooperate (for various reasons); (4) unreliability of transmitting/copying information or beliefs, due to mistakes (e.g., misunderstanding); (5) dogmatism: insisting in one's own beliefs/methods (Smart, 2018b); and (6) cognitive biases. All these properties are usually considered as negative. They should be overcome by social, pedagogical, or technological interventions. However, mandevillian intelligence suggests that what looks like a vice on the individual (subcollective) level may be a virtue on the global collective level. In the following, we will discuss in more detail how distrust, dogmatism, and cognitive bias may bring forth these collective benefits.

Collective virtues of distrust, dogmatism, and cognitive bias

Distrust

If agents do not trust each other, there is only a low probability of taking over the belief of the others. Consequentially, distrust will limit their information exchange and increase the space that is searched within the entire belief space. This is typically the case in situations where agents do not (yet) know each other well. In the worst case (which is certainly not adaptive) the network is not connected at all. It is then this agent-level (initial) distrust that yields the desired network property of sparse connectivity ensuring maintenance of diversity. Of course, distrust may have other reasons as well, such as dislike or even hate. In that case, sparse connectivity is long-lasting.

Dogmatism

Dogmatism is the exaggerated unwillingness to give up old beliefs to which the agent had been committed hitherto. Dogmatism has cognitive as well as personality aspects: in as far as beliefs are concerned, it is a cognitive issue; in as far as

the behavioral side is concerned (stubbornness; reactance), it is a personality is-sue. Science has seen many major controversies in the past where dogmatism was involved to a high degree, e.g., the controversy whether peptic ulcer disease is caused by hyper-acidity (incorrect hypothesis) or by a bacterial (correct hypoth-esis) (Zollman, 2010). Smart describes how the two camps were effectively segre-gated from each other and how that fostered maintenance of diversity: "By being dogmatic, a scientist is essentially insulating themselves from the influence exert-ed by conflicting evidence." (Smart, 2018b, p. 262). When evidence for one of the two controversial hypothesis becomes overwhelming the truth will be found sure enough. A certain degree of dogmatism is then adaptive in a collective because it balances two essential processes – "exploration" and "exploitation" (Smart, 2018b, pp. 259+262). "Exploration" is the activity of scanning the global belief space and is related to terms such as "search, variation, risk taking, experimentation, play, flexibility, discovery, innovation", whereas "exploitation" is the activity of probing a smaller part of the belief space more intensely and is related to terms such as "refinement, choice, production, efficiency, selection, implementation, execution" (March, 1991, p. 71). Exploration seems to be closer related to liberalism in think-ing and exploitation more to dogmatism. Dogmatism has a positive effect for the collective, e.g., the scientific community, in so far as (1) it functions as "an intel-lectual safeguard against pernicious forms of cognitive convergence and consen-sus." (Smart, 2018b, p. 263) and (2) the presence and protracted study of minority hypotheses helps reinforcing and motivating studying the majority hypothesis and refining it such that its truth is strengthened or it is eventually falsified (Smart, 2018b, pp. 263f). Both outcomes are equally welcome. This characterization of dogmatism in terms of collective epistemic virtue, i.e., mandevillian intelligence, can be applied to the levels of the collective, subcollectives, and individuals alike. Displaying some degree of it on any of these levels is certainly valuable and adap-tive (Smart, 2018b, p. 263, FN 8). Such a graded view is consistent with scien-tific practice which is probabilistic, e.g., in Bayesian modeling. Hypotheses come with some probability/likelihood and agents are usually not totally convinced or unconvinced of them.

Cognitive bias

Finally, cognitive biases also provide a mechanism for cognitive diversification in so far as they counter-act standards of scientific rationality. In that sense, well-known cognitive (heuristics and) biases such as representativeness, availability, adjustment and anchoring, and salience (Tversky, & Kahneman, 1974) may not be considered totally as intellectual vices hindering tracking the truth. One outstand-ing bias in this respect is the "confirmation bias", i.e., the "seeking or interpreting of

evidence in ways that are partial to existing beliefs, expectations, or a hypothesis in hand" (Nickerson, 1998, p. 175; Smart, 2018b, p. 264). In science, the confirmation bias manifests itself in the complementary tendency to see one's own hypothesis confirmed by positive evidence but to neglect negative evidence. This has the effect that theories are not abandoned too easily – irrespective of their being correct or incorrect – and thus still compete with others, maintaining diversity. Moreover, both exploration – of the entire belief space by various agents (or subcollectives) – and exploitation – in-depth study of their own theory by each agent – would be ensured, rather than all agents trying to roam the entire belief space superficially. For each agent this behavior is epistemically vicious because most agents will not attain true knowledge. However, for the collective it is epistemically virtuous because attainment of true knowledge is thus optimally ensured.

A cognitive meta-principle: The stability-plasticity dilemma

The paradoxical relation between individual vice and collective virtue which was reviewed in terms of maintenance of diversity may be resolved by invoking a well-known meta-principle of cognitive science – the stability-plasticity dilemma. It applies in many domains, most notably in learning and memory, where the cognitive system has to strike a balance between two adversary demands: (1) *stability*: to preserve what has been learnt previously (and resist change in the case of irrelevant new events), and (2) *plasticity*: to allow for significant, new information to be learnt (Abraham, & Robins, 2005; Grossberg, 1987; Mermillod, Bugaiska, & Bonin, 2013). Maximizing both at the same time is not possible. If stability dominates, the system is not sufficiently able to learn new information; if plasticity dominates, catastrophic forgetting of older information may result. Rather, a balance needs to be stricken between them, for the sake of the cognitive system to stay adaptive globally – which is a higher level or meta-cognitive demand. According to Grossberg (1987) this balance is a result of self-organization in natural and artificial learning systems. Also in societies, which can be conceived as dynamical systems similar to the cognitive system in a relevant sense, stability and plasticity need to be balanced for the sake of global adaptiveness of the society. In the case of ACC, the two subcollectives, ACC deniers and ACC advocates, play complementary roles in terms of stability and plasticity. They both deserve credit in terms of collective epistemic virtue. On the one hand the position which ACC deniers enounce has some collective virtue insofar as it prevents the society from making too big and too fast changes (which, after all, might be detrimental in case climate science is wrong and/or climate scientists are not trustworthy). ACC deniers, in this respect, preserve stability. On the other hand, the position of ACC advocates

has collective virtue insofar as it allows the society to respond to the new demands of the global situation with change and a transformation of the society towards more sustainable development.

Convergence in the ACC controversy

Thinking that only the part fulfilled by ACC advocates is adaptive, since it promotes plasticity, but the part fulfilled by ACC deniers is non-adaptive, since it prevents plasticity, is too short-sighted. It needs both roles to satisfy the global requirement of a society, namely maintaining diversity of beliefs, and thus remaining adaptive. Similarly, the dimension projected by the two opposed terms "exploration" and "exploitation" (March, 1991) but not any of the two constituting terms alone is related to adaptiveness. It is important to recognize that these opposing pairs – stability-plasticity and exploration-exploitation – constitute a meta-principle. They can be thought of as thesis and antithesis which, however, do not become "sublated" in a synthesis, as in Hegelian dialectics, but which converge on a stable oscillatory trajectory of the two processes, i.e., a limit cycle, in a dynamical state space (Beer, 2000). This attractor state can be identified as *adaptiveness*. It is a higher-level principle in the hierarchy of the cognitive system and therefore a more important aim to reach than each of its constituting sub-principles. Taking the controversy about ACC to a higher level – achieving convergence through controversy – is a highly welcome result from a cognitive science perspective. This is exactly the role and the capability of a meta-science such as cognitive science (Bermúdez, 2020).

The virtue and vice of levels (of argumentation)

After arguing for resolving the ACC controversy in terms of the higher-order principle of global adaptiveness at the level of the society, a pressing question remains: Does this meta-level convergence mean that ACC advocates should applaud ACC deniers? An answer that is consistent with the differentiated, two-layered argument, is: "no" at the "object level" of the controversy itself but "yes" at the "meta-level" of the controversy! The claim of ACC deniers – that ACC does not exist – does not become true, i.e., epistemically virtuous, although it gains some virtue at the societal level, in virtue of satisfying global adaptiveness. This is because vice and virtue present themselves differently at these two levels and must be distinguished in the argumentation. According to this leveled construal of the controversy ACC advocates may vigorously combat the arguments of ACC deniers at the

object level. They may sharpen their arguments and adduce even clearer evidence, at the cognitive level. Importantly, also the emotional level must be taken into consideration. If an empathic emotional response is missing in the sense of a general appreciation of the opponent, "dysfunctional polarization" and a schism in the society might ensue – a highly undesired result. Realizing and appreciating the higher-level virtue of ACC denial may be a serendipitous way out of this predicament.

Conclusion

In conclusion, cognitive science may (1) help to construe and understand the controversy between ACC deniers and advocates in a novel way; (2) model seemingly irrational behavior (reverse belief updating) with a rational model (Bayes net); (3) point out and balance out epistemic vices and virtues of ACC denial at the individual and collective level of the society, by invoking mandevillian intelligence; (4) re-frame the tension between ACC deniers and advocates in terms of a dilemma of dynamical learning systems, i.e., the stability-plasticity dilemma; (5) point to a higher-order principle, namely maintaining diversity, or global adaptiveness; and lastly, (6) be appreciated as an interdisciplinary meta-science that helps to elucidate complex societal problems in terms of dynamical processes. While it may achieve convergence at the meta-level of the controversy it may retain freedom to act as a committed party in the controversy itself.

Outstanding questions

I will finally address some outstanding questions and limitations of this paper and outline future strands of research.

Actual impact of an interdisciplinary perspective on ACC

It is undisputable that conceiving and acting on ACC properly necessitates an interdisciplinary approach (Buanes, & Jentoft, 2009; de Tombe, 2015; Gray, 2016; Stern, 2000; Störqvist, 2016). However, given the universal scale of the problem and the speed at which it develops, our best scientific tools and methodologies may not be able to scale up with it and fail, as Jamieson (2014) concluded soberly. Yet, faineance is not an option. Whatever reasonable action aimed at stopping, slowing, or mitigating ACC – scientists can take, they should take in a concerted way.

The stability-plasticity dilemma in relation to society

The stability-plasticity dilemma is well-founded in the domain of learning and memory of natural and artificial systems. In this research the target entity is a single individual (natural or artificial agent). The present paper, however, claims that the same principle also applies to a collective, i.e., the human society. Two questions need to be addressed, though: First, can processes pertaining to an individual also be applied to a collective, in any relevant sense? Second, does the satisfaction of a higher-level principle (global adaptiveness) have precedence over the satisfaction of a lower-level principle (local rationality of scientific and political discourse and action)? This question also touches upon the different timescales on which the meta-principle and the lower principle(s) unfold: global adaptiveness in the long term *vs* local rationality in the short or medium term.

Mandevillian intelligence

Invoking collective epistemic virtue ethics in general and mandevillian intelligence in particular in the ACC controversy seems promising. Yet, the historical roots in Bernard de Mandeville's writings on morality, e.g., his famous treatise "The Fable of the Bees" (Vandenberg, & deHart, 2013) and its impact on economic and social theory need to be studied in more detail. In addition, the status of mandevillian intelligence as a kind of intelligence (in any psychological sense) needs to be clarified.

Boundary conditions of mandevillian intelligence

For mandevillian intelligence to work the opponents in the controversy need to stay in touch at least to a certain degree in order for the collective as a whole to benefit from the different insights into the problem space. Furthermore, they have to commit themselves to a common set of unnegotiable principles, e.g. principles of justice, human rights or epistemic principles of adhering to truth and facts (as opposed to "alternative facts", "post-factual truth"). However, when the society as a whole does not agree on such general principles and disunites over the problem, i.e., when "dysfunctional polarization" occurs, the collective virtue of mandevillian intelligence is spoiled. Therefore, maintaining a shared "common ground" (Klein, Feltovich, Bradshaw, & Woods, 2005) among citizens is crucial in order for the society to cope successfully and indeed benefit from controversy.

ACC and sustainable development

The controversy of ACC is just one – yet a highly important – issue within the grand challenge of the transition to more sustainable development (APA 2011, 2008; Raworth, 2012). An interdisciplinary cognitive science perspective should therefore embrace the subject matter more broadly, by addressing the cognitive, enactive, motivational, and emotional factors that may hinder or facilitate human reasoning about and taking action against ACC and in favor of sustainability.

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CHAPTER 5

ELEna

An interdisciplinary research

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This paper focuses on the description of the controversies that arise from the interdisciplinary work necessary for the creation of an on-line platform for learning Spanish as a foreign language, which we call ELEna. The platform develops the learning of written expression skills, thus promoting written production and interaction, the most demanded areas for the students of foreign languages nowadays. In this way, it has been necessary to create an interdisciplinary team made up of linguists and computer scientists who are specialized in the fields of Spanish language teaching and in the creation of interactive on-line platforms. This fact has led to a series of challenges that we present below with their respective solutions in pursuit of scientific progress.

Keywords: technology, language learning, on-line platforms, interaction

1. Introduction and motivation

The following interdisciplinary research try to explore the technological framework as well as the linguistic guidelines that are being applied on an ongoing project for the development of a dialogue system for language learning. This environment imposes critical requirements to the whole architecture and the design of the different modules and departments involved. On one hand, computer researchers and, on the other hand, researchers on linguistics. This interdisciplinary situation causes several controversies.

The study on the relations between linguistics and technology provides us with a considerable repertoire of theoretical and normative discourses, objective register of the state of the discussions in the last decades on this interaction, with important practical repercussions about efficiency levels and language learning organization (Gómez Fernández, 2013; Moral, 2006; Fernández, 2005).

In addition, the emergence of technology in everyday life has modified training habits. In particular, e-learning has not only grown exponentially, but also been the central topic of research (Cabero, 2010; Barberá, 2008; Trujillo, 2005), as it has been shown to be functional and because it generates a lot of learning experiences. (Donnelly, Kirk and Benson, 2012: 5).

The application of language technologies in non-native environments still represents a major research challenge. In addition, if this non-native environment must integrate a solid and comprehensive learning orientation, we are facing one of the most demanding environments for the application of Language Technologies.

However, this scenario represents a significant industrial and commercial opportunity. Moreover, in the context of the goals specified for a Multilingual Europe and a Multilingual Digital Single Market, the application of language technologies for language learning represents a key intersection between a research challenge and an industrial opportunity. This item has been a main controversy. We were crossing borderlines between computer and linguistic sciences with an economy and marketing point of view.

More than 1.5 billion people are currently learning a second language world wide. The estimated market size for 2013 just on digital English reached $1.8 billion. The compound annual growth rate for the period 2013–2018 exceeds 11%, with a forecast of more than $3 billion by 2018 (Adkins, 2014).

Moreover, only 5% of the Language Learning Industry relies on digital components. Accordingly, language learning products in general are becoming the largest business opportunity in the international language learning market.

During the last few years, a significant number of key improvements have appeared on the field of Language Technology. Speech recognition, multimodal interfaces, machine translation or dialogue systems constitute some of the key technological platforms. Its integration with convergent areas like robotics, big data, cloud computing, machine learning, and so on, will determine the immediate future. Learning environments and platforms constitute an additional convergent area.

In fact, using technology to improve the educational process and outcomes has been a classical and persistent goal during the last decades. However, regarding the use of technology for language learning, it is important to take into account that language itself is one of the most pervasive and complex processes, as it involves many knowledge levels and skills. Therefore, the application of technological developments and methodologies for language learning has been and it is still a critical research challenge.

The value added to the idea stands in the computer-aided learning, much more affordable than face-to-face teaching, and the ease for the platform access in terms of time and resources, in other words, we provide the possibility of accessing through any mobile device with internet access without schedule restrictions.

There are currently lots of apps for language learning but a shared feature among all of them is that they offer a completely guided process for the language itself that may be useful for reviewing previously adquired concepts and skills.

In our case, we are looking for a more advanced step in learning through a free conversation simulating dialogues with a native speaker that could provide needed capabilities for the improvement of target language.

One of the long-term goals of the project that it's in mind should be the possibility of certifying his/her studies by means of some official institution. Moreover, this can be a source of motivation for the student.

Adkins report is published by Ambient Insight, a company that pretends to produce market studies and predictions about business opportunities based on learning technologies. In this report some five years in the future projections are made, from 2013 to 2018, and collect consumption data from more than a thousand providers of products related with language learning abroad more than 98 countries all over the world.

It's predicted a growth in the in the learning of English language through digital media over 20% in Africa and almost 15% in Asia, Latin America and Eastern Europe among other regions. Countries of emerging economies such as Mexico, Turkey, Brazil and Saudi Arabia also stand out in growth for this period of time. Although the crucial point here is the trend to a greater digitalization of language learning worldwide. This trend has currently a very low market share so it can ve conceived as a great opportunity for business development in mid or long term.

Nowadays, as stated previously, the language learning relies on traditional learning, let's say, a combination of face-to-face classroom classes and printed material. So only 5% uses digital media, so this fact allows a bif growth potential at least in the next 5 or 10 years.

At global level, the following key factors are considered for a reconversion of the sector towards the digital era:

* Large-scale initiatives in academic segments.
* New government policies to increase a foreign language adquisition.
* High demand of customers in digital products and software, especially in the mobile application sector.

The current products related with digital language learning base its money income in a subscription model directly marketed to potential client in internet, social networks and content providers. Curiously, most of current companies are subsidized by national and regional governments and by non-governmental organizations.

1.1   The context

In this area of opportunity and relevance, our research focuses on the teaching of Spanish as a foreign language. The increasing demand of Spanish is leading to an equally growing interest about how to improve its teaching (Martínez, 2007; Robles, 2006). We present an international and transversal project characterized by a high degree of interdisciplinarity which improves research but also increases complexity. To deal with this inconvenient, each team (linguistic and computer) works in its own field with a member specialized in intermediate tasks who connects both groups with the ultimate goal of improving student performance and motivation thanks to the creation of ELEna. This e-learning platform aims to provide a conversational system to facilitate natural interaction through speech between the person and the computer (Llisterri, 2006).

ELEna emerges as a business initiative within the so-called start up companies with the previous experience of Milao Language Inc. (Jiménez Palmero, 2015; Quesada, Nunez & Suárez, 2013)

It was in 2016 when a group of researchers from the Department of Computer Science and Artificial Intelligence and the Department of Language, Linguistics and Theory of Literature (University of Seville) started to work. In 2017 another team of the department of philosophy joined in the context of an international project with a team from the University of Malaga. In addition, we worked together with a specialized member in economics and marketing who offers the point of view in order to the viability of the project as a company in the context of the pre-incubation and coworking project of the University of Seville. All of them put together their efforts to come up with a platform that allows students to practice conversation skills outside the class.

The oral skill is one of the most complicated abilities for students, especially for those who do not have a cultural immersion experience. In addition, other companies in the sector have created a void because they have not tested it yet because they chose a more comprehensive and global learning system, so they do not focus specifically on this skill. For example, in the case of Duolingo or Babbel they contemplate learning based on e-learning target that cannot be used in face-to-face classes. Radically on the contrary side is the bet made by ELEna since it is intended to be a complement of the classroom with the objective of encouraging conversation exercises outside the classroom.

In short, ELEna has been conceived as a comprehensive system which integrates different technologies and approaches. In addition, the platform is based on an implementation of gamification strategies on CALL (Computer Assisted Language Learning) environments.

The organization of the human resources has two well differentiated teams in its practices and objectives. On the one hand, a group focused on designing the pedagogical and linguistic model in charge of methodological planning. On the other hand, a second team work in translate the methodological specifications proposed by the first group to the computer program and also focusing its efforts on the infrastructure and systems management.

Currently, the project is in the testing phase. It has already been tested with students from the University of Iceland (Háskóli Íslands) in Reykjavík and is currently operating at the University of Lisbon. A third and last test in France is planned to confirm the positive results obtained in Iceland.

Undoubtedly, the main challenge is to make a fully open and flexible dialogue with the students. As a consequence, students are encouraged to engage in conversation, not just doing homework like other similar platforms.

At the moment, the platform has the possibility of having conversations in Spanish with an initial level dealing with understanding spoken and written expressions. However, it has been designed in order to allow the incremental incorporation of additional learning levels and languages. Furthermore, we will not only use writing skills. In the future oral conversation will be implemented.

To sum up, ELEna is a platform for an educational virtual environment of Spanish as a foreign language (ELE) which enables students to interact in diverse dialogue scenarios designed on the latest developments in the field of Natural Processing Language (NPL).

Taking into account that learning a human or natural language requires the acquisition of a lexical and grammatical background, but a human language is mainly a communication tool; and therefore, an operative learning requires an interactive use. Undeniably, linguistic immersion is the most effective strategy for language learning. However, a big percentage of the world population does not have the required resources to allow such strategy. Even classical teaching strategies are not able to cover the whole market.

As a consequence, a systematic and coherent approach for the application of language technologies to the generic market of language learning will become a relevant industry in the next few years.

Conversational Interaction Technologies will play a crucial role in this process. However, specific constraints conditionate the possibilities as well as the right approach to be effective. In particular, it will be necessary to integrate the technological environment over a sound methodological framework.

2.   The technological, methodological and linguistic framework

We are working towards one of the main goals in the current trends in the research and development around Computer-Assisted Language Learning environments: the creation of interactive interchanges where the learners can improve their linguistic skills by engaging themselves in natural conversations or even mimic real-life scenarios.

The use of Language Technologies as a tool for the development and deployment of Language Learning platforms is a relatively unknown area of research and innovation. In a review about the application of language technologies to education, Eskenazi (2009) concluded that "appealing systems that incorporate spoken dialogue and games are at the leading edge of the field, (…) they will soon be central, providing not only tutoring, but also testbeds for the development of new algorithms and strategies."

The SLS group at the MIT plays a crucial position among the main precedents in this research strategy (Xu & Seneff, 2011). The motivation of its research project is quite significative to understand the technological approach: "It is widely recognized that one of the best ways to learn a foreign language is through spoken dialogue with a native speaker. However, this is not a practical method in the classroom due to one-to-one student/teacher ratio it implies. A potential solution to this problem is to rely on computer spoken dialogue systems to role play a conversational partner."

A perfect simulation of these scenarios is a great technological challenge at the moment. Nevertheless, we are working on the creation of the tools required to chase the aforementioned global goal.

About linguistic framework, we have consulted the main books of learning Spanish as a foreign language (A level) and we have combined the similar contents to give the student the possibility of practicing that knowledge seen in class.

– Nuevo avance (Moreno, Moreno & Zurita, 2010):
  – Thematic contents: Spanish speaking countries. Classroom. Public places, famous people and their professions. The family tree and family relationships. Personal photos.
  – Lexical contents: similar words in several languages. Communication in the classroom. Days of the week, the time, places and public spaces, most usual regular verbs. Family members. Civil state. Jobs. To know and to meet: differences in use. To go and to come: differences in use. Phrases with the verb to have.
  – Functional and sociocultural contents: spelling. Formal and informal greetings. Courtesy. Basic resources to communicate in the classroom.

Spanish proper names. Names of the countries of Latin America. To ask and to answer about the time, about the date, personal questions, about habitual actions, about schedules, to request and to give information in general. To express the relationship or possession. To express more habitual actions. To describe personal photographs. The Spanish schedules. The independence of children in Spain.

– Grammatical contents: the numbers from 1 to 10. Present of the regular verbs in -ar, -er, -ir. The interrogative pronouns. Contractions to and from. Prepositions: in, of, a. The numbers from 11 to 30. Present of the irregular verbs to do, to leave, to put, to bring, to give, to be, to know, to offer, to lead, to translate, to have, to say, to hear, to be and to go. Adverbs, expressions and locutions to express the frequency. The possessives. The cause: because + verb. Some prepositions that indicate time.

– Spelling content: b / v – c / qu / k – c / z – g / gu g / j – h – r / rr

– Phonetic contents: phonemes of Spanish.

– Nuevo español en marcha (Castro Viúdez, Díaz Ballesteros, Rodero Díez & Sardinero Francos, 2010):

– A: To say hello and to introduce yourself in class and someone else. Gender of nationality adjectives. To give personal information. Plural of the names. To talk about daily routines. Reflexive verbs: getting up, going to bed. Present of irregular verbs: to start, to go back, to go and to go out. Prepositions of time: to, from, by, from.

– B: alphabet. Spelling. Resources for the class. Jobs: gender. Present of regular verbs. Present of irregular verbs: to be and to have. Pronunciation: interrogative intonation. Place markers: below, above, to the side, in front, behind, in, in, to the right and to the left. Possessive adjectives. Demonstrative pronouns. The days of the week. To talk about work: place, job and schedule.

– C: To give the phone number and address. Numbers from 0 to 20. To ask and to tell the time. World hours. Numbers from 21 to 5000. Pronunciation and spelling: stress. To talk about breakfast. Breakfast of the world. Pronunciation and spelling: g.

– D: treatment greetings. Habits and schedules of the Spanish people.

– Nuevo prisma (Gelabert & Menéndez, 2013):

– Functional contents: To say gooobye. To ask for confirmation and confirm previous information. To ask how something is said in another language. To ask for clarifications and repetitions. Spelling. To ask for and to give personal information: name, age, origin, place of residence, profession, to talk about the profession and the place of work. To talk and to ask about

personal relationships. To ask and to give personal information. To express possession To describe people: physical description, character, clothing.

- Grammatical contents: subject personal pronouns. Verb to be. Interrogative pronoun: how? The determined article. The gender and the number of the name. Concordance of the determined article and the adjective with the name. Interrogative pronouns: which? what? how many? Possessive adjectives. Adjectives of physical description and character. To be, to have and to carry.
- Types of text and lexicon: brief dialogues. Nationalities Lexicon of survival in class. Names of countries and continents. Descriptive text of personal information: form. Lexicon of the class. The colours. Jobs and places of work. Journalistic text Lexicon related to family and social relationships. The physical aspect, the character. Clothes.
- The strategic component: to relate information through the images. Strategies for lexical acquisition through images. Resources to use the dictionary
- Cultural content: courtesy treatments in Spain and Latin America. Spanish names and surnames. General information about Spain and its autonomous communities. Some famous people with Hispanic origin. The family: concept and structure. Famous people in the Hispanic world.
- Spelling / phonetics: Question marks and exclamation marks. The alphabet. Abbreviations. The syllable. contrast g, x, k. The graphs g / j

- Sueña (Álvarez Martínez, Blanco Canales, Gómez Sacristán & Pérez de la Cruz, 2000):
  - Functions: greeting, spelling, introducing oneself, to ask and to say the name and surnames, the origin, the languages spoken, age and job or studies, to request and to give information about the meaning and form of the words. To say hello and goodbye. To introduce someone and to respond when asked. To ask and to say the address and the phone number. To answer the phone and to ask for someone. To express family relationships and to talk about family members. To express habitual actions and how often we do things
  - Grammar: Subject pronouns. Being + nationality adjective; to be + name of city or country. Gender and number in nationality adjectives. Interrogative pronouns: how?, from where?, how many (years), what?, what? Numbers from 0 to 100. Forms of treatment. Demonstrative pronouns. Contract forms. Concordance in gender and article number and demonstrative. Interrogatives: what?, where?, when?, how many?, how?, what? Gender and number of family names. Present indicative of the

most frequent regular and irregular verbs. Reflexive verbs. Possessive: unstressed forms. Interrogatives: who?, what?, how many?, how?, where?, presence of the article with the days of the week. Frequency expressions: always, normally, often, sometimes, never.

– Writing: spelling. Alphabet. Types of writing. Personal and professional information (passport, student card). Abbreviations. Diary. Date and address in an envelope.

– Phonetics: first approach to the pronunciation of the letters. Intonation of enunciative and interrogative sentences.

– Lexicon: greetings. Name and surname. Countries, nationalities and languages. Studies and jobs. Greetings and farewells. Parts of the day. Presentations. Addresses and telephones Fundamental public places. Jobs. Work places. The family. Civil status. Days of the week. Usual actions.

– Culture: famous people of the world.

– Vuela (Álvarez Martínez, Blanco Canales, Torrens Álvarez & Alarcón Pérez, 2005):

– Functions: to say hello and goodbye. To present oneself. Personal information. To ask and to give personal information: first and last name; age and date of birth; home; email; languages to be spoken. To express tastes and interests. To talk about habitual actions and customs. To talk about actions that are carried out not frequently. To ask and to talk about how often we do things. To express kinship relationships. To describe people by their physical characteristics.

– Grammar: Nationality adjectives: gender and number. Interrogatives: how?, what?, where?, how many?, why? Present of indicative of want and like + infinitive. Good, bad and regular adverbs. Present of indicative of verbs of habitual actions. Irregular verbs. Reflexive and pronominal verbs. Prepositions by and of for the parts of the day / absence of preposition for the days of the week. Frequency markers: never, sometimes, often, normally, always. Gender in kinship nouns. Concordance. To be / to have / to carry for the description of people. Demonstratives.

– Lexicon: greetings and farewells. Countries and nationalities. Numbers from 0 to 50. Sports. Parts of the day. Days of the week. Habitual and daily actions. The family. Adjectives for the physical description.

– Structure / Phonetics: the vowels of Spanish. Registration form. Personal files. Representation of r and rr.

- ¿Sabes? (Ding, De Prada Segovia, De Juan Ballester, Couto Frías & Salazar Lorenzo, 2010):
  - Communicative functions: to say hello and gooobye. To introduce yourself and someone. To ask and to answer for the identity, for the nationality and for the name. To talk about languages, jobs and places of work. To ask and to answer for contact information. To describe people. To ask and to answer about age.
  - Grammatical contents: Spanish alphabet. Subject personal pronouns (three persons of the singular), nationality adjectives. Demonstrative. Possessives. Interrogatives. Verbs: present to be called, to be and to speak. Subject pronouns (three persons of the plural). Singular and plural. Numbers from 0 to 20. Article determined and indeterminate. Colours. Gender concordance and number of adjectives with nouns. Verbs: to call, to be, to talk, to work and to dedicate. Possessive adjectives. Adjectives. Demonstrative adjectives in the plural. Numbers from 21 to 100. Present of indicative of the three conjugations: -ar, -er, -ir. Verb to have.
  - Cultural differences: names and surnames. The greetings in Spain. Countries Nationalities Languages. About personal identification numbers. The Spanish family.
  - Vocabulary: Jobs. Work places. Contact information. The members of the family.

2.1   Communicative competence and dialogues

Within the global area of language learning, our main focus and concern concentrates on Communicative Competence. Accordingly, we are working on a framework that has been designed to prioritize this linguistic factor during the learning process. The main strategic consequence of this approach is the requirement of a sophisticated and very advanced design of Dialogue Interactions. Therefore, the technological core is a Natural Language Processing tool specifically designed and tailored for Language Learning. Mainly, we have been working in this items:

- The logic of a dialogue interchange. Input and output.
- Feedback evaluation like spelling checker (the system must be able to detect any spell mistake. But checking the spelling is a real challenge in NLP in general even more so in its application to Language Learning in particular);
- The ability of the system to have both a proactive and a reactive attitude.
- The design of the system must allow a dynamic flow of the conversation incorporating new topics when needed or even replying accordingly to the topics introduced by the student.

- In order to effectively rate a learner communicative competence, it is often necessary an in-depth analysis of the semantic and even the pragmatic dimensions of the conversation
- Accesing external information (A conversation cannot be reduced to a self-contained structure either)
- Language levels A1, A2, B1, B2, C1, C2 (Instituto Cervantes, 2006).
- Student's age and place of birth with special attention to intercultural aspects.
- The impact of gamification strategies (Jiménez, Quesada, Salguero & Quesada, 2017)

2.2 Open domain dialogue systems challenges and difficulties

The most thrilling feature of ELEna platform will be the offering to the final user of an open and free conversation with a simulated language teacher. The conversation topic can be driven by the system but it must be able to deal with open questions and even topic changes if user wants.

The main technological challenges that a dialogue system must face in order to achieve this requisite are (Glass, 1999):

*   Human dialogue modelling.

Human conversations contain phenomena like disfluencies, interruptions (in spoken dialogue systems), confirmations, rejections, turn-management dialogue acts, anaphora and ellipsis (in both spoken and written dialogue systems). Many of the utterances simply can't be well understood without the context of the conversation in which they occurred. So context modelling for the dialogue should be implemented and used.

The study of the human-human interactions can drive us to implement such features in our system so we could make a system to have more natural dialogues with humans. But these features also have the potential to make things more complex and ambiguous.

Another key point here is that humans really apply pragmatic skills to handle the dialogues and its ambiguities. For example, "Do you know what time it is?" won't be answered by another human with (only) a "Yes" or a "No" because pragmatics (let's say also your personal experience) tells you to answer the current time although we have a propositional question that, at least in theory, should be answered with an agreement or a disagreement.

The pragmatics skill implementation is another research field in its own and there are some promising works that involve knowledge modelling and repesentation, machine reasoning and common sense implementation driven by experience and reinceforment learning.

*   Matching expectations with system skills.

Expert users are familiar with the system capabilities, or at least to a subset of them, so they change their utterances acording to the expected capabilities of the system. But novice users can have more difficulties to adapt their expectations. Typically, this issue can ve overtaken if the system drives the conversation with questions that are known to be answered with shot and not ambigous utterances (propositional or choice questions). But this can lead to lack of naturalness and of course it can't be used to improve the comunnicative skills of the user.

So, the model is changed to a mixed-initiative strategy which provide more freedom to the student. This total freedom can be dealt by the system by means of some kind of "help" capability that can be used to address the proper topic or domain. But this is not an easy-to-implement skill: Users are not really sure about how to ask for help and identifying those help requests by the system is a complex task on its own.

In addition to the lack of knowledge about the domain, the user even doesn't know about the range of that domain. For example, in the context of a medical appointment booking lesson, system could ask about the city where the user wants the appointment but the machine has only a certain amount of cities or towns in its lexicon. So a mechanism that detects an out-of-vocabulary word is needed in order to offer the user what cities the system knows without having to list them all.

Another important issue comes from the wide variety of speaking styles that users can use. From isolated words (U: 'Seville'), to criptographic utterances (U: 'Appointment, Seville'), to being extremely chatty (U: Yes, hello, ok, I would like to book an appointment for the doctor in Seville but tomorrow because the day after tomorrow I'm on holiday in Valencia).

*   Recovering from errors.

Errors in dialogue system can come from a wide variety of sources, in written dialogue systems the main ones are lexicon missing words, parsing coverage and understanding failures and it's even difficult to detect that there has been an error, what was the reason of that error and to compose an appropriate answer for the user.

Many systems use a confidence scoring scheme that allows to refine the source of error and its correction but it seems that some more advanced grounding mechanism (in the sense of how to stablish common knowledge between human and machine) is needed to improve the error handling of such systems.

*   Implementation Strategies.

There are many ways dialogue managers can be designed and implemented but most of them use a scripting lanaguage to determine the flow through the

dialogue. But this scripting mechanism can be faulty when we have an open domain conversation.

One usefull technique is the dynamic activation/deactivation of some understanding features like lexicon or grammar rule sets accordingly with the topic or active question under discussion.

Anyway, the dialogue strategies are quite often hand-crafted so this can become a time consuming task whose can't be generalized to other domains so a good dialogue strategy modelling could be crucial for the reusability of the chosen implementation.

* User student status.

This challenge is specific of our platform due to the fact that it's going to be used for language learning so we face with users that:

– Are learning the target language: So there will be failures because the user is still learning that language.
– Will not understand partially or totally the system utterances.
– Will not follow accurately the grammar rule set of the target language.

These sources of failures can be dealt together if we provide the system with enough robustness that grounding and error handling schemes can help to achieve. In addition to this we should add to the platform some other features like:

– Spell corrector: minor changes in lexicon contained in user utterances can have a great impact on robustness so spell corrector that maps the incorrect word to the correct one is a must have.
– Grammatical noise system: We can have the possibility of ignoring some of the detected words if a grammar rule can be applied to the rest of the sentence. This will improve the parser robustness (and thus, the system language understanding phase will be improved its performance) so, we will have the opportunity to evaluate the student skills in order to provide some reports at the end of the dialogue.
– Machine learning module: Another fashionable area of researching is to include automatic learning methods into understanding stage. These systems are more robust than rule-based system and context free grammars. But they are based on the processing and learning algorithms that require a big annotated corpus. That corpus can be built only after great effort and time consumtion, although we have another possiblity in a research line that is called right now "user simulation" that tries to get the corpus automatically with some interesting results. Anyway, a hybrid approach, taking the advantages of rule-based models and machine learning models is a path to expore and evaluate.

* Natural Language Generation.

Once the dialogue manager composes the answer, formatted in an abstract representation, it must be passed to natural language generation (NLG) stage to send a grammatically correct sentence to the student. The most of NLG system tend to be very static because they use a fixed pattern response for every situation. But introducing some variation in the way system prompts user is effective in making the system appear less robotic and also becomes important in reducing monotony of responses.

* Student evaluation.

One of the major challenges when creating the platform was to decide how to evaluate student performance for every possible dialogue made in the platform. This is a crucial point because system should deal with student errors and system errors as well.

Some metrics have been accorded to inform the user if the dialogue was successful or not. For example, one of the metrics is called "Fluency" and its based in the time needed by the student to answer some question that the system asks. Other interesting metric is to evaluate proactivity in the user. For example, if system ask student name it would be desirable (as well as a communicative skill) that the student asked the system's name.

3. Research challenges

Natural Language Processing is a very well known and established field of research and development, with many worth-noting and outstanding systems and applications created during the last few decades. Inside this field, Dialogue Modeling plays a crucial role, as it comprises all the main components and algorithms of Language Engineering.

At a high level of specification, a dialogue system should incorporate the following main modules:

– Natural Language Understanding (NLU): in charge of the lexical, morphological, grammatical and semantic analysis of the input received from the user. This module must generate a final representation of the meaning of the whole utterance.
– Dialogue Management (DM): different techniques and algorithms has been documented and applied to control the dialogue structure, from finite state automata till knowledge-based mechanisms, game-based strategies, statistical and machine learning frameworks, etc. The dialogue manager must organize

the conversation as a set of tasks, and cooperate proactively with the user. This component must model the conversational scheme, receive the formal input generated by the NLU component and produce a formal representation of the corresponding output.

– Natural Language Generation (NLG): this module will receive the formal representation generated by the DM and will produce the exact realization of the formal model into a natural language utterance, depending on user preferences and/or current competence, etc.

Our technological framework is based on this basic and global approach. Nevertheless, the language learning environment has been proved as one of the most demanded and challenging.

When we set out to design an interface for dialogue and learning, our proposal was to make it useful for people and, at the same time, try to solve certain underlying problems that arise when designing a Dialogue System (DS). In the tension between the design of a useful and effective tool and the resolution of technical and theoretical problems, a new controversy also appears between the theoretical and the applied stuff.

The first problem is to describe those aspects of the behavior of human agents that interact with the system and that are not completely rational or, at least, are not predictable by a classical logical model. Human agents behave as non-ideal agents, while our DS must be as transparent as possible for its users. The interaction between an artificial agent – our DS – whose task must be to deal with human agents that make mistakes, has to be modeled in real time, while the communicative interaction takes place.

Dialogue Systems are defined as computer programs that accept as input speech acts that may be incomplete and that produce as output a new act of speech that must be clear to the human user. For this, the design of the DS should be maximally usable and the interaction tasks should be defined in the simplest way we could manage. Of course, we can imagine that this design of the DS is as versatile as possible, to implement it in different environments, but the one that concerns us is a language learning environment and we have to stick to it.

The human ability to learn through dialogue is a high-level cognitive capacity that requires the use of inferential processes of contextual elaboration and metacognition (attribution of knowledge or presumption of ignorance). The DS must be able to mimic this ability so that learning can be as natural as possible.

What we propose, therefore, is how we can make the SD handle all those linguistic phenomena that suppose a semantic enrichment of the discourse: presuppositions, lexical relations, metaphorical transpositions, etc. For this we have decided to analyze the role of the underlying logic in the interpretation and

contextualization of dialogue processes in order to design formal models that represent the meaning of various speech acts in the NLU and NLG modules of our DS.

The logical inferences necessary for the correct interpretation of speech acts in dialogue are defined as dynamic processes (programs) that lead from an initial "mental state" to a final state as a result of the successive application of well-defined logical rules on the preceding mental states. These inferences are involved in the interpretation of the communicative intentions of human agents, even when they make mistakes or the information they offer is not complete. Therefore, in the dialogue inferences become a fundamental part of the mental representation of the successive interpretations of the speech acts, necessary to give them meaning with respect to the mental states previously declared (states of information) and the mental states that the epistemic agents that intervene in the dialogue are ascribed to each other (cognitive states).

This is the way in which speakers establish the lexical and semantic relationships necessary to relate concepts in the dialogue, establish the essential presuppositions to give meaning to certain speech acts (for example, indirect speech acts), and extract the implicatures that contribute knowledge about the actual cognitive states of the interlocutor (human or artificial), essential for the interpretation of semantically unrelated expressions but that are linked in the same context.

So, in our DS design, we consider communicative acts as processes of information flow between two or more epistemic agents, dealing with dialogue as the paradigmatic act of communication, defined as a sequence of speech acts in which the following requirements are met:

1. All epistemic agents involved share identical or similar language skills.
2. All epistemic agents change their mental states in each intervention.
3. Information flow between epistemic agents is continuous during the dialogue – interruptions can be treated as noise – and is subject to feed-back.

As we know that the information provided by each speech act in a dialogue does not always represent a complete informative state – mainly due to noise, not fully referring expressions, lexical or structural ambiguity or the lack of a well-defined discourse domain – we need to consider it should be increased or supplemented by means of rational inferential processes by the epistemic agents involved in dialogue. Of course, these inferential processes operate over previous informative states as well as over those cognitive states attributable to the epistemic agents, what requires an Abductive Dynamic Epistemic Logic to be modeled as the underlying logic to any DS, in our opinion.

4.   Controversies and interdisciplinary work

On the other hand, the socio-educational debate has been focused in the last decades on optimizing the results of language learning, even before being impulse by technological development. Nowadays, linguists, pedagogues and economists work together addressing the complex interactions between education, language skills and employability (Sáez, 2000), as a necessary solution to the challenges and recent changes in the labor market in the European Union caused by the financial crisis.

In this area of opportunity, we have to work hard in an interdisciplinary way if we want to get positive results. For this reason, we had been facing several controversies.

The researchers of the group belong to two departments with different particularities. On one side, the Department of Computer Science and Artificial Intelligence from the University of Seville and, on the other side, the Department of Language, Linguistics and Theory of Literature. We have different specific objectives because, while linguistic areas are interested in how to teach and improve student's level, the computer area is looking to create a virtual human.

This is the reason because we needed to look for common points such as Natural Language Processsing. In this way, we have found interesting objectives for both teams that allow to resolve the crossing borderlines controversies.

Another controversial aspect has been observing what other companies have been done. This field of work is currently dominated by several institutions such as Duolingo and Babbel. They are reference in the sector. However, not everything they do must be necessarily correct. For that reason, we have analyzed advantages and disadvantages as well as the gaps in which they do not work in order to differentiate our product. That is why, mainly, we seek the real conversation without limits, even if it is a really difficult challenge to achieve.

We have recently joined into a Project Explora (Ref: TIN2015-72709-EXP). This, on the one hand, allows us a very solid basis for investigation but, on the other hand, the work group is added with a new department (philosophy) as well as a new university (Malaga). This reinforcement is also positive because it offers the possibility of expanding human resources as well as new and different points of view.

Last but not least, it is the point of view of Economics and Marketing. This is really our main controversy because the project members have no specific training in this field. To be able to solve this controversy we have been guided and we are being helped with a specialized mentor adscribed to the preincubation and coworking project of the University of Seville that we obtained in competitive concurrence as one of the projects with better future. In this way, we hold weekly

meetings with the specialist who give us tips from an economical and marketing point of view.

5.   How to move forward

One of the main challenges is the design of strategies to understand utterances produced by non-native speakers. This problem cannot be reduced to the spell-checking phase. The literal translation from structures in the student's native language, in conjunction with all the standard types of mistakes made by language learners, represent a main challenge in the global design.

We have to point out that evaluating a complete dialogue is a complex challenge. Additionally, as our main goal concentrates on communicative competence, the evaluation scheme must carry out this idea. Currently, our evaluation scheme is based on three main criteria: accuracy, fluency and intent. For each criterion, a specific number of factors are analyzed. However, we are testing our platform to mprove the evaluation design. We have just tested it in Iceland and Portugal but we will need more students so we could compare our results with french students.

To continue with the research, we must expand the levels that we currently have prepared. In this way, we will be able to cover all the types of students and not only those at the initial level.

In addition, it will be fundamental to be able to compete with other similar applications to have a wide range of learning languages and not focus our efforts just in the Spanish language. In this way, we will be able to fulfill the marketing objectives and to have a profitable economical vision.

Maybe these controversies emerged so far in our research might seem natural, given the interdisciplinary nature of the investigation, but they need to be solved in order to keep moving forward.

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CHAPTER 6

What is the meaning of biodiversity?

A pragmatist approach to an intrinsically interdisciplinary concept

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The preservation of biodiversity is one of the greatest concerns of our age. However, a satisfactory operational definition of biodiversity is still lacking, and it is likely that it won't be achieved in the near future. In their practice of measurement scientists adopt a pluralistic and multi-dimensional metric – an approach which is widely accepted, but not theoretically justified. The goal of this paper is to account for such pluralistic approach. Our solution is pragmatist: we hold that the pragmatic maxim highlights the fact-value entanglement intrinsic to the concept of biodiversity. On this basis, we argue that the axiological dimension is essential to the meaning of the concept since its extension cannot be fixed independently of it.

Keywords: biodiversity, fact-value entanglement, measurement, pluralism, pragmatic maxim, pragmatism

The preservation of biological diversity is one of the greatest concerns of our age. Scientific research has now shown that industrialization, pollution, deforestation, and anthropogenic climate change have been altering the ecosystem in which we live, causing a significant loss of biodiversity that will eventually affect our welfare and that of future generations. As many scholars have pointed out, the loss of biodiversity that we are witnessing is so massive that it is possible to conceive of it as a phenomenon of mass extinction (Chiras 2006, p. 195).

It comes to no surprise, therefore, that in the Western world the issue of biodiversity is getting more and more attention from both the public and the scientific community. However, all these efforts notwithstanding, a clear and satisfactory definition of biodiversity is still lacking, and it is very likely that it will not be achieved in the near future. As a matter of fact, more than eighty different

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scientific definitions of biodiversity have been recorded which differ in almost every respect, and the theoretical landscape is getting more and more variegated.

The present state of uncertainty about biodiversity may well seem puzzling. After all, biodiversity is a relatively new concept, having being coined as recently as in 1985 by Walter Rosen during the organization of the conference "The National Forum of BioDiversity" held in Washington DC in 1986 and popularized few years later by the proceedings of that conference, edited by Wilson under the title *Biodiversity*. Accordingly, one would expect a widespread agreement on its meaning to be possible, since the concept has not undergone a long career of theoretical changes and stratifications. Such lack of agreement is even more problematic since a clear-cut definition of the concept seems to be needed for measuring biodiversity and, consequently, for deploying successful strategies to fight its loss. If it is not clear on which basis to measure the notion of biodiversity, it seems impossible to assess whether it is affected or threatened.[1]

This fact is widely acknowledged in the literature. Gaston, for instance, in his *Biodiversity: An Introduction* Gaston remarks as follows:

> As a result of the variety of elements of biodiversity, and of differences between them, there is no single all-embracing measure of biodiversity – nor will there ever be one! This means that it is impossible to state categorically what is the biodiversity of an area or of a group of organisms. Instead, only measures of certain components can be obtained, and even then such measures are only appropriate for restricted purposes. (Gaston and Spicer 2004, p. 9)

Gaston refers here to the impossibility of capturing biodiversity by a set of operations expressing a single criterion of measure. Due to the variety of elements of biodiversity, any attempt to measure the latter has, at best, a local and limited validity. However, this limitation should not be perceived as detrimental. At the end of the day, humility grounded on facts is much less harmful than unwise ambition. Scientists and practitioners in the field are now persuaded that we would be better off endorsing a pluralist approach that acknowledges the possibility of applying different standards of measurement in different contexts according to different purposes. Standards of measurement are correct to the extent that those purposes that are deemed important happen to be satisfied.

The goal of our article is to philosophically account for such an impossibility of providing a single, satisfactory definition of the concept of biodiversity. In order to do this, we will rely on and expand the results reached by one of the authors of the present article in his book (Barrotta 2018). In that text, the approach was

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1. For the formulation of a similar concern, see for instance Hamilton (2005) and Swingland (2001).

mainly theoretical; here, on the contrary, we will adopt an empirical approach that starts from the current state of scientific research: we take for granted that a single unit of measurement of biodiversity is not available and is not going to be found. Actually, this is commonly acknowledged by almost anyone working in the field. At the same time, however, we agree with Maclaurin and Sterelny that "it is important to avoid the false dilemma of believing that either there is a single natural quantity of a system, its biodiversity, or that anything goes, and that biodiversity is in the eye of the beholder" (Maclaurin and Sterelny 2008, p. 172–173). We believe that a philosophical clarification is needed of the *epistemological* assumptions that lie at the basis of the current debates on the measurement of biodiversity, with the aim of showing that the lack of a single, unified unit of measurement does not prevent the possibility of objectively assessing biodiversity. In this sense, we are not interested here in the ethical problems related to the policies of biodiversity conservation. Even though we will deal at length with the issue of the fact-value entanglement in the definition of biodiversity, our approach is epistemological rather than ethical.

Moreover, our approach is strongly interdisciplinary, in a twofold way. On the one hand, it is interdisciplinary because the intrinsic interdisciplinary character of the concept of biodiversity requires it to be so. Because of the fact-value entanglement that lies at its basis, the notion of biodiversity cannot be satisfactorily dealt with without also addressing the axiological issues related to it. A philosophical analysis of the role and function of values in the process of scientific inquiry, therefore, is a constitutive part of the definition of the concept. On the other hand, our approach is interdisciplinary in the sense that we, as philosophers, have the ambition to contribute to the clarification of the scientific concept of biodiversity: clearly, not in the sense that we as philosophers aim to guide scientists, or to prescribe them some line of research. That would amount to a sort of external imposition which betrays the idea of interdisciplinary to which we are committed. Rather, we think that philosophical reflection can help scientific research by shedding light on some implicit theoretical assumptions which lie at its basis and can be held responsible for some of the controversies in the field. In doing so, an indirect contribution to the empirical work of scientists is provided: by clearing the ground of unwarranted and troublesome assumptions, the current pluralistic practice of biodiversity measurement is justified. This is only one part of the story, however. Indeed, we believe that a philosophical clarification of the concept of biodiversity can be also useful to enhance the level of reflexivity of scientific practice: the elucidation of the complex structure of the concept – we will argue in the paper that biodiversity is an 'entangled' concept in which factual and axiological elements are intrinsically interwoven – paves the way for a better understanding of the full range of options available in the act of choice of the unit of measurement.

The solution that we present in the following pages is pragmatist through and through. First of all, in the first section we discuss some influential approaches to the issue of the measurement of biodiversity, and we show that scientific practice has abandoned the idea of a single unit of measurement and has become more and more pluralistic. In the second section we outline the main features of our pragmatist epistemology, with the aim of showing that the scientific pluralism in the field of biodiversity measurement can be explained and justified in philosophical terms. Finally, in the last section we introduce the pragmatic maxim, and we argue that it can shed light on the structure of the concept of biodiversity since it is able to account for the fact-value entanglement that lies at its basis.

1.   The traditional approach to biodiversity

As philosophers, we are interested in conceptual clarification, and we believe that the proliferation of biodiversity measures is a fact that deserves attention. As pragmatists, we are used to conceiving plurality as non-problematic, and we hold that it may become so only if a flawed epistemological outlook is adopted. We also argue that the acceptance of a pluralist stance in epistemology – which is one of the key tenets of any sound form of pragmatism – can justify the practice of changing our conceptual apparatus from one time to another without relapsing into relativism. According to this view, all the concepts that we develop and employ in our reasoning are tools whose function is that of finding a way out of a problematic situation. In a Deweyan spirit, concepts are tools and language is a particular type of technology, and so, the choice of a particular set of concepts is motivated by the specific conditions that have to be met in a specific situation. Some of these conditions are empirical – they depend, for instance, on the objective features of the situation at stake; others are axiological – they are matter of the values and aims that an agent (individual or collective) intends or hopes to achieve. These two layers, factual and normative, put constraints on the choice of the concepts and warrant the objectivity of our judgments.

As should be evident, the pragmatist account of scientific knowledge outlined above matches well with the recent insistence on the plurality of ways of measuring biodiversity. In both cases, the point at stake is to loose the tie between the notion of objectivity and the idea that something which does not depend on our categorical frameworks is needed in order to assure the objective validity of our judgments. This is so far from being an abstract philosophical distinction that the history of the discipline can also be read – at least from a philosophical perspective – as a progressive acknowledgment of the importance of that distinction.

The first approaches to biodiversity conservation started from the rather commonsensical assumption that for the discipline to be firmly established, a single unit of measurement of its object had to be found somehow. The attempt was to conceive of biodiversity as a form of natural kind, a property of the world in itself. So, rather naturally, the choice fell on the notion of biological species: different from other taxonomic units, biological species are usually treated as objective features of reality since they are backed by individuable and detachable biological processes which account for the capacity of the members of a population to interbreed freely under natural conditions. As Maclaurin and Sterelny have remarked – though it has to be stressed that they do not accept *biological* species as the fundamental unit of measurement of biodiversity – "species are objective and observer-independent" while "[g]enus, family, class, order, phylum are conventional" (Maclaurin and Sterelny 2008, p. 42).

Wilson was worried about the consequences of accepting conventional units of measurement. In his book *The Diversity of Life,* he explicitly articulates this line of thought:

> Since antiquity biologists have felt a compelling need to posit an atomic unit by which diversity can be broken apart, then described, measured, and reassembled. Let me put the matter as strongly as this important issues merits. Western science is built on the obsessive and hitherto successful search for atomic units, with which abstract laws and principles can be derived […]. Both theory and experimental analysis are predicated on the assumption […] that complex systems can be cleaved into simpler systems. And so the search proceeds relentlessly for natural units until, like the true grail, they are found and all rejoice […]. So the species concept is crucial to the study of biodiversity. It is the grail of systematic biology. Not to have a natural unit such as the species would be to abandon a large part of biology into free fall.   (Wilson 1992, p. 37–38)

Leaving aside the rhetoric through which these ideas are presented, Wilson's proposal is clear – clarity being a large part of its attractiveness. In order to measure something, we need a fundamental unit of measurement, Wilson remarks. If the chosen unit is not grounded on the reality of facts, so to say, and is merely conventional, then measurements would lack objectivity and reliability. Clear and natural borders would be blurred, as a consequence of which it would turn out to be impossible to objectively assess the quantity of biodiversity of different ecosystems: only bare description would be allowed of the organisms that compose them, but no much more than that (Wilson 1992, p. 38).

The argument is as powerful as it is intuitive. How could one possibly compare two different ecosystems in terms of their biodiversity if there is no clear-cut criterion for comparing them in a 'fair' way? And how is it possible to be 'fair' in

our measurements if the selected unit does not carve the world at its joints? These questions are strictly connected with the necessity of operationalizing the concept of biodiversity in a satisfactory manner. Traditionally, one of the major concerns among those working in the field has been to figure it out how to translate the abstract idea of biodiversity – which refers to, in a general and unspecified way, the diversity of life – into a well-defined concept to be applied in scientific research programs. According to Wilson, biological species satisfy both demands perfectly: they are believed to carve the biological world at its joints so that counting them yields a reliable measure of biodiversity; simultaneously, since counting the number of species found in a sample is a straightforward procedure that can be easily standardized and implemented, biodiversity becomes an empirical concept.

As elegant and promising as it may seem, Wilson's species account of biodiversity – either as species richness or as species evenness – is too simplistic. It is now a widely acknowledged fact that some important features of biodiversity cannot be grasped in terms of the number of biological species coexisting in an ecosystem: biodiversity is a much more complex object than it was originally expected to be. Apart from all the problems related to the applicability of the notion of biological species to asexual organisms, scientists and practitioners soon realized that the measurement of biodiversity is sensitive to other factors and aspects of reality. So, as a consequence of the growing interest in genetics, the importance of the genetic basis of biodiversity has been emphasized.[2] Similarly, ecological biodiversity has gained in popularity. Accordingly, even though the most commonly used method to measuring biodiversity is still that of enumerating the biological species present in a particular locality, it is now almost universally accepted in the scientific community that the assessment of biodiversity cannot be achieved by adopting a single unit of measurement. Indeed, in current scientific practice, there are three fundamental levels of biodiversity that are usually taken into account: genetic diversity, species diversity, and community or ecological diversity.[3] Without entering into details, it can be said without any doubt that the measurement of biodiversity is now conceived of as the outcome of the adoption of a pluralistic and multi-dimensional metric.[4]

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2. See, for instance, Bailey (2011). For an interesting application of this approach, see Kocher, Albertson, Carleton, Streelman (2003).

3. For a clear statement of the relations between these three levels of description and assessment, see Dirzo and Mendoza (2008).

4. See, for instance, for a clear formulation of this point. Hangeveld (1996).

2.   Pragmatist epistemology and the rejection of the copy theory of knowledge

As said before, the pluralistic turn in biodiversity studies is very much welcome from a pragmatist perspective. However, one should be wary not to draw too strong a conclusion from the recognition of an apparent convergence. Indeed, scientific pluralism can be conceived of in many different ways, and with various degrees of radicality. It can be grounded on a pluralistic epistemology and, therefore, positively vindicated: in this case, the pluralism of the practices is backed by an explicit epistemological view that accounts for the validity of the pluralistic approach. Or it can simply be acknowledged as a fact that cannot be properly justified but has to be accepted *faute de mieux*. The latter seems actually to be the current state of biodiversity studies: the pluralistic approach to biodiversity measurement is taken for granted and recognized to be the best possible method to assess biodiversity, but – at least to our knowledge – no serious attempt has been made to provide an epistemological justification of it. That is what we intend to achieve, and in doing so we aim to clear the ground of some possible misunderstandings.

Indeed, such a lack of clarification brings about undesired consequences. As Gaston has remarked some time ago, "a large number of papers open with the recognition that species richness is only one measure of biodiversity but proceed to treat it as if it were *the* measure of biodiversity" (Gaston 1996, p. 4). We do not want to put too much emphasis on a passing remark, but we believe that the latter can be fairly taken as a sign of a widespread sense of discomfort with the consequences of pluralism. In our view, the problem at stake is that, although pluralism is formally acknowledged as the best solution available on pragmatic grounds, the idea that there is something like *the* unit of measurement of biodiversity is still operative and effective.

A few words are needed here in order to avoid possible confusion. The reasons pro or contra the existence of a single, universal unit of measurement are multifarious. Some reasons are empirical: it may or it may not be that such a unit will eventually be discovered. This is an issue of fact, which means that it is up to scientists and practitioners in the field to decide whether or not the assessment of biodiversity can be traced back to a single method of measurement which proves satisfactory in the light of the data at hand and the purposes to be achieved. Some other reasons are epistemological, and depend on specific theoretical assumptions whose validity can be evaluated *per se* and are quite independent from the practice of science. Now, our argument in favor of pluralism belongs to this second group; it is epistemological through and through. Accordingly, we do not want to take position on the empirical question about the possibility of operating with a single

unit of measurement; rather, we want to call attention to and criticize the kind of epistemology that makes it seem necessary that a single unit has to exist.[5]

As we have hinted at above, the epistemological view that we hold responsible for this a priori commitment is the conception of knowledge as a copy of reality. It is important to be clear on this point. Obviously, the commonsensical belief that something counts as knowledge only if it provides reliable information about the world is not problematic. Nor is it problematic to argue that reality puts constraints on how we can describe it. *Common sense* realism can be easily defended and accepted on pragmatic grounds. What is problematic is *metaphysical* realism, i.e., the idea that there is something out there, wholly independent from our conceptual frameworks and yet conceptually structured, that must be grasped by our thoughts or propositions, and that the objectivity of the latter depends on their capacity to faithfully represent the former – representation being a technical term.

We hold that metaphysical realism is wrong, and that the realist conception of knowledge that follows from it is flawed. But what is the shape of an epistemology that does not ultimately rely on metaphysical realism? And what are the practical consequences – in the case at stake here, the consequences on the practice of measuring biodiversity – that this epistemological outlook brings about? Put in different words, we have said above that pragmatist epistemology is comfortable with the idea of pluralism, and that, for this reason, it can be used to account for the current state of biodiversity studies. However, what are – concretely – the conceptual tools thanks to which such an account can be achieved?

We believe that two pragmatist theses can be helpful in this scenario. On the one hand, the idea of inquiry as a process that constitutes objectivity;[6] on the other

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5. A clarification here is in order. We can distinguish between two different philosophical theses about the possibility of discovering a single unit of measurement of biodiversity. It is important to remark that we are dealing here with *philosophical* arguments, that is, with arguments whose conclusions are warranted by epistemological considerations. According to the strong view, it is impossible in principle for scientists to achieve that goal since there are some epistemological arguments that rule out that possibility. According to the moderate view, on the contrary the possibility of discovering a single unit of measurement is not ruled out on the basis of epistemological considerations; it is up to scientists to decide whether or not a single unit of measurement can be satisfactorily applied in the practices aimed at assessing biodiversity. At the moment, scientists are oriented toward a pluralistic approach, but it might be that in the future they will change this belief. Nonetheless, it is possible from a philosophical perspective to deny that the search for a single unit of measurement can be grounded on the copy theory of knowledge. We subscribe to the moderate view.

6. As is well known, objectivity can be said in many different ways. It can be conceived of in terms of intersubjectivity, or it can be understood in metaphysical terms, as the accordance between representation and reality. The pragmatist conception of objectivity emphasizes the constructive activity of the epistemic agent engaged in the inquiry: the object is not 'there' from

hand, the pragmatic maxim as a tool not only for clarifying the meaning of a theo-
retical concept, but also for fixing its *denotatum*. The two theses converge towards
the idea that the object which is the referent of a scientific concept is not something
which is given and determined independently from our conceptual framework
and has to be discovered by the process of inquiry, but is something that must
be constituted in that very process. Since the pragmatist conception of inquiry as
the *locus* of constitution of objectivity provides the theoretical framework for the
justification of the pragmatic maxim, we first analyze the former issue, and then,
in the next section, we address the latter. In doing so, by going from the general
to the particular, we aim to show the various theoretical resources that pragmatist
epistemology is able to deploy.

We have just said that the pillar of pragmatist epistemology is the idea that
inquiry constitutes objectivity. The idea that scientific objects are constituted in
the process of inquiry should not be taken, however, as meaning that the inquirer
comes to know what an object really is only at the end of the process. This would be
blatantly obvious and, therefore, wholly uninteresting from a philosophical point
of view. A sound pragmatist epistemology says something stronger: it says that the
object in itself is constituted through inquiry.[7] In the case here at stake, according
to the first reading, we operationalize the concept of biodiversity, we establish its
surrogates, we delimit the spatial region of our research, we measure its quantity;
once we have done all this, then we eventually *know* what biodiversity is. From a
pragmatist perspective, on the contrary, once we have done all this, the object 'bio-
diversity' gets constituted since a well-defined referent is attached to the concept.
The pivotal insight of pragmatist epistemology is, therefore, not merely epistemic;
it is also semantic – it is concerned with the meaning of scientific concepts.

Accordingly, the idea that the object is constituted through the process of
inquiry simply means that in some cases the values held dear by the epistemic
agent are an indispensable factor of the objective meaning of the concept. In more

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the very beginning, waiting to be discovered, but has to be formed by existentially modifying the
data of the problem through manipulation and experiment. The pragmatist conception of objec-
tivity is clearly epistemic, but – since it has to do with concrete and practical modifications of the
external environment – it does not collapse into a form of social relativism and conventionalism.

7. This position may sound idealistic, but it should not be. It clearly cuts across the distinction
between subject and object, but that does not imply that the object is created by the subject, or
that – put in modern words – objectivity is a matter of convention. The point is rather that in
some particular cases, such as the concept of biodiversity, the referent of a concept cannot be de-
fined exclusively in purely descriptive terms. An evaluative component is essentially implicated
in its definition. When formulated in these terms, subject and object lose their metaphysical
overtones and become two different ways of speaking about the world; consequently, the charge
of idealism is no longer harmful – it spins in the void, so to say.

philosophical terms, we argue that the concept of biodiversity is characterized by an entanglement of facts and values. This conclusion is in accordance with the standard view of the scientists and practitioners in the field: it is now widely acknowledged and explicitly admitted that any cluster of measurements is intended to "capture a certain aspect of biodiversity" (Magurran and McGill 2011, p. 2), and that the choice of which aspect to capture depends, among other things, on the values that enter into and guide scientific research. Since a choice has to be made because of the richness and complexity of biodiversity, values cannot be eliminated. Some of these values are cognitive (i.e., the informativeness of a certain ecosystem), others economical (i.e., the importance of some resources for medical research), still others aesthetic (i.e., the beauty of a landscape or an ecosystem), social (the preservation of a form of human life inhabiting an endangered environment)[8] and moral or religious (i.e.,wilderness). As different as they may be, all these values contribute to the fixation of the unit of measurement of biodiversity and, consequently, to the definition of its meaning through the process of inquiry.

We argue that, once the fact-value entanglement is acknowledged, the copy theory of knowledge which stems from metaphysical realism is ruled out.[9] The literature on this topic is growing rapidly, at such a high rate that is now almost impossible to keep track of all the different positions. Consequently, we will not

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8. In some cases, natural phenomena are constitutive parts of human ways of living. Think, for instance, of the importance of some animals or plants for the religious practices of many primitive communities. In these cases, the preservation of biodiversity must take into account the social value attached to those natural phenomena.

9. As is well known, the fact-value entanglement has traditionally been a major source of concern among analytic philosophers, in particular among those working in the fields of ethics and meta-ethics. Without entering into technicalities, it can be said that the traditional image of the relationship between the descriptive and the evaluative dimension of a concept was dualistic and separationist: on the one side, we have the descriptive content of the concept, which can be formulated in purely non-evaluative terms; on the other, there are the evaluations that are expressed about that factual and descriptive content. According to the standard view, the two elements, the descriptive and the evaluative, are logically independent. However, thanks to the work of influential moral philosophers such as Philippa Foot, Iris Murdoch and Bernard Williams the standard view has been called into question. Focusing the attention on the so-called thick concepts, many meta-ethicists now argue that the separationist strategy is wrong, and that the descriptive and the evaluative dimension are entangled in such a way that the former cannot be formulated independently from the latter. It is impossible, they say, to fix the meaning of a thick concept like "shrewd" or "brave" or "nasty" without taking into account the evaluation that is incorporated within it. Our approach is highly sympathetic with this line of thought, even though we will try to defend the thesis of fact-value entanglement by adopting a different strategy.

directly address the issue, but we will deal with it in a sort of indirect way.[10] What is interesting to note for our present purposes is that from a pragmatist perspective the fact-value entanglement can be handled in a simple and straightforward manner. That does not mean that, in our eyes, current meta-ethical debates are wrongly framed or senseless. Rather, we simply suggest that if focus is shifted from the analysis of moral language to the scientific practices in which those concepts are applied, and if the meaning of some scientific concepts is accounted for in terms of their role in actual, concrete scientific practices, then the issue takes on a different shape.

Epistemic agents undertake an inquiry with the aim of solving a problem. In pragmatist terms, this means that epistemic agents are spurred by some form of doubt which blocks their habitual action to investigate the problematic features of the situation to which they are confronted. They do not know what to do and how to behave in the situation at hand, and they have to figure out a possible solution that reinstates a general habit of action. The most rational and effective way to get rid of doubt is through an act of reflection: since, in the case of doubt, to be genuine is to be local, the act of reflection can rely on the beliefs and practical capabilities that are not called into question in the problematic situation. Now, the distinctive aspect of pragmatist epistemology is that, among the beliefs that an agent may use to find a solution to the problem, one should also rank axiological beliefs – that is, beliefs concerning ethical, aesthetic, and social values. According to pragmatist epistemology, indeed, the epistemic agent is a concrete human being who undertakes an inquiry loaded with all the values and intellectual beliefs that she is not compelled to call into question by the problems under investigation. Through reflection, she attempts to construct or reconstruct a set of concepts that she believes may be helpful in dealing successfully with the situation, where concepts are conceived of as tools that express general ways of action.

As a general way of acting, a concept is purposeful in that it explicitly states that a certain end can be reached by performing a set of operations, mental as well as physical, aimed at altering some features of the situation. Pragmatists hold that the content of any concept can be formulated as a hypothetical judgement of the form "if you do this and this in a particular context and in a particular way, then an effect of the type F will follow." Consequently, since a concept is primarily a mode of action, an element of choice is intrinsically involved in its nature: one has to choose which end she wants to achieve as well as the means that she considers the most appropriate to reach the goal. In addition, she has to establish which means-end relations she takes as relevant for the definition of the meaning of the concept.

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10. For a general overview of the issue of the fact-value distinction which devotes considerable attention to the pragmatist perspective, see Marchetti and Marchetti (2016).

All these choices are made on the basis of (a) factual information on the world and (b) preferences grounded on axiological beliefs. What is important to remark is that, in a pragmatist framework, the two components of a choice are intrinsically interwoven since which pieces of information count as relevant depends partly on the 'objective' relations holding among things in the world and partly on the purposes and criteria of the epistemic agent. The fact-value entanglement turns out, therefore, to be the very structure of human action.

It is in the light of this epistemological outlook that we argue that the pluralistic approach in the study of biodiversity can be properly justified – and not simply accepted as a fact resulting from scientific practice.

Up to now, we have outlined a general epistemological framework in which to account for the plurality of conception of biodiversity, and we have argued that such a plurality is not problematic. Clearly, however, something is still lacking. We have not yet provided a detailed analysis of the meaning of the concept of biodiversity. This will be the goal of the next section.

3.   How to make biodiversity clear: Pragmatic maxim and the meaning of scientific concepts

In the last part of the previous section we exposed the fundamental tenets of pragmatist epistemology, and we remarked (a) that the latter accounts for the pluralistic approach to the practice of biodiversity measurement, and (b) that it is able to provide a general schema for the analysis of meaning. However, in the course of this argument we made reference to some notions without further clarification. In particular, we have taken for granted that the content of any concept can be formulated as a hypothetical judgement of the form "if you do this and this in a particular context and in a particular way, then an effect of the type F will follow," and that, consequently, the conceptual content is – or can be described as – a general habit of action.

The justification of these assumptions is provided by the pragmatic maxim. Pragmatic maxim was introduced for the first time by Charles Sanders Peirce in his essay *How to Make Our Ideas Clear* (1878), with the aim of supplementing the traditional forms of conceptual clarification (by acquaintance or familiarity or by definition) with a third level of analysis. While the clarity provided by the familiarity with a scientific concept is a matter of the capability of the agent to get so acquainted with that notion to the point that she has "lost all hesitancy in recognizing it in ordinary cases" (Peirce 1878/1986, p. 258); and the search of clear and distinct ideas through which to formulate the definition of the concept may be useful to organize our thoughts, it cannot bring about new knowledge. The third, pragmatic

level of analysis is productive of a different kind of conceptual clarification, in which the meanings that allow us to give a definition of the concept are discovered through a process of detection of the practical consequences that follow from its adoption as a guide of action, as a set of hypothetical imperatives. The validity of the pragmatic maxim is grounded and warranted by the belief – which is actually the core of pragmatism – that no conceptual distinction is so refined and 'ethereal' that it cannot show itself in practice. The adoption of a concept as the guide of action brings about specific effects that are distinctive of that particular concept, and that would not have taken place if a different concept had been adopted.

The original formulation of the pragmatic maxim is quite well known, and runs as follows: "Consider what effects, that might conceivably have practical bearings, we conceive the object of our conception to have. Then, our conception of these effects is the whole of our conception of the object" (Peirce 1878/1986, p. 266). In simpler terms, it means that the conceptual content of a scientific notion consists in all the possible, conceivable effects that are expected to follow from a specific habitual action.[11] In Peirce's intention, the practical bearings that should be taken into consideration are not simply the actual effects of our action, but rather all the *possible* conceivable consequences of an activity directed by the concept under consideration.[12] The pragmatic maxim can be also expressed in this way: "[t]he entire intellectual purport of any symbol consists in the total of all general modes of rational conduct which, conditionally upon all the possible different circumstances and desires, would ensue upon the acceptance of the symbol" (Peirce 1905/1960, p. 293, § 5.438). The advantage of this formulation is that here the modal nature of scientific concepts is made clear, and the relation with habitual or general modes of action is explicitly stated. Formulated in these terms, the pragmatic maxim is easily applicable to the case we are considering.

With all this said, then, we can now turn our attention to the pragmatist clarification of the notion of biodiversity that we want to provide. We have remarked that, from a pragmatist perspective, every inquiry is prompted by a concrete, practical problem. In order to rationally solve the problem, we have to apply a concept

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11. 'Conceivable' here has two meanings. On the one hand, 'conceivable' means 'possible', 'not strictly actual here and now'. On the other hand, 'conceivable' means 'conceivable by an agent in the light of her background knowledge'. The first meaning of 'conceivable' concerns, therefore, the modal structure of the concept; the second states a sort of constraint of accessibility. The two meanings are clearly different, but they should not be disjointed: without the constraint of accessibility, the pragmatic maxim loses any epistemic significance.

12. It is worth noting that the shift from actuality to possibility is necessary in order to avoid the shortcomings of verificationism and to account for all the counterfactual situations to which concepts can be applied. On this issue, see Misak (1991) and (1995).

that guides and controls our action, and – for a concept to guide the action – it has to specify the course of our future conduct, showing which consequences will follow from it. In addition, when we undertake an inquiry, we can rely on any concept that we already have at our disposal.

So, when we are struck by a *new* phenomenon of biodiversity, we apply to it one of the concepts of biodiversity that are available – for instance, the concept of biodiversity whose unit of measurement is the number of biological species living in the environment.[13] Since the content of that concept is entirely determined by its conceivable practical consequences, we imagine how the world would look like if we acted on its basis in this particular situation.[14] It may be that the phenomenon of biodiversity that prompted inquiry is preserved in our imagined scenario. In this case, the phenomenon counts as a legitimate form of biodiversity. But it may well be that this is not the case; it may happen that in the imagined scenario the course of action guided by the chosen concept of biodiversity does not preserve the form of biodiversity we are interested in – or, better said, it does not preserve that phenomenon that at the beginning of inquiry we were ready to classify as a form of biodiversity, while now we are compelled to acknowledge that it does not fall within the extension of the concept of biodiversity we have chosen. In this case, two roads are open. We might decide to hold fast to the biological species concept, and therefore to conclude that that phenomenon does not count as a genuine form of biodiversity. In doing so, we clarify the meaning of the concept by excluding from its extension the phenomenon under consideration. However, we might also decide to save the phenomenon, and therefore to conclude that it is the concept of biodiversity that should be modified: the imagined scenario has

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13. In a pragmatist perspective, in order for an application of concepts to be cognitively significant, it has to deal with new cases – that is, cases which look different from the ones that we have already taken into account. In the latter cases, indeed, no inquiry is needed to ascertain whether or not the concept applies: consequently, the application of the concept is purely mechanical.

14. We believe that this is a point of strength of our proposal. Many scholars have insisted on the importance of relating biodiversity to the practice of its preservation. See for instance Sarkhar on this issue. However, it is not clear what the rationale is behind their connection. Our pragmatist account explains it in a straightforward way, without committing ourselves to the conclusion that the study of biodiversity coincides with its preservation. The practice of conservation is the 'model' through which the meaning of the concept of biodiversity is clarified. Indeed, by imagining the conceivable practical effects on the current status of biodiversity that will follow from the adoption of the unit of measurement prescribed by a certain concept of biodiversity, it is possible to better understand what is only implied in that concept. Moreover, in so doing, it is also possible to assess whether the practice of preservation we would give birth to if we decided to act according to the concept to which we are committed satisfies the demands – both evaluative and factual – that are posed by the situation at stake. Understanding the meaning of the concept and evaluating it are, therefore, two moments of the same act of clarification.

revealed that the measurement of biodiversity in terms of the number of species living in an environment is unsatisfactory since it does not yield reliable results in the present situation. In addition – and the two aspects are closely related – it has also revealed what we want to be included in the concept of biodiversity: the latter has to be sensitive to the values that we hold dear, and that we see embodied in the case at stake.

Let's give an example to clarify all this. In his book *Biodiversity and Environmental Philosophy* Sarkhar has called attention to some particular biological phenomena that defy any attempt to assess them according to the standard units of measurement of biodiversity – genes, species, and ecosystems. The most interesting case discussed by Sarkhar is that of the *Monarch Butterfly* (*Danaus plexippus*). The Monarch Butterfly is common throughout North and South America, as well as in New Zealand and Australia, and is not endangered on a global level. However, there are two populations in North America that present a very interesting migratory behavior – one population migrates from Canada to Mexico in the winter, and from Mexico to Canada in the summer; the other migrates to California. Without entering into details, what is interesting to note is that during the summer migration new generations are produced, which continue their migration toward Canada led by some hereditary instinct. As is clear, the preservation of these populations is very difficult since many overwintering sites have to be protected, and many of them are facing serious threats, mainly due to anthropogenic causes.

The issue here at stake, to report Sarkhar's words, is that "[t]he disappearance of overwintering sites will not necessarily mean the extinction of monarch butterflies" since "there are numerous nonmigratory tropical populations"; nonetheless, "what will disappear is the remarkable migratory behavior of the two populations just discussed, which has come to be seen as an example of 'endangered biological phenomena'" (Sarkhar 2005, p. 181). If we are interested in preserving this endangered biological phenomenon, then we have to acknowledge that there is a leakage in our classificatory schema, and that the concept of biodiversity should be modified in order to include the migratory behavior of the two populations of the Monarch butterfly in its extension. As Sarkhar incisively remarks, "[p]rotecting the holy trinity of genes, species, and ecosystems will typically not save such phenomena" (Sarkhar 2005, p. 182; see also Sarkhar and Margules 2002, p. 302).

The same point can be formulated in a slightly different way, which is actually more revealing of the function of the pragmatic maxim in clarifying our scientific concepts. We may ask what are the values that, in this case, are not preserved in the traditional classificatory schema provided by the three standards (genes, species and ecosystems) of measurement of biodiversity. We think it is safe to argue that the reasons why we may feel compelled to save the two migratory populations

of Monarch butterfly from extinction are mainly aesthetic: we are aesthetically pleased with the existence of such a complex and fascinating biological phenomenon, and we feel that the world would be impoverished if it were to disappear.

Consequently, when we imagine a hypothetical scenario in which the preservation of those two populations is assured, and we deploy a possible line of conduct that would achieve that end, we have to acknowledge the role played by aesthetic values in the process of selection of the criteria that direct our action. It is clear, indeed, that the concept of biodiversity that we are ready to apply in the present situation is one that is compliant not only with the factual information available but also with the values that we hold dear and want to embody in our practice. But this also means that the extension of the concept of biodiversity cannot be fixed apart from, and independently of, the values to which we are committed. The descriptive and evaluative dimensions are so deeply interwoven that they cannot be disentangled: it is constitutively impossible to state the conceptual content of biodiversity in a purely descriptive terms since which biological phenomenon falls within the extension of the concept partly depends on what we take as relevant for our purposes.

It follows, therefore, that the pluralism in biodiversity assessment which we aim to account for is ultimately grounded on the fact-value entanglement that characterizes the very structure of the concept of biodiversity. It is the plurality of our interests, values and concerns that lies at the basis of the plurality of units of measurement that are used in scientific practice.

4.   Conclusion

The goal of our article was that of accounting for the pluralistic approach to biodiversity measurement that represents the dominant trend in current scientific practice. We have argued that the pragmatic maxim helps us to clarify the intrinsic relationship between pluralism and fact-value entanglement. More precisely, we have maintained that the pragmatic maxim shows that the pluralistic approach to the measurement of biodiversity is grounded on the plurality of values and interests that may affect the conduct of the scientists and the practitioners working in the field, and that the role played by the axiological dimension cannot be ruled out as a sort of extrinsic and separable element. On the contrary, it is an intrinsic and essential element of the meaning of the concept since its extension cannot be fixed independently of it. In doing so, we believe we have succeeded in providing a sound philosophical account of the legitimacy of a kind of approach that is almost universally adopted in practice, but lacks of a theoretical justification.

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CHAPTER 7

Human evolution

A role for culture?

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This paper presents a range of approaches going from the complete rejection of any role culture could have played in human evolution, to the other extreme in the range in which the very dichotomy between nature and culture is rejected. We will also go through middle-range standpoints, such as that of gene-culture coevolution theorists, that attach to culture a central role in human evolution. The clash between these approaches is still going on in the contemporary scene, with implications for the way boundaries are set inside disciplines such as Anthropology, as well as for conceiving how it is related to Psychology and Biology, among other disciplines. We will show that some debates in the Philosophy of Biology, concerning an extension of the neo-Darwinian theory of evolution, have contributed to clarify the issues, and have been followed by some anthropologists who are also concerned by the way human development and evolution are separately addressed in orthodox approaches.

Keywords: nature/nurture dichotomy, polemical exchanges, interdisciplinarity, human evolution, critical point theory, gene-culture coevolution, dual inheritance theory, biosocial evolution, developmental systems theory

In this paper we will show that the topic of human evolution, and especially that of the role culture could have played in this process, has been an arena in which confrontational interactions have been going on in several disciplines, especially in Anthropology.

Marcelo Dascal proposed a distinction between different kinds of polemical exchanges: discussions, disputes and controversies. Discussions and disputes deploy strategies that favor dichotomies which harden standpoints and boundaries, blocking exchanges and creativity. Dichotomies are, for Dascal "strategic argumentative tools" (2008, p. 33). A controversy is non-dichotomus, what

> … grants it a flexibility, an open-endedness, a challenging attitude vis-à-vis established beliefs and practices, a non-dogmatic rationality that account for its special contribution to the growth of knowledge and its explanation: the creation of a space where radical innovation within rational boundaries becomes possible.
>
> (Dascal, 2008, p. 46; 1998)

Drawing on Dascal's terminology and categorization, we will argue that some of the confrontations regarding the relationships between human evolution and cultural dynamics have the properties of a dispute, favoring a nature/culture dichotomization.[1] This dispute is, still nowadays, a major obstacle for dealing adequately with those processes in their complexity and relationship.

This topic offers also a way to ponder on some of the consequences of a dispute, as far as exchanges (or the lack of) between disciplines, and also between areas inside a discipline, are concerned. A lot of ink has been spilt on the issue of interdisciplinarity, but not as much on the cleavages internal to disciplines- often as a consequence of dichotomies that are tacitly assumed-, and the means to eventually overcome them. Again, Anthropology is a good case-study on this regard.

Anthropologists don't agree about the reasons for the divide in their discipline between a biological anthropology (initially named 'physical anthropology') and a cultural anthropology.[2] Foley and Ingold, for instance, have the same concern with the contemporary status of Anthropology, as far as its integrity is at stake, although they have different accounts on this matter. Foley points to a clash that has been going on during the 20th century between an evolutionary perspective and a cultural one:

> In 1904, human evolution was the totality of anthropology, including prehistoric archaeology, which came under the Board of Anthropology. Nothing could be more different a hundred years later. Over the course of the twentieth century this grand view of anthropology as the search for human history through the lens of evolution was abandoned. Social anthropology rejected an evolutionary framework in favour of a purely cultural one (…) Malinowski and Boas had become dominant figures and drawn the discipline away from the natural sciences and towards the social ones.
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> (2005, p. 1)

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1. We will also refer to that dichotomy as the nature/nurture one. In his 2008 paper, Dascal lists several dichotomies (body/mind, animality/humanity among others) but not the nature/nurture dichotomy. For some reason, this dichotomy is neither explicitly mentioned in any other of his papers we looked at. I am grateful to Oswaldo Melo for his help in doing this search.

2. This is how this area is named in the USA. In Britain, it is usually called 'social anthropology' and this difference in terminology expresses differences in viewpoints about its objects and methods. We can't go into this here. Both names will be used here interchangeably to refer to the same area and to distinguish it from biological anthropology.

Ingold blames not the anthropologists for this situation, but a dogmatic attitude taken towards Darwin's theory, after the accomplishment of its synthesis with genetics:

> Anthropology has always looked beyond its borders for sources of theoretical inspiration, and has sought creative conjunctions between ideas that other disciplines may have maintained in separate compartments. This eclecticism is the very source of its openness and vitality. Conversely, the hegemony of the neo-Darwinian paradigm in 'evolutionary biology' has effectively closed it off, locking it up within a hermetically sealed, intellectual universe of its own.   (2007, p. 15)

Perhaps these differences in diagnosis amount, at the end, to disciplinary allegiances: Foley is a biological anthropologist whereas Ingold is a social anthropologist.[3] We will see, however, that the disparity of their appraisals is, in fact, rooted in different conceptions about what present day Biology is, or should be, like.

Some anthropologists and philosophers of biology have been doing a conceptual work in the last decades that can offer tools for "tactical moves" (Dascal, 1998) which can turn what can be evaluated as a sterile dispute into a controversy, by means of a de-dichotomization of the opposition nature/culture. This might be an opportunity for making progress in understanding human evolution, among other topics. If this controversy is ever resolved, Anthropology might restore, as a consequence, its integrity as a discipline by closing the gap between those two areas and, additionally, a fruitful interchange with other fields in the social and natural sciences be in view.

A way to understand what is at stake is to display three contrasting frameworks for dealing with the question in the title of the paper, which are milestones in the debate:

1. Theory of the 'critical point'
    This stance thoroughly denies any role for culture in human evolution, sharply distinguishing biological evolution and cultural dynamics. Historically, this position was endorsed by A. Kroeber that claimed a 'superorganic' status for culture, coupled with the idea that there was a 'critical point' in hominin evolution in which culture emerged, after *Homo sapiens*' biological evolution had already came to an end. A position close to that one is still sustained today in different areas of the Academy. It grants to culture a *proximate* role in understanding human behaviour and it emphasizes the notorious diversity of behaviors and social organizations in human groups. This standpoint often goes

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3. Ingold is undeniably acquainted with research being done in biological anthropology, and more generally in biology for that matter. He blames, however, the other camp to ignore largely the research that is being done in social anthropology (Ingold, 2007).

with a critique of the idea of human nature, understood as a set of biological and psychological traits shared by all human beings, which evolved mainly by natural selection, among other causes. This theory clearly implies a dichotomy nature/culture.

2. Gene-culture coevolution

   Dual inheritance theory, proposed by P. Richerson and R. Boyd, is the main theory in this category. It presupposes that at a certain point in hominin evolution, culture started to function as a new inheritance system and to interact with the genetic inheritance system, bringing about evolved psychological propensities and biases that account for cooperation in large, non-kin, groups, besides other species-specific phenotypic traits. In this theory, culture is not only a *proximate* cause of human behaviour but also an *ultimate* (evolutionary) cause of some traits of human psychology. Therefore, culture is able to explain behavioral phenotypic traits in *Homo sapiens*, including our ultra-sociality.

3. Biosocial evolution

   The very nature/culture dichotomy is boldly dismissed in this perspective. Anthropologists such as T. Ingold, M. Bloch and A. Fuentes sustain that development and evolution can't be thought as separated processes. They champion this position and argue that, as a consequence, individual development as well as cultural and social history should be seen as sequels to biological evolution: those would be, actually, abstractions from a unique process, namely "biosocial evolution". Although those anthropologists come from a completely different academic tradition and arrived at their positions in a fairly independent way, their accounts are in notable agreement with those of some philosophers of biology with a focus on developmental systems and not on genes in their account of the evolutionary process.

   A conflict between those frameworks[4] has implications for how borders are traced inside disciplines such as Anthropology, Psychology and Biology, as well as for how the relations between them are entertained.[5]

   In the following, those perspectives will be worked out in more detail, highlighting their commitments to strategies of nature/nurture dichotomization or, otherwise, of de-dichotomization.

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4. There are, certainly, other frameworks. We don't aim at an exhaustive presentation of all current proposals but rather emphasize the strategies associated with the chosen three and the tactical moves used by the participants in the relevant confrontational exchanges (refer to note 16).

5. It is significant that a recent issue of *Current Anthropology* (v. 57, 2016) addresses this very topic: 'Reintegrating Anthropology: from inside out'.

Dichotomization

1.   Culture as superorganic

The theory of the critical point[6] presupposes the idea that culture and civilization are "superorganic", a term introduced by Spencer and adopted, with qualifications, by Kroeber in a classic paper (1917, p. 188): "… human society [holds] a specific content that is non-organic".

Curiously, Kroeber uses the term 'superorganic' only once, in the title of his paper, what can be interpreted as a sign of the divergences he had with Spencer, that forged it around the idea of "heredity by acquirement" (Kroeber, *ibid*., p. 187–8; Stocking, 1991, p. 298).

Kroeber argues that the "current confusion of the organic and the social is the predominance, in the present phase of the history of thought, of the idea of evolution" (*Ibid*., p. 163). This "confusion" would be a result of the injustifiable extension of an analogy between "organic evolution" and "social evolution".[7] There are, however, disanalogies and Kroeber emphasizes, especially, the impossibility of extending inheritance to social evolution: "… organic evolution is inevitably connected with hereditary processes; the social evolution which characterizes the progress of civilization, on the other hand, is not, or not necessarily, tied up with hereditary agencies" (*Ibid*. p. 167).

He strengthens the same point later in the paper: "… civilization and heredity are two things that operate in entirely separate ways" (*Ibid*. p. 185). It is important to further develop this point here since we will be addressing, below, a theory that claims exactly the opposite: that culture became an inheritance system in human evolution (Richerson & Boyd, 2002, 2005).

'Heredity' means, in the context of Kroeber's paper, "the doctrine of heredity by acquisition or accumulation", championed by Spencer. This meaning has, of course, the imprints of neolamarckism which boomed at the end of the19th century, at the same time Darwinism was in decline, as a consequence of fierce criticism and skepticism about the role natural selection plays in evolution (Bowler, 1983). We hear neolamarckian echoes when Kroeber criticises the ideas of Lester Ward, which are summarized as follows: "Mental qualities are not subject to natural selection; hence they must be accumulated in man by acquirement and fixed by heredity" (Kroeber, 1917, p. 187). This kind of claim is, for Kroeber, a

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6. Kroeber gets to an explicit and thorough formulation of the critical point theory only in his 1948 book *Anthropology*.

7. It stands out that Kroeber uses the same term 'evolution' in both expressions, despite the many differences he underlines between those processes.

consequence of the "habit of mind" of looking at the social "through the glass of the organic" (*Ibid.*, *id.*).

The idea that the social is non-organic is presented by Kroeber metaphorically: "The dawn of the social … is not a link in any chain, not a step in a path, but a leap to another plane" (1917, p. 209).

In a famous illustration, the "evolution of the organic" is represented by a line that smothly goes up above the "in-organic" horizontal level. At a certain point in that "evolution", another line, representing the "development of civilization", detaches from the previous one and its slope increases quickly upwards.[8]

In our interpretation, the organic/cultural opposition plays, in Kroeber's thinking (and in the following generation of anthropologists'), the role of a dichotomy in a dispute (in Dascal's sense of the term). It is compelling how Kroeber opens the 1917 paper, listing some "complementary antitheses" that have been "characteristic of western civilization":

> One of these pairs of ideas with which our world has been laboring for some two thousand years is expressed in the words *body* and *soul*. Another couplet that has served its useful purpose, but which science is now often endeavoring to rid itself of, at least in certain aspects, is the distinction of the *physical* from the *mental*. A third discrimination is that of the *vital* from the *social*, or in other phraseology, of the *organic* and the *cultural*.   (Kroeber, 1917, p. 163)

Strikingly, he embraces the organic/cultural "antithesis" while he is willing to dismiss the other ones. Arguably, this is not a coherent position since the nature/culture dichotomy rests, primarily, on the body/mind dichotomy (Oyama, 2003, p. 173; Ingold, 2007, p. 17). We will not pursue this line of argument here, though.

C. Geertz offers a clear construal of the critical point theory in a 1964 paper:

> In the critical point of view man was considered more or less complete, neurologically at least, before the growth of culture commenced, because the biological capacity for culture was an all-or-none thing. Once achieved it was achieved entirely; all else was a mere adding on of new customs and developing of older ones. Organic evolution proceeded up to a certain point and then, the cerebral Rubicon crossed, cultural evolution took over, a process in itself autonomous and not dependent upon or productive of further nervous system alteration.
>   (1964, p. 42)

Geertz goes on challenging this stance:

> The fact that this is apparently not the case, that cultural development was underway well before organic development ceased, is of fundamental significance for

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8. Kroeber makes explicit that "Height above the base is degree of advancement, whether that be complexity, heterogeneity, degree of coordination or anything else" (*Ibid.*, p. 211).

our view of the nature of man. He becomes, now, not just the producer of culture but, in a specifically biological sense, its product. This is true because the pattern-of-selection pressures during the terminal phases of the evolution of the human animal was partly determined by the initial phases of human cultural development, not simply by natural environmental factors alone….   (Geertz, *ibid. id.*)

Geertz pinpoints that one of Kroebers' chief motivations was the need to reaffirm the "psychological unity of humanity" (the latter prefers the expression "equality of racial capacity"), as a barricade against the risks of racism and, fundamentally, of poligenism which had haunted Anthropology since the 19th century (Kroeber, 1917, p. 180–1; Stocking, 1991, p. 313–4; Degler, 1991).

Tylor and Morgan were monogenists but made the mistake to uphold the view that the various human groups follow an unidirectional and progressive 'evolutionary' trajectory. They believed that various extant human groups exhibit an inferior degree of civilization and were, therefore, viewed as "live fossils". Arguably, they couldn't see that this view was in contradiction with the assumed thesis of the "psychological unity of humanity" (Bloch, 2012, p. 28–32).

Since Boas and Kroeber, at least, we have seen a dispute going on, in the first half of the 20th century, to secure the autonomy of their field and the distinctiveness of its subject matter. To assert an organic/cultural dichotomy was crucial in their strategy. Boas set himself apart from 19th century anthropologists such as Tylor, so-called 'evolutionists',[9] by affirming the singularity of the various cultures and rejecting the use of the expressions 'cultural capacity' or 'culture' to refer to a property shared by all humans. Boas' disciples, R. Benedict e Margaret Mead, followed him by favoring the pole 'nurture' of the opposition, the only legitimate way, in their view, to fully explain human behavior and to ground the human predicament. Laland and Brown point, effectively, to the 1930s as a crucial period in the history Anthropology that accomplished a full "transition from hereditarianism to environmentalism" (Laland & Brown, 2002, p. 54).[10]

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9. This 'evolutionism' actually goes back to the 18th century Enlightenment and it would be a mistake to interpret it in Darwinian terms. Stocking (1991, p. 302–14) uses the expression "classical evolutionism" to refer to positions such as that of Tylor. Most of the time, we will be using, in this paper, the term 'evolution' with its established meaning in present-day neo-Darwinian theory. Other meanings of the term, associated with a critique of this very theory, should be clear from the context.

10. They were, more acurately, proposing a kind of diffusionism as an alternative to hereditarianism (Stocking, 1991).

Some anthropologists in the 1960's and 70's, among them Geertz and W. Durham, started to question the dichotomy organic/cultural and, therefore, the very strategy that was conceived by Boas.[11]

Concepts of culture

At this point we have to be more precise concerning the concept of culture. This is not straightforward, though: it's wellknown that Kroeber and Kluckhohn (1952) listed 164 definitions of 'culture'! A definition embodies, effectively, the problems, objectifs and methods of a particular research program.

Kroeber was pivotal in defending the critical point theory, so we will mention first his definition, proposed in 1948: "… the mass of learned and transmitted motor reactions, habits, techniques, ideas, and values – and the behavior they induce – is what constitutes culture. Culture is the special and exclusive product of men, and is their distinctive quality in the cosmos" (Kroeber & Kluckhorn, *ibid*., p. 44).

Kroeber's notion of culture echoes, in some respects, that one proposed in 1871 by E. Tylor, usually viewed as the first one to forge a technical definition useful for doing anthropological research:[12] "Culture, or civilization is … that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society" (Kroeber & Kluckhorn, *ibid*., p. 43).

In the next section we will be discussing Richerson and Boyd's dual inheritance theory, so it is appropriate to introduce here, for ease of comparison, their definition of culture, which plays a crucial role in their program: "Culture is information capable of affecting individuals' behavior that they acquire from other members of their species through teaching, imitation, and other forms of social transmission" (Richerson & Boyd, 2005, p. 5).

This definition is of another ilk, contrasting strikingly with Kroeber's and Tylor's concepts of culture, presented above. It focuses on the *individual* (and not in society or the group), as well as on the *psychological process* of social learning, and not on historical tradition, like the former definitions. Richerson and Boyd also put an emphasis on *cultural transmission*, and the "costs associated with [it]"

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11. The acrimonious reaction to the publication of E. O. Wilson's book *Sociobiology: the new synthesis* in 1975 possibly acted as a hindrance to the development of these early proposals of gene-culture interaction. It is beyond doubt that it strengthned the longstanding dispute between hereditarianism and environmentalism. We can't give here empirical support for this historiographical hypothesis. Segerstråle (2001), Durham (1991: 2, 17–20) and Laland & Brown (2002, p. 97–8) offer relevant evidence.

12. This historical claim has been challenged, however, by Stocking (1991, p. 302–3).

(1985, p. 131), since dual inheritance theory presupposes that culture became an inheritance system at a certain point in the evolution of the hominin lineage, functioning in parallel to genetic inheritance.

In relation to cultural dynamics, Boyd and Richerson point to the fact that the notions of culture concocted in the 19th century were *descriptive*, such as that by Tylor. Their proponents had nothing to say about the causes of that process (that is, they were not *explanatory*). Those conceptions were also committed to an idea of progressive stages in human societies, associated with an increase in complexity or some other quality, as we made explicit above (Abrantes, 2014; cf. note 9).

Furthermore, Boyd and Richerson propose an ideational concept of culture (Keesing, 1974) that contrasts with concepts that do other jobs, as in Kroeber's theory for instance.[13]

De-dichotomization

2.   Gene-culture coevolution

Dual inheritance theory is one of the main contemporary approaches to human evolution which presuppose that several human traits are the result of gene-culture coevolution (Richerson & Boyd, 2005; Laland & Brown, 2002).

If we adopt Richerson and Boyd's definition of culture, presented above, many animals surely have culture. However, the evidence presently available is that cultural *accumulation* is a very rare phenomenon.[14] In the human case, culture functions as another inheritance system, making available, therefore, a faster way to meet adaptive problems in a wide range of environmental conditions.

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13. It is appropriate to quote Kroeber on this regard: "Mentality relates to the individual. The social or cultural, on the other hand, is in its very essence non-individual. Civilization as such, begins only where the individual ends…" (Kroeber, 1917, p. 192–3). Kroeber refuses to accept an individualistic stance as a way to objectify culture and he correctly associates it with Darwinism (what later will be named "population thinking"). This is another aspect in which, for Kroeber, the social and the biological are distinguished. Boas and his disciple Kroeber diverged on this point. Boas "neither eliminated the individual nor hypostatized society", although inconsistencies can be found in his work (Buckley, 1996, p. 264). It is beyond our aims to go into this point of contention, albeit revealing.

14. It is important not to conflate the question about the origins of culture with a totally different one, about cultural evolution. To model cultural dynamics is a different task from devising a scenario of how culture, as a new kind of inheritance system, evolved in the first place, on top of the genetic system.

Gene-culture coevolution was supposedly responsible for bringing about specific traits in our species, especially the ability to cooperate in large non-parental groups.

Richerson and Boyd claim that it is not enough to explain the observable variation in human behavior on the basis of just genes and environment, a mistake we find in other approaches to human evolution, such as in evolutionary psychology and in behavioral ecology:[15] "The evidence accords better with the traditional views of cultural anthropologists and kindred thinkers in other disciplines: heritable cultural differences are crucial for understanding human behavior" (2005, p. 19; cf. Laland et al. 2010).

Culture is in their theory an evolutionary cause of a psychological profile that shapes human behavior (Richerson & Boyd, *ibid.*, p. 8).[16]

Concerning cultural evolution (refer to note 15), Richerson and Boyd model it by assuming "forces" which are *not* analogous to those acting on genetically-based evolution (2005, p. 68–9). Among those, we have several biases in the way we assimilate and transmit culture, as well as a special kind of natural selection acting specifically on cultural variation. Cultural evolution is not, therefore, strictly analogous to biological evolution as understood in neo-Darwinism. This is not an unsurmontable obstacle, however, for conceiving a coevolution between those two processes.

Conformism as a psychological bias plays a prominent role in supressing variation inside each cultural group, at the same time that it increases variation between groups and sustains this variation along the time. Therefore, culture as a new inheritance system provided the necessary variation between groups for natural selection to act also at the group level. Cultural niches were responsible, at another level of selection, for different selective pressures on the agents in each group. In a scenario of competition between groups, the interplay between selective forces acting simultaneously at several levels brought about conspicuous evolutionary effects, including those psychological traits that underly our ultra-sociality.[17]

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15. We don't have space in this paper to go into those other contemporary approaches to human evolution. For a good overview, see Laland & Brown, 2012. Anyway, in those approaches culture doesn't play a significant role in evolution, if any.

16. Less speculatively, there is much empirical evidence for asserting that adult lactose absorption, a non-behavioral trait in our species, was a relatively recent effect of the coevolution between a dairying culture of pastoral groups and genes responsible for lactase production.

17. Kin selection and reciprocal altruism are not enough to support cooperation in groups whose members are not genetically-related or, else, in large groups. Richerson and Boyd point, therefore, to other mechanisms for the suppression of variation between cultural groups: moralistic aggression and symbolic markers (Abrantes, 2013; Bernal & Abrantes, 2018).

In the next section we will look at anthropologists which argue that we should reconsider the terms of the two previous programs, since they would both be committed to a dichotomy nature/culture. It is explicit in Kroeber, as we have shown; Richerson and Boyd would also have implicitly assumed it. Ingold places the latter's approach under the category 'interactionism', to stress the fact that they presuppose a connection between the genetic and the cultural inheritance systems (Ingold, 2000a, p. 386).[18]

Ingold distinguishes four stages in the history of Anthropology: the Enlightenment, the Consensual, the Interactionist and the Relational stages (Ingold, 1986, p. 48; 2008, p. 23). The first one is at the origin of Tylor's anthropology; the second started with Boas and Kroeber. Geertz would be a representative of the interactionist stage, and we think Durham should also be included here.[19]

3.   Biosocial evolution

In order to get rid altogether of the dichotomy nature/nurture, the proposals we will present next vindicate some kind of revision, more or less profound, of the theory of evolution that came out of the great synthesis.

Ingold is the most radical on this regard: he goes as far as saying that "Darwinian theory is dead" and calls for a new biology, in which developmental processes would be at the center (Ingold, 2000b, p. 260). Only an approach that integrates development and evolution can convey, in his view, a revision of the ontologies presupposed by biologists and anthropologists today: "There can […] be no separation between ontogeny and phylogeny, development and evolution. Ontogenesis, far from being accessory to evolutionary change, is the very fount from which the evolutionary process unfolds" (Ingold, 2000a, p. 385).

He argues that in place of the theory of evolution accepted nowadays we need, instead, a "general theory of the evolution of biosocial becomings" (Ingold, 2013, p. 12). He expects that this new standpoint will, eventually, reunify Anthropology.

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18. Gene-culture interaction should not be conflated with the interaction between genes and environment, which is more consensual. Actually, Richerson and Boyd don't incorporate culture in the environment, since the former is taken as a kind of inheritance system that has a degree of autonomy with respect to the dynamics of the environment. This autonomy is assured even if we accept that a generation inherits the environment constructed by the previous generation. Odling-Smee et al. (2003) distinguish, effectively, ecological inheritance and cultural inheritance.

19. At first sight it might seem odd to place Geertz side by side gene-culture coevolution theorists. Nonetheless, Boyd & Richerson (1985, p. 281) and also Durham (1991, p. 4) praise Geertz's contribution to their approaches (cf. Bloch, 2012, p. 41).

Genes and culture, when abstracted from the development system, exist just "in the eyes of the investigators", that is, biologists and anthropologists (2007, p. 13).

The reification of dichotomies in the disputes going on in Anthropology and in other disciplines will be avoided if we come up with a new biological construal: "Despite Boas's strictures, there is nothing wrong with accounting for … any aspect of cultural form on a "purely biological basis", so long as the biology in question is of development, not genetics" (2007, p. 13; 2004, p. 217).

This construal would be a contribution to the relational stage in the history of Anthropology. Before further developing these ideas, we would like to look at other anthropologists' viewpoints. Despite their differences with Ingold, they also emphasize the need to integrate development and evolution.

Agustín Fuentes is more moderate than Ingold: he acknowledges the need of an extended theory of evolution, looking for a new theoretical toolkit that includes niche construction and that postulates other inheritance systems besides the genetic one. He also calls for a closer relationship between evolutionary and developmental processes (Fuentes, 2007, p. 106–8; 2016).[20]

Natural selection is not taken, anymore, as the main cause of "human becomings": "… development over the life course and current and past niche construction are the co-architects, in addition to natural selection, of expressed behaviour …" (Fuentes, 2013, p. 48).

He argues that humans are not static "evolved systems" and rejects the adaptationism that goes with that "traditional view".[21] Fuentes refuses, therefore, optimality models- evolutionary psychologists are clearly a target here, as well as human behavioral ecologists.

The focus in his account is on 'becoming' and not on 'being': humans are "evolving bioculturally in the past and present". The biological and the social are not taken as distinct "domains of being" but rather "… as intertwined processes of becoming [what] presents a powerful approach for anthropology" (Fuentes, 2013, p. 42).

Fuentes and Ingold agree on the basic requirements for handling complex processes such as human evolution:

> We need an integrated anthropological framework for asking evolutionary questions about humanity – one that is inclusive of ethnographic and sociocultural theory and data as well as evolutionary approaches. I believe our challenge is to

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20. Several attempts are presently being made to extend the synthetic theory of evolution by taking into account those processes. For an overview, refer to Odling-Smee et al., 2003; Pigliucci & Müller, 2010.

21. The classic critique of adaptationism, with an early plea for niche construction, can be found in Gould and Lewontin's 1979 paper.

figure out how to effectively engage human cultural systems, individual actors, and group and community-level dynamics with biology, history, and human niche complexity.   (Fuentes, 2016, p. S23)

Another anthropologist, Maurice Bloch, also looks for a "dynamic synthesis" between several processes, including evolution by natural selection and the development of individual human beings:

> The root of the problem caused by the dichotomy [nature/culture] has been its fundamentally static character while we are dealing with complex dynamics. Thus, implied by the concept of nature is a unified combination of processes: the processes of natural selection, the developmental process of birth and maturation, the ecological process of the life of particular species occurring amongst the dynamic of other living things, other individuals and even the non-living world. Similarly, implied by the concept of culture is the process of history. It is the unity and co-occurrence of all these processes that we, as social or natural scientists, should make the object of study.   (Bloch, 2012, p. 67)

There are clearly commonalities between the views Ingold, Bloch and Fuentes argue for. Despite their disagreements concerning other topics, they all promote an integrative approach in Anthropology but also a new relationship between this and others fields, including Biology and Psychology.

Ingold was criticized very early for his heterodox standpoint, even inside his own camp. A paper he published in *Cultural Dynamics* in 1995, "People like us", was subjected to criticism in a 1996 issue of the same journal (Oyama, 1996; Dunbar, 1996), followed by Ingold's replies.

He questioned in this paper the concept of an "anatomically modern human" that amounts, in his view, to accept that the ancestors of our species (he takes the Cro-Magnon man as an example) had the same biological endowments as we have, and that the relevant differences would be uniquely historical-cultural. If we accept that a developmental system underwrite our capacities, that we are "human beings-in-an-environment", argues Ingold, then our ancestors of the Upper Paleolithic were, after all, *not* "like us", even biologically speaking (Ingold, 2000a, p. 376).

For Ingold, as far as Anthropology admitted, in the first half of the 20th century, that the only way to reject racism and poligenism was to assert the "psychological unity of humanity" on a genetic basis, it was forced to disconnect biological evolution from cultural dynamics. As we have shown, the critical point theory was a clearcut expression of this strategy. However, it amounts, in Ingold's interpretation, to go back to a view that prevailed in the 18th century: "Once again human beings figure in a dual capacity, on the one hand as a species of nature, on the other as creatures who – uniquely among animals – have achieved such emancipation

from the world of nature as to make it the object of their consciousness" (Ingold, *ibid*., p. 389; 2004, p. 210–11).

A way out is to reject the dichotomy altogether and to mingle cultural dynamics and biological evolution:

> … my conclusion, that the differences we call cultural are indeed biological, carries no racist connotations whatever. By refocusing on the human-being-in-its-environment, we can dispense with the need for a species-specific characterisation of humankind, and so also with the opposition between species and culture. People inhabit one world, not because their differences are underwritten by universals of human nature, but because they are caught up – along with other creatures – in a continuous field of relations, in the unfolding of which all difference is generated.   (Ingold, 2000a, p. 391)

R. Dunbar, an evolutionary anthropologist, criticized Ingold for conflating Nico Tinbergen's "four why's". The famous ethologist is well-known for distinguishing four questions one can ask about the causes of a behavioral pattern: (1) What are its proximate mechanisms?; (2) How does it develop?; (3) What is its function (or survival value)?; (4) How did it evolve?[22]

Dunbar pinpoints that these questions correspond to different "grains of analysis" that are conflated by Ingold: "To claim that Cro-Magnons are not the same as living humans because their cultural milieu was different is a specious argument. Cultural contexts are not part of the formula, and are not relevant to the questions of historical speciation that are the concern of palaeontologists" (Dunbar, 1996, p. 367).

What culture "has allowed us to do" is "constrained by our genetic heritage", claims Dunbar (*Ibid*., p. 367). In his reply, Ingold argues that the privilege conceded to the genes configures a kind of preformationism that revives "the opposition between form and substance", that goes back to Aristotle, and the "priorization of form over process" (Ingold, 1996: 379).

Dunbar uses the awkward stratagem to apply Tinbergen's four questions to cars and not to the behavior of organisms! The way Ingold replies is relevant to what we discussed earlier:

> Would any one seriously suggest that a history of people could be written as a sequence of types, each defined as an assemblage of character traits, without regard to their experience of living out their lives in an environment? In the early part of this century, there were indeed some ethnologists and culture-historians who thought along these lines, but it is a point of view that has been long since

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22. If we adopt Mayr's and Sober's terminology, as we have been doing in this paper, the first question is about the *proximate* causes of the behavior and the last one about its *ultimate* causes.

> abandoned in anthropology. It survives today only in the works of biologists who have attempted to handle the phenomena of culture within a neo-Darwinian explanatory paradigm.
>
> (Ingold, 1996, p. 382)

He mentions as examples of this paradigm the research of gene-culture coevolution theorists such as Boyd, Richerson, Cavalli-Sforza, Feldman and Durham.

Tinbergen's four questions presupposes that the processes of evolution and development are separated. This would be, for Ingold, a tacit "epistemological assumption" of biologists: "that every form is the embodiment of a design that pre-exists its realization in the material" (*Ibid*., p. 383).

Another presupposition of this approach is that the organism is the "effect" of genetic and environmental causes. To question this, Ingold refers to Oyama's 1985 book, where she offers a radical alternative to the orthodox theory of evolution.

Dunbar and Ingold are clearly talking past each other in their confrontation. Dunbar is criticized for adopting a neo-Darwinian framework, whereas Ingold calls for an entirely new, developmental approach to the issues at stake. We will turn now to disclose what this approach is all about, given the influence it had in the debate.

Philosophers of Biology are implicated in the debate

The interlace of developmental and evolutionary processes has been controversial among philosophers of biology, and even biologists. Actually, the disputes inside Anthropology mirror, in some ways, debates that have been going on in the Philosophy of Biology over topics such as: units of evolution and levels of selection; adaptationism; niche construction; the role of other causes of evolutionary phenomena besides natural selection.

Against neo-Darwinian orthodoxy, some philosophers and biologists alike advocate a rejection of the gene's eye view of evolution, point to the existence of other inheritance systems besides the genetic one and postulate multi-level natural selection.[23] Besides, they give a prominent place to niche construction alongside other processes in evolution and reject the dichotomy proximate/ultimate causation in dealing with human behavior.

Most important to the perspective we adopt in this paper, some of those critiques focus on the need to bring together evolutionary and developmental

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23. R. Lewontin, D. S. Wilson, E. Jablonka, F. Odling-Smee and K. Laland are some of the most influential critiques of the 'gene's eye' view of evolution (Laland et al., 2000). This view goes back to Williams' book, *Adaptation and natural selection* (1966) and to the successful attempts, by Hamilton and others, of explaining some cases of altruistic behavior invoking the concepts of 'kin selection' and 'inclusive fitness'. This view was popularized by Dawkins in his influential 1976 book *The selfish gene*. Bernal & Abrantes (2018) offer a detailed analysis of these attempts.

processes. Developmental system theory (DST) is one of the radical views in support of this program. It promotes a profound revision of the theory of evolution handed down by the great synthesis.[24] In a nutshell, developmental system theorists assert that:

1. the full range of developmental resources are inherited (including constructed niches), and not just genes;
2. genes interact with many other resources in development and don't have any privileged role in this process;
3. all resources in the developmental system carry information, and not just genes;
4. the life-cycle of an individual is self-reconstructed in each generation.

It follows that evolution is the differential reproduction of cycles of developmental processes, and not just the differential reproduction of organisms, which are not viewed as mere phenotypic expressions of genotypes, like in the received evolutionary theory. In Oyama's words: "Evolutionary change is better viewed as change in the constitution and distribution of developmental systems" (1996, p. 356–7).

Many commentators emphasize the non-reductionist stance of DST, since it denies that any sub-set of resources, including genes, control ontogenesis. Evolution is still being described using the formula 'variation + differential replication', but there is a great change in standpoint since the organism is not isolated from the physical, biological, social and, in the relevant cases, cultural environments.

Especially in the human case, genes and cultures are both implicated in the processes of development and evolution, bringing about species-specific traits, including at the psychological level. Social structures, for instance, are "elements of culture" required for the "stable replication of human evolved psychological characteristics" (Griffiths & Gray, 1998, p. 141).

Despite the powerful insights offered by DST, it is far from being consensual among biologists, and it has been criticized also by philosophers for its extreme holism.[25] This theory might better be taken as a philosophy of nature, partially

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24. The central ideas of DST were set up by the developmental biopsychologist Gilbert Gottlieb at the beginning of the 1960s (Griffiths & Gray, 2005). More recent and influential contributions can be found in the publications of the psychologist S. Oyama, the philosopher of biology P. Griffiths and the behavioral ecologist R. Gray (Oyama, 2000; Griffiths & Gray, 1988, 2005; Oyama & Griffiths & Gray, 2001).

25. We don't have space in this paper to go through those critiques in detail. For a sample, refer to Sterelny & Griffiths, 1999, p. 108–9; Godfrey-Smith, 2001; Mameli, 2004.

assimilated by its scientific counterpart: evolutionary developmental biology, also known as 'evo-devo'.[26]

Ingold targets ironically even evo-devo: "… devo comes after the evo, when it should be the other way around" (2016, p. 111). Anyway, he assimilated in his original conceptual framework (that was rooted in other philosophical traditions)[27] some elements of those debates on the foundations of biology: "[The objections of DST and evo-devo people] to neo-Darwinism have much in common with those often expressed by social and cultural anthropologists, and (…) this commonality holds real promise for a future synthesis" (2007, p. 13).

He takes issue with DST, though, since life-cycles are still taken as bounded entities. "Forms of life" are, instead, unbounded- they actually emerge, claims Ingold. Organisms are, for him, embeded in a field of relations with other organisms in an environment. Social anthropologists regard persons as "ensembles of relations", "biosocial becomings" in a "biosocial field". Organisms should be regarded, likewise, as evolving within a "matrix of relationships" (Ingold, 2013, p. 8). This would amount to a "topological" view of evolution,[28] as opposed to the "statistical" view that prevails in neo-Darwinism (Ingold, 1986, p. 133).

Like DST theorists, Ingold argues that "the capacities are properties of developmental systems and not of genes", fighting against those that presuppose the existence of a specific human capacity for culture (Ingold, 1994, p. 8; 2014). Here the target could be the critical point theory but is, in fact, Geertz.[29]

Ingold goes further down this path, pointing to one implication of a developmental approach: history comes to be seen as a continuation of evolution. In other words: "The domains of the social and biological are one and the same" (Ingold, 2013, p. 9), a view also espoused by Fuentes, as we pointed out.

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26. Godfrey-Smith, 2001; cf. Griffiths & Gray, 2005, p. 418. Evo-devo, as a scientific research program, focuses on morphological development, while DST encompasses psychological and behavioral traits, what places culture, as a resource of the developmental system, in the front stage (Krohs, 2006).

27. Bergson, Whithead and Merleau-Ponty are, avowedly, major influences in Ingold's thinking (Ingold, 2014). In his first book, *Evolution and Social Life* (1986) he attempted to reinterpret neo-Darwinism using the insights of Bergson's and Whitehead's ontologies. A new edition of this book came out in 2016.

28. Evolution is described by Ingold as the unfolding of a "tapestry". To picture his view of lifeforms as "becomings", he uses also metaphors such as that of 'field'.

29. In a famous passage Geertz claims that we are naturally pre-equiped "to live a thousand kinds of life but end in the end having lived only one" (1973, p. 45; cf. Ingold, 2000a, p. 379).

In an early paper, Ingold claims that "… the questions being asked by developmental biologists and by social and cultural anthropologists are not just analogous: when it comes to human beings they are, in effect, one and the same" (1996, p. 378).

In Oyama's reply to Ingold's 1995 paper, she strikes that same chord and distinguishes 'evolutionary History', the 'historians' History' (both with a capital 'H') and the 'history of development' of an individual. Usually those histories are assumed to be disconnected, but Oyama regards them as intermingled: "From a developmental systems perspective, the History of peoples and cultures is not a sideline somehow appended to the biological story of humans. It is part of the biological story of humans" (Oyama, 1996, p. 357).[30]

She argues, like Ingold, that dual inheritance theory doesn't dissolve the nature-nurture dichotomy, as we might think:

> We are constantly being told that the nature-nurture problem was solved when we realized that nature and nurture (or culture, learning, experience, or environment) interact. But if, as developmental systems theorists argue, the very concepts of nature and nurture are incoherent, then saying that the two interact is hardly an improvement, however conciliatory it may sound.
>
> (Oyama, 1996, p. 355; cf. Ingold, 2004, p. 217)

The proliferation of "information channels" as we find, for instance, in Jablonka and Lamb (2006), would not be a solution either, but rather an indication that the relevant dichotomies rest untouched (Oyama, 2003, p. 175).

Oyama denounces other related developmental and evolutionary dichotomies, such as those of inherited/acquired, rigidity/flexibility, genotype/phenotype, passivity/activity, external selection/internal constraints, among many others she lists (Oyama, 2003, p. 171–2).

Another relevant issue is that one can't fully address the development of organisms that have a mind without mentioning cognitive processes. Psychology has, therefore, to be included in any attempt to mingle development and evolution, in our species at least. In his approach, Bloch emphasizes cognition going on in individuals that share a species-specific kind of mind: "What anthropologists, psychologists and other cognitive scientists are dealing with is a mind, for which evolution has made the historical process part of the natural. This unified natural phenomenon is these disciplines' only and common subject matter" (2012, p. 74).

Bloch goes through a discussion of evolutionary psychology (EP) and what he calls the 'modularity revolution' showing its relevance for Anthropology. However,

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30. A more conventional way to argue for this continuum is to invoke the idea that each generation creates a richly structured environment in which the next one will develop (Odling-Smee et al., 2003; Fuentes, 2013, 2016).

the research about child development from Piaget on calls for, in his interpretation, a dynamic kind of modularism. D. Sperber's more acceptable version of EP is praised but Bloch in the end rejects his approach for not being able to address how the individual's ontogeny changes her psychological predispositions, for instance through learning (2012, p. 71–3).

Despite their agreement in highlighting developmental processes, Ingold conceives very differently knowledge, learning and how one generation contributes to the next one's education, among other issues. In the second edition of his 1986 book he acknowledges that the first edition lacked a thorough discussion of psychological processes. In his later work, he tried to fill this gap by drawing especially on Gibson's ecology of perception. Ingold's critique of EP comes with a more general critique of cognitive science and the role played, in this approach, by the ideas of information processing, mental content, problem-solving, innate structures, etc. Effectively, he does not presuppose a cognitive science standpoint, as Sperber and Bloch do: "… the process of cognition is tantamout to the historical process of social life itself. And the latter … is but a continuation, into the human domain, of a more encompassing process of evolution" (Ingold, 2001, p. 143).

Ingold distinguishes knowledge-as-information and practical enactment; knowledge as representation and knowledge as skill; enculturation and enskilment. Furthermore, his constructivism makes salient that the development of an individual, since childhood, happens in the environment that has been set up by previous generations: "the contribution that each generation makes to its successors amounts to an education of attention" (2001, p. 139; 2013).

We hope this brief excursion in Psychology can clarify how Oyama's various 'histories' are embricated and how developmental dichotomies can also be questioned, besides the evolutionary dichotomies that were central to our analyses in this paper.

Final remarks

We have been discussing three influential frameworks that address the problem of the role culture might have played in human evolution, which we can sum up as follows:

1. Human evolution is strictly a biological phenomenon that preceded the emergence of culture. Cultural dynamics doesn't affect human's biological make-up;
2. Evolution in the hominin lineage was embedded in culture from its beginnings. Genes and culture coevolved;
3. Biological evolution and sociocultural dynamics can't be distinguished and the nature/culture dichotomy is dismissed.

We tried to identify the types of debate and kinds of tactical moves (in Dascal's sense) associated with each of those frameworks. The first one deploys clearly a strategy of nature/nurture dichotomization. The other two attempt de-dichotomization, a strategy most effective in the third, biosocial-evolutionary, perspective. The rejection of the nature/nurture dichotomy, which is explicit in the tactical moves of the latter framework, favors a more controversial type of debate. It has, therefore, a potential to unblock the communication channels between different disciplines in the social and natural sciences, or even between different areas inside the disciplines concerned. What is fundamentally at stake is a more adequate understanding of the human predicament.

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A historical controversy about politeness and public argument

The dispute about fashion between Melchiorre Gioja and Antonio Rosmini

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This article presents the Nineteenth-Century dispute arising from the criticism that the Italian philosopher Antonio Rosmini expressed against the arguments that the statesman Melchiorre Gioja supported in defense of fashion in his *Apologia della moda* 'Apology of Fashion' (1822) and against the utilitarian ideology that permeates the text. Gioja's aggressive answer (in 1827) leads Rosmini to write a treatise on polite manners writers must have in public debate, thus offering an interesting ethical treatise. We aim to analyze the controversy adopting an interdisciplinary approach that investigates metapragmatic evaluative comments from the point of view of argumentation in order to reconstruct the argumentative justification behind each evaluation of (im)politeness and to show the principles defended by the disputants.

Keywords: argumentation, politeness, Nineteenth Century, Italy, historical controversy, fashion, interdisciplinarity, ethics

1. Introduction

The metapragmatic awareness of argumentation as a communicative activity seems to be on a descending trajectory in the Nineteenth Century, in Italy as well as in other countries. This is a period in which the studies of rhetoric and dialectical logic are stagnating.[1] Interestingly enough in 1824 Antonio Rosmini (one of

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1. Genette's (1972) thesis that after Dumarsais (1730) French rhetoric becomes a "restricted rhetoric" (*rhétorique restreinte*) mostly concerned with *elocutio* and chiefly with tropes is well known (see Abbott, 2006). While Douay-Soublin (1990) questions the historical accuracy of the

the main philosophers and theologians of the Nineteenth Century) wrote a text, the *Esame delle opinioni di Melchiorre Gioja in favore della moda* 'Examination of Melchiorre Gioja's Opinions in favor of Fashion' in which he advances more than forty "observations" against the arguments that Melchiorre Gioja (the official historiographer of Napoleon's Cisalpine Republic, and the Director of the Bureau of Statistics of the Italian Kingdom) supported in defense of fashion in his *Apologia della moda* 'Apology of Fashion' (a chapter of the *Nuovo Galateo*, 'New Galateo', 1820). The *Examination* starts a controversy that lasts four years and involves four texts: in addition to the two already mentioned, the debate also includes Gioja's *Risposta agli Ostrogoti* 'Answer to the Ostrogoths' (1827) and the *Galateo de'letterati* 'Writers' galateo' (1828) by Rosmini, in which he combines dialectic with politeness, thus offering a precious treatise concerned, not only with politeness, but also with ethics and anthropology.[2]

In order to study this historical debate we firstly refer to Marcelo Dascal's chapter *Understanding controversies* (2003, pp. 280–292) in which he underlies the dialectic as well as the argumentative and meta dimension of the controversies. We believe that these dimensions can be deeply explored by the instruments of the argumentative analysis (Van Eemeren, Grootendorst, 2004; Rigotti, Greco, 2019, 2010), and the historical (im)politeness studies (Eeelen, 2001; Watts, 2003, 2005). This interdisciplinary approach is very relevant in a controversy such as this in which, indeed, the controversialists justify their opinions using several arguments and also judge interlocutor's behavior.

After a theoretical premise, in which we show the relevance of our interdisciplinary approach and provide the necessary tools (Section 2), we historically contextualize the controversy (3.1) and then we analyze it by reconstructing the implicit premises that sustain some of the main arguments defended by the disputants (3.2 and 3.3). As the analysis shows, it is possible to discover the anthropological and ideological principles that sustain two author's opinions.

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thesis, her study of French XVIII century rhetoric books confirms that the logical-dialectical component of the "topics" does disappear from the tradition.

2. Theoretical premise

2.1 Controversies and argumentation

In a dialectical perspective such as the one exposed by Van Eemeren and Grootendorst (2004) argumentation arises from the attempt of solving differences of opinion. But what are the features that separate a controversy from an ordinary argument?

According to Dascal a controversy arises in front of a complex problem: "[…] an actual controversy is never a matter of a *single* difference of opinion on *any* issue" (2003, p. 281). For this reason, he continues, a controversy rarely lands in one disputant's favor, on the contrary, "the positions rather tend to become increasingly *polarized* and *entrenched* and the controversy perpetuates itself in *sustained* debate, ever more *encompassing*" (2003, p. 281). But, to whom is a controversy addressed? Who judges its outcome? Although a controversy involves apparently only two parties, Dascal points out that it is necessary to consider also a third party, that is the "learned public". In fact, it is the public that determines who wins – this figure corresponds to what in Aristotle's *Rhetoric* is called *krités*, i.e. the judge who decides to adhere to a proposal only after having sieved the reasons in favor and the reasons against a certain standpoint (see Van Rees, Rigotti, 2011). For this reason Dascal proposes to treat controversies not as dialogue but rather as "quasi-dialogue", because "behind each 'regular', opponent-driven pragmatic constraint, there is a further constraint […] audience-driven" (2003, p. 290). Far from being a "disembodied Court of Reason" (2003, p. 289) the learned public is both sensitive and rational. Thus, it is essential that a controversy preserves an argumentative structure so that a party is not allowed to distort the other's position freely. To this purpose Pragmadialectical ideal model elaborates a series of rules (Van Eeemeren, Grootendorst, 2004, pp. 59–62) that are necessary in order to reasonably solve the difference of opinion.

In addition to showing the complexity of controversies and their public dimension, Dascal talks also about the object of the dispute. Interestingly, in a controversy arguments do not only focus on the ultimate object of disagreement but also on the way to conduct the debate: "contenders diverge not only regarding 'content', but also about how to interpret each other's claims, about what is substantive and what is just 'rhetorical', about what is to count as a good argument and about the method of solving the dispute", for this reason, he concludes, controversies "spill over to meta-issues as the above" (2003, p. 281). To borrow a distinction from Pragmadialectics, in controversies disagreement is both material and procedural.

2.2 Argumentation analysis: Analytical overview and inferential configuration

In order to critically evaluate an argumentative discourse it is necessary to interpret it, and it is possible only if the discourse has been made explicit and transparent. Pragmadialectics uses the term *reconstruction* (Van Eemeren et. al., 1993) to refer to the analysis of the "deep structure" of the discourse or text, according to which it is possible to establish the standpoint that is argued for in the discourse, and what utterances in the text are presented as arguments. Since the arguments are mostly complex it is necessary to working out how its components fit together in supporting the standpoint: we can distinguish between *subordinative* argumentation (where the argument is in turn the standpoint of another argument and will be indicated as 1.1;1.1.1; 1.1.1.n), *multiple* argumentation (in which the premises supporting the standpoint are taken to be independently relevant for supporting it and will be indicated as 1.1; 1.2; 1.n) and *compound* argumentation (in which the premises supporting the standpoint are intended to be relevant only if taken jointly and will be indicated as 1.1.a; 1.1.b; 1.1.n) (see Van Eemeren, Grootendorst 1992, pp. 73–89; Snoeck Henckemans, 1992). Finally, we need to know how premises are taken to be inferentially relevant for the conclusion.

To this regard we refer to the AMT (*Argumentum Model of Topics*) model elaborated by Rigotti and Greco Morasso (Rigotti, Greco Morasso, 2019, 2010) which represents the inferential configuration of an argument expressed in ordinary discourse. The model combines a procedural component with a material one. The procedural starting point is based on the semantic-ontological structure, which generates the inferential connection (represented by the *locus*) from which the logical form of the argument is derived; each locus, in turn, gives rise to a series of inferential connections called *maxims*. The material starting point integrates into the argument scheme the implicit and explicit premises bound to the contextual common ground, where the premises are both general, and often implicit (*endoxa*), and factual (*datum*).

This analysis offers the necessary instruments to evaluate the correctness and appropriateness of the argumentative structure in a controversy, which is, according to Dascal, necessary to avoid that "controversialists do not enjoy an unrestrained freedom in distorting each other's positions" (2003, p. 290). Argumentative analysis is relevant in a controversy such as this because it allows to evaluate the efficacy of the logic that sustains disputant's argumentations and to better understand the strategy adopted, as well as to provide precious insights on the worldview, the social and intellectual habits underlying the texts of the two authors.

2.3   The meta dimension of a controversy and its relationship with politeness

According to Dascal, contenders rarely diverge on the content but rather on the way in which the dispute is presented by the counterpart. Thus, we can affirm that controversies present a polite dimension: the recent studies on historical (im)politeness (Eelen, 2001; Watts, 2003, 2005), indeed, argues for the necessity to investigate comments on (im)politeness rather than (im)polite formulas (as proposed by the previous model of Brown, Levinson, 1978). Watts, in particular, studies politeness from the point of view of the speakers' evaluations, i.e. the metapragmatic comments, which focus on the way in which the interlocutors perceive the communication.

Caffi underlies the reflexivity's feature of the language, that is the "possibility that speakers have of communicating on the communication they are engaged" (1998, p. 584). She suggests to consider metapragmatics as emblematic of a communication between two individuals: the meta- is the capacity to look critically at themselves, it "determines that space in which the other's perspective can be accepted" (1998, p. 585). Thus, to adhere to the other's perspective should not be automatic: "metapragmatics specializes in the control of the argumentative conditions and strategies, lending itself easily to becoming a critical instrument of fundamental importance in digging up and highlighting the underlying presuppositions as well as the different kinds of unsaid" (1998, p. 585).

In our controversy, the two disputants, and particularly Rosmini who shall act as accusers, constantly judge, criticize the other's perspective. The study of these judgments from an argumentative point of view allow us to bring to light the reasons that justify an evaluation which has very often to deal with politeness.

3.   The controversy between Gioja and Rosmini about fashion

3.1   The development of the conflict

The controversy arises from Rosmini's criticism of the *Apology of Fashion* contained in the *New Galateo*, a conduct book published in four different versions (1802, 1820, 1822, 1827)[3] in which Gioja intends to supplant the old aristocratic politeness model based on a conventional ceremonial with an alternative model based on *ragione sociale* 'social reason' and *civilizzazione* 'civilization': "l'uomo naturalmente rozzo, personale, semi-barbaro, si dirozza, si umanizza, ingentilisce sotto l'influsso della *ragione sociale*. […] *La civilizzazione consiste dunque nelle*

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3. Rosmini refers to the 1822 edition: his library in Stresa, Italy, contains the third edition of the Galateo with numerous marginal notes made by Rosmini himself.

vittorie che ottengono i principii della ragione sociale sugli impulsi disordinati della natura" ('the human being, inherently rough, selfish, semi-barbarian, is smoothened, humanized, refined under the influence of *social reason*. […] *Civilization therefore consists in the victory of social reason over disorganized natural instincts*', Gioja, p. 4).[4] According to Gioja, social reason is the capacity to seek the affection and esteem of others and it is an expedient for acquiring services, honors, public esteem as well as religious rewards.

This utilitarian view, influenced by the French ideologues (such as Condillac and Cabanis) and the Jeremy Bentham's utilitarianism (see Sciacca 1948, pp. 132–133; Ghiringhelli, 1990; Sofia, 1990; Botteri, 1990; Tasca, 2004; Vanni, 2006), equally dominates the chapter about fashion. In order to defend fashion from the XVIII century critics whom he calls *pedanti* 'pedantics' (1822, p. 133), who accuse fashion of causing moral corruption (see Carnino, 2014, pp. 97–152), Gioja stresses the economic benefits generated by fashion. The main argument that sustains the whole apology is, in fact, that fashion benefits the economy because it creates work: as a result, the poor can obtain work instead of having to ask for a handout. Although this was not a new idea (in England Mandeville was the first one to write an apology of luxury in his *Fable of the Bees*, alongside Pietro Verri and Cesare Beccaria in Italy, see Carnino, 2014, pp. 49–96) Rosmini specifically targets Gioja's apology. A probable reason is that his criticism on the *Apology of Fashion* is an excuse to criticize the ideology that permeates the entire *New Galateo*, where ethics was reduced to economy, as we can see in this scathing satire of Gioja's views, which Rosmini produces in the last text that shapes this controversy:

> […] l'individuo può allor calcolare sicuramente fino a qual segno s'accresca la somma de' suoi piaceri coll'aumento degli altrui dolori, e quando gli sia lecito d'essere umano senza scapito della vivezza de' piaceri suoi, e quando le angosce altrui, cominciando a diventar inutili al maggior grado di sua voluttà, sieno proibite dalla nuova morale de' sensi […].
>
> '[…] the individual can then calculate confidently up to what point the amount of pleasures increases in proportion to the increase of the displeasure of others, and when he is allowed to be human without damaging the intensity of his own pleasures, and when someone else' anguishes, as they start to become useless in furthering his gratification, are prohibited by the new moral of the senses […].'
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> (1828, p. 108)[5]

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4. We consider the 1822 edition ed. by Pirotta. All translations are ours. We are thankful to Annick Paternoster for reviewing the translations and checking the language of the manuscript.

5. For both Rosmini's *Examination* (1824) and *Writers' galateo* (1828) we consider the 1997 edition ed. by M. A. Raschini.

According to Piovani Rosmini uses Gioja "as a means to fight the opinions of his time" (1997, p. 56, our translation); his criticism, indeed, is not restricted to the *Apology of Fashion* and the *New Galateo*: Rosmini also writes two books against Gioja's *Nuovo prospetto delle scienze economiche* 'New Outlook on the Economic Sciences' (1815–1817). He senses the danger of a popularization of sensism, as Giordano observes: "no other Italian representative of Sensism and Enlightenment has advanced such an articulated, successful, popular, and therefore such a dangerously misleading proposal before, besides Melchiorre Gioja" (1976, p. 122, our translation). The *New Galateo*, in fact, addresses young people, who represent, according to Rosmini, "the group that is easiest to catch with sophisms and epigrams" (1828, p. 91). In the *Examination*, in particular, Rosmini makes a series of critical "observations" about the arguments used by Gioja in defense of fashion. He draws attention on a number of paragraphs containing what he calls "rushed conclusions and errors of thinking" (1824, p. 29), listing more than forty mistakes.

The controversy causes an incensed reaction by the author of the *New Galateo* who replies with the *Answer to the Ostrogoths* – the "Ostrogoths" being a Nineteenth-Century commonplace to label the adversaries of civilization. In turn, Rosmini answers with the *Writers' galateo*, a treatise on polite literary communication and discussion in which he wants to "attingere a questa fonte tutti gli esempi de' vizi che offendono l'urbanità e la letteraria gentilezza" ('draw from this source [the Answer to the Ostrogoths] all the examples of the vices that offend urbanity and literary politeness'). His aim is to "raccorli […] in questo piccol trattato, ove i letterati veder possano, quasi in un quadro, quelle sconvenevolezze che loro è bisogno sfuggire per non parer forse […] e scabri e selvaggi" ('collect them […] in this little treatise, where scholars can see, as if in a painting, those improprieties that they must avoid in order not to appear […] rude and savage', Rosmini, 1828, p. 95). This treatise is not limited to exposing Gioja's errors, but addresses the function of public discussion in a learned society and proposes an "ethic of the civil writer", as Raschini said (1997, p. 13). It is, in many ways, a manual about the 'improprieties' authors should avoid when criticizing their fellow writers, and as such it points to critical discussion as a central issue for Rosmini's anthropology. As befits a proper controversy, this diatribe is complex as it concerns not just fashion, nor politeness but rather the foundation of fashion and good manners and the proper means of public debate. Thus, our analysis aims to show both the procedural (in 3.2) and material aspect (in 3.3) of this controversy. Rosmini's confutation, in particular, focuses both on the material falsity of Gioja's opinions as well as on his unsound inferential procedures and on his impolite manner of debating.

3.2   The first part of the controversy: Rosmini dissecting the *Apology of Fashion*

In this section we intend to repeat the "logic exercise" performed by Rosmini, that is we will verify if the "apologist" failed to defend fashion properly, as the philosopher argues (1828, p. 169). Already in the *Examination* Rosmini mainly focuses on the analysis of Gioja's reasoning, rather than on the conclusions, as the author stresses in the preface of his text: "le conclusioni poco c'importeranno: tutto l'esame cadrà sul valore delle prove colle quali quelle si pretendono di sostenere" ('we do not care much about the conclusions: the entire examination will focus on the value of the proofs with which they are supposedly supported', 1824, p. 29). From this declaration it follows that Rosmini's aim is to attack Gioja's argumentative procedure, as well as his material ideological premises, rather than his central conclusions: in fact, he never advances an opposite standpoint such as 'fashion is cause of corruption'. This is why, also locally, at the micro level, we will pay attention to the proper target of Rosmini's refutation, checking whether he is rebutting Gioja's standpoint or rather intent on striking down the supporting arguments.

3.2.1   *Gioja's* Apology of Fashion *and Rosmini's confutation*

The thematic structure of the *Apology of Fashion* and the *Examination* can be summarized as follows:

I section:	arguments in favor of fashion and its variations;
II section:	arguments in favor of fashion from an economic point of view;
III section:	arguments in favor of fashion from a moral point of view.

Figure 1. Structure of the *Apology of Fashion*

Observations I–V:	confutation of the arguments from work;
Observations VI–XIII:	confutation of the arguments from corruption and available capital;
Observations XIV–XX:	confutation of the arguments from the corruption of the savages;
Observations XXI–XXIV:	confutation of the arguments from the nature of love;
Observations XXV–XLIV:	confutation of the arguments from the corruption of love.

Figure 2. Structure of the *Examination of Melchiorre Gioja's Opinions in favor of fashion*

It should be noted that Rosmini only addresses sections II and III of Gioja's *Apology*. From the economic point of view, Gioja advances two different

arguments (in examples 1 and 2), which sustain the implicit standpoint "the whims of fashion are good".

(1)   I capricci della moda […] guarentiscono costanti mezzi di sussistenza di persone bisognose […]. Dunque i capricci della moda danno valore a materie che resterebbero inutili; per esempio, il consumo dell'ambra che succedeva in Roma indusse alcuni popoli germanici a raccorla sulle sponde del mare e ricevere in cambio […] l'oro dei Romani; dunque il lusso de' Romani […] dando valore a cose che sarebbero rimaste inutili, somministrava loro un mezzo di guadagno.

'The whims of fashion […] guarantee constant means of support for people in need […]. Thus the whims of fashion give value to materials that would otherwise remain worthless; for example, Rome's demand for amber has led several German peoples to pick it up from the shores of the sea and receive […] Roman gold in return; thus Roman luxury […] gave value to materials that would have remained worthless and provided them with a means to make money'.   (Gioja, 1822, p. 129)

The argumentative reconstruction of (1) can be represented by Figure (3).
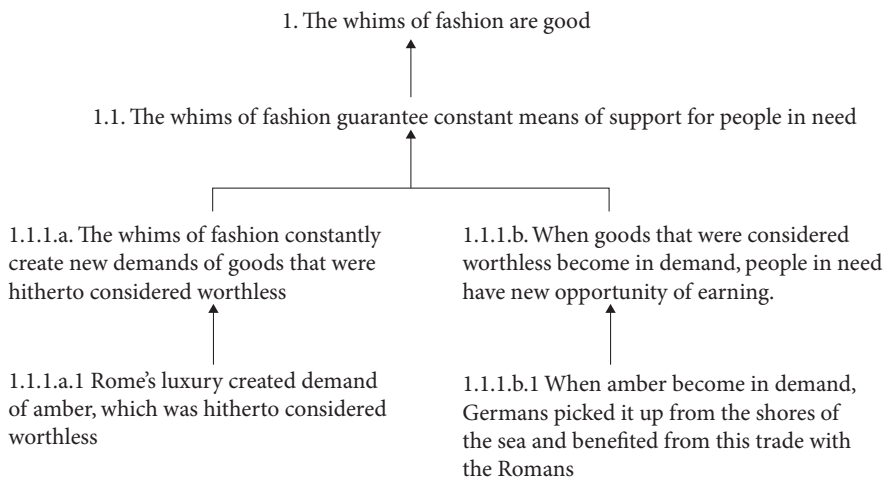
Figure 3. Argumentative reconstruction of Example (1)

Gioja's argumentation is based on the "locus from the instrumental cause" which is strictly connected with the locus from the final cause (goal and instrument are, in fact, constituents of an action).

The whims of fashion represent a source of income for people in need because they give value to materials that would have remained worthless (1.1.1.a) thus providing them with a job, as the historical example shows. This reasoning hides a maxim like the one introduced for the first time by the philosopher Boethius:

"cuius usus bonus est, ipsum bonum est". If we focus on the interpretation of '*ipsum*' as 'means', it can be reformulated as "if the outcome or the purpose is good, the means is too". Adopting the AMT model we can reconstruct the implicit premises of Gioja's argumentation in this way:

Endoxon:	that those in need can earn money is a good outcome
Datum:	the whims of fashion are a means for those in need to earn money
Maxim:	if the outcome is good, the means is too
First conclusion/minor premise:	the whims of fashion are a means to achieve a good outcome
Conclusion:	the whims of fashion are a good means

Rosmini's confutation reveals the ambiguity of the maxim which is likely to be a fair interpretation of the proverb "the end justifies the means" (see Rigotti, 2008, p. 569). In the fifth observation of his *Examination* he takes this line of reasoning to the extreme by saying that, if we follow Gioja's argumentation "we should commend drunkenness too because it makes innkeepers rich" (Rosmini, 1824, p. 35), that is, all the means that allow to earn money are good. This maxim is ambiguous because it presupposes the existence of a class of morally neutral resources (but actually Gioja's means are not neutral). By destroying the maxim the conclusion is refuted too.

Rosmini shows the ambiguity of the relationship between goals and means/action also in the second argumentation advanced by Gioja:

(2)   I capricci della moda sono il mezzo per cui […] il ricco alimenta il povero non a titolo di limosina, ma di lavoro. […] Un abito che presenta l'apparenza della novità è tosto ricercato dalle persone più ricche, e diviene l'oggetto delle brame di quelle che lo sono meno. […] gli artisti imitano con materie meno costose […] la prima foggia […] e per conseguenza ne decade il prezzo. Decadendo il prezzo diviene proporzionato alle finanze delle persone povere, le quali per ciò vengono messe a parte di piaceri, da cui senza le variazioni della moda resterebbero escluse. La moda, […] eccita nella massa popolare la voglia di parteciparvi; quindi diviene pungentissimo stimolo contro la naturale inerzia.
'The whims of fashion are the means by which […] the rich help the poor by supplying them with a work instead of a handout. […] A dress with the outward appearance of newness quickly becomes sought-after by the richest people, and it becomes the object of desire in people who are less rich. […] the artists imitate the original model with less expensive materials […] and therefore its price drops. With the price getting lower, the dress becomes proportionate to the financial resources of the poor, who, therefore, can take

part in pleasures from which, without the changes in fashion, they would remain excluded. Fashion, […] fuels in the masses a desire to take part in it, thus becoming a biting incentive against natural inactivity',

(Gioja, 1822, pp. 129–131)

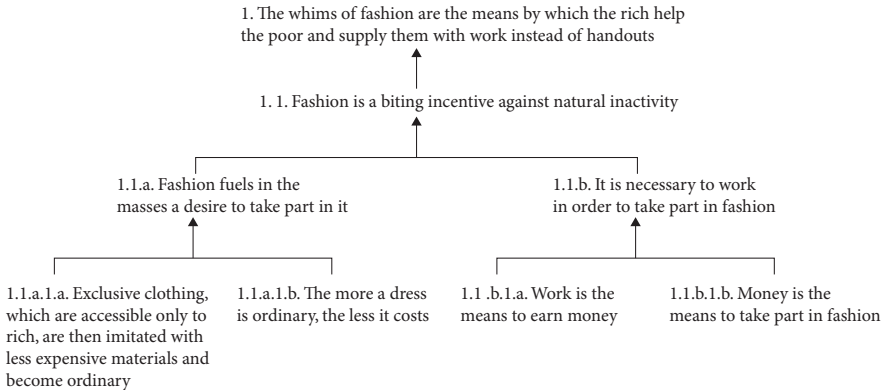The argumentative reconstruction of (2) can be represented by Figure (4).

Figure 4. Argumentative reconstruction of Example (2)

This argumentation is based on the "locus from final cause" because it shows the relationship between the goal (the desire to take part in fashion) and the action necessary to realize it (the work): according to Gioja it is fashion that fuels the poor man's desire to work. In order to describe the locus from final cause, Rigotti explains it with the "ontology of action" (2008, p. 565), according to which a subject, who desires to achieve a goal, activates a causal chain that allows him/her to realize this purpose. Rosmini's confutation is addressed to two different points:

a. He firstly refutes the datum: with the sentence "we should observe human nature rather than imagine it" (1824, p. 33) he accuses Gioja of ignoring the reality. In fact, he argues, the poor are impatient and lazy; in order to make them work it is not sufficient to increase the desire for what they are deprived of because it is not the obstacle itself that provides the energy to overcome the obstacle. He concludes that the poors' inactivity can only be overcome by 'moral means': "quanto voi renderete l'uomo più morale, tanto più egli acquisterà la coscienza della propria attività e in ragione di questa coscienza egli sarà laborioso" ('the more you make man moral, the more he will be aware of his activity and because of this awareness he will become laborious', 1824, p. 33).

b. Then Rosmini makes a concessive representation of the point of view of the antagonist (see Rigotti, Rocci 2006, pp. 18–19, and Rocci, 2017, p. 396) using the concessive connector *quando anche*, 'even if': "[i.] quando anche la moda rendesse l'uomo più desideroso di ottenere il frutto del lavoro, [ii.] non ne

verrebbe che lo rendesse più laborioso" ('[i.] even if fashion would make the individual more keen on achieving the result of his work, [ii.] it would not follow that fashion would make him more laborious', 1824, p. 103). Where [i.] is a concessive representation of the point of view of the protagonist (Gioja) which represents, in turn, the *datum*; [ii.] represents the point of view of the antagonist (Rosmini) and leads to a different conclusion. Rosmini argues his sentence by affirming that "l'uomo non è conseguente con se stesso" ('man is not logically consistent', 1824, p. 33); this idea is also explained by Rigotti who points to the complicate nature of decision making:

> The possible presence in the causal chain of subservient instrumental actions and the quality of their ends and of their possible side effects turn the action into a complex and hardly manageable process, in which the human subject intensively "negotiates" the realization of its purpose with the surrounding context.
>
> (2008, p. 565)

Both Rosmini's confutations show a partial use of logic in Gioja: Gioja poses an erroneous relationship between means and goals, and he is guilty of a partial knowledge of human nature.

From the moral point of view Gioja advances the following argument:

(3)   L'amore è di sua natura esclusivo […]. Aumento di affezioni amorose è dunque uguale a diminuzione di godimenti comuni. Ora in generale le affezioni amorose crescono in ragione della bellezza. Quindi i popoli più laidi sono i più dissoluti.
'Love, by its nature, is exclusive […]. An increase in love is proportionate to a decrease in communal enjoyment. Now, in general love increases in reason of [i.e. in proportion to] beauty. Thus, the ugliest peoples are the most dissolute.'   (Gioja, 1822, p. 135)

With a coordinative argumentation, Gioja affirms that "the ugliest peoples are the most dissolute", which is, in turn, an argument of an implicit standpoint such as "fashion is not the cause of corruption":

1. The ugliest peoples are the most dissolute

1.1.a. Love increases in reason of [i.e. in proportion to] beauty

1.1.b. An increase in love is proportionate to a decrease in communal enjoyment

1.1.1.b. Love, by its nature, is exclusive
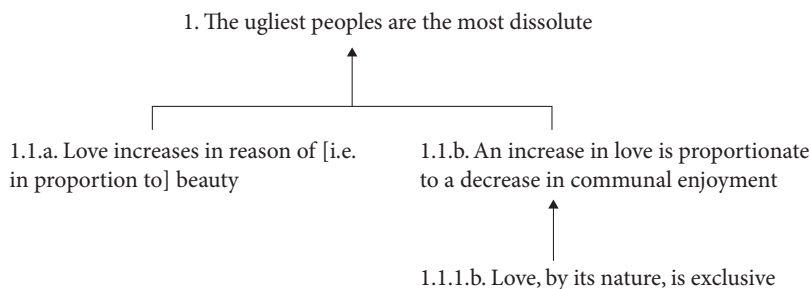
Figure 5. Argumentative reconstruction of Example (3)

Rosmini's confutation focuses on the argument 1.1.b. In particular, in Observations XXII and XXIII, he claims that two different consequences of the principle posed by Gioja should be inferred:

a. First consequence: firstly he introduces a concessive proposition: "[i.] se l'affezione amorosa crescesse in una sola persona, [ii.] questa rapirebbe a sè […] l'oggetto dell'amore; e [iii.] quindi diverebbe questo più proprio" ('[i.] if love would increase in one single person [ii.] this person would grab for himself […] the object of his love; [iii.] thus this would become more exclusive', 1824, p. 65). Rosmini shows that Gioja's conclusion [iii.] is possible only if the datum changes [i.]. The second proposition, indeed, which is introduced by a 'but', shows that, if we maintain Gioja's datum the logic conclusion must be different: "[…] ma crescendo le affezioni in tutti, egualmente cresce in tutti il desiderio dell'oggetto, e però la prima conseguenza del principio posto sarebbe, che l'aumento generale delle affezioni amorose corrisponde ad aumento di gelosia […]." ('[…] but when affections increase in everybody, then everybody's desire for the object increases in equal measure too, and therefore the first consequence of the principle would be that the general increase in love corresponds to an increase in jealousy', 1824, p. 65). By changing the datum, Rosmini infers a conclusion that is opposite to Gioja's: an increase in love is proportional to an increase in jealousy.

b. Second consequence: Rosmini observes that "quanto sono maggiori le affezioni amorose, tanto [è] più necessario, ma insieme più difficile l'osservarsi una regola e un ordine nelle medesime" ('the more affections increase, the more it is necessary, but at the same time more difficult, to maintain rule and order in them', 1824, p. 66). He then explains from where this order may arise: "crescendo le affezioni amorose, bisogna che cresca la virtù o la forza morale, perchè i godimenti si rendano meno comuni e più propri" ('if love increases, it is necessary that virtue and moral strength increase too, so that enjoyments become less communal and more exclusive' 1824, p. 66).

To sum up, if we reconsider Gioja's conclusion:

> The increase in love is proportionate to the decrease of communal enjoyment

As the analysis has shown, Rosmini's confutation leads him to change both the first and the second part of Gioja's proposition in this way:

a. An increase in love is proportionate <u>to an increase in jealousy</u>
b. <u>An increase in virtue and moral strength</u> is proportionate to a decrease in communal enjoyment

3.2.2   *Gioja's* Answer to the Ostrogoths

Gioja, who writes a *Galateo* grounded in reason, takes offence at Rosmini's confutation according to which his *Apology of Fashion* is full of logical mistakes. However, Gioja's reply is unable to deny Rosmini's judgment. The *Answer to the Ostrogoths*, indeed, is a direct attack on his antagonist – as the titles of the first and the second section show: *menzogne* 'lies', and *errori* 'mistakes' – rather than a reasonable confutation. Without exploring the contents of the *Answer*, it is worth noting that Gioja replies only to two confutations advanced by Rosmini: the accusation of having partially defend fashion and the accusation of ignoring savage people. Gioja answers to the first accusation by blaming Rosmini of telling lies – but actually his confutation is based on arguments taken from other chapters in the *New Galateo* -, he answers to the second accusation by listing historical examples (taken from Jewish history, Ancient Greece and Rome), the veracity of which is mostly doubtful, as Rosmini in his *Writers' galateo* shows.

Gioja's partial answer leads Rosmini to accuse Gioja of being a sophist: "stogliere l'attenzione de' leggitori dal punto principale della quistione dove si sente la propria deficienza, e richiamarla sopra un accessorio dove si crede d'aver ragione, affermando francamente che quest'accessorio è il punto principale: ecco il sofista" ('to draw the attention of the reader away from the fundamental issue where he feels he is deficient, and to draw it to a secondary issue where he thinks he is right, whilst bluntly stating that this secondary issue is the fundamental one: there you have the sophist', Rosmini, 1828, p. 105). This judgment announces the theme of the fourth and final text of this controversy in which Rosmini focuses his attention on the way in which a polite writer should behave in a public debate, thus lifting the discussion to the meta level.

3.3   The second part of the controversy: The meta level and the public dimension

Rosmini presents his *Writers' galateo* as a 'public' book – rather than a private treatise such as Giovanni Della Casa's *Galateo* (1558) (1828, p. 185) –, that is, addressed to a public audience. The *Writers' galateo*, indeed, is a meta comment regarding the public discussion between Rosmini and Gioja: indignant at the aggressive answer of his opponent, the philosopher recognizes the need for urgency in judging the impolite behavior of those writers who, in a public discussion, put their private interest before the public one, where, indeed, we can see "il piccolo ambizioso abusare dell'ingegno a trovar qualche artificio rettorico […] qualche vigliacca ingiuria di cui affliggere l'avversario, intenebrare il vero, ingannare il pubblico" ('the insignificant ambitious writer who abuses of his intelligence in order to find some rhetorical artifice […] some coward offence with which to trouble the

adversary, darken the truth, cheat the public', 1828, p. 90). Rosmini, however, is far from writing that such a behavior damages the antagonist (Rosmini himself in this case), rather, he stresses the fact that it damages especially the public, which is, according to Dascal, the one who judges. Following Rosmini we can represent the communicative situation as Figure (6): the author has to be polite to his adversary, to the public and also to himself (see also Saltamacchia, Rocci 2018: 143).
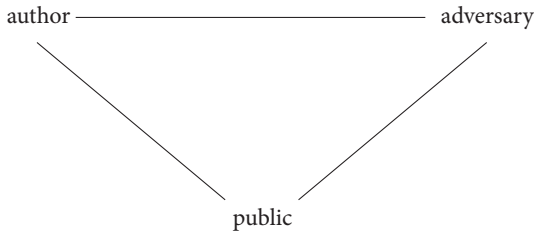

Figure 6. Representation 1 of Rosmini's communicative situation

Furthermore, Rosmini clarifies the role of the public: in regards to Gioja's excuse of not replying, in his *Answer to the Ostrogoths*, to Rosmini's more complex confutations because his [Gioja] audience is composed of young people (unable to understand such complex discourses); Rosmini replies that young people should not be considered as judges, but rather as *discepoli* 'pupils', since the book aims at educating them. Thus, he concludes, the authors should rather address the *savio pubblico* 'learned public' (1828, p. 111) – interestingly, Rosmini uses the same adjective as Dascal (see 2.1). Rosmini's clarification leads us to do a further representation of the communicative situation (in Figure 7, where young people does not correspond to the adversary but to the addressee):
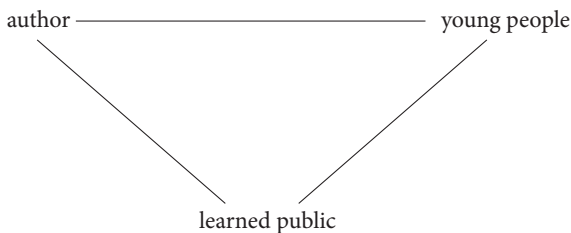
Figure 7. Representation 2 of Rosmini's communicative situation

In the *Writers' galateo*, Rosmini wants to show the improprieties that the writer should avoid in order not to be impolite to his adversary, to the public and to himself. More precisely, he does not simply speak about politeness but rather about the argumentative foundation of politeness. In this perspective the argumentation approach is relevant because it allows to show the inferential principles that sustain Rosmini's evaluations. However, argumentation is relevant at another level:

Rosmini himself speaks about *sofisma* 'sophism' and *sconvenienza* 'improperty' which is synonymous with fallacy, a term which is adopted from argumentation studies. Although Rosmini did not know these modern studies (nevertheless he did know Aristotle's fallacies of the *De sophisticis elenchis*), these fallacies correspond to the ones that occur in the *Writers' galateo*: according to Pragmadialectics, indeed, fallacies correspond to a violation of any of the rules of the critical discussion that can make the resolution of conflict more difficult, or may even obstruct it (Van Eemeren, Grootendorst, 2004, p. 162). We analyze some of these fallacies in Section 3.3.1.

3.3.1   *The* Writers' galateo: *Pars destruens and pars costruens*

The *Writers' galateo* consists of a *pars destruens* (chapters I-IV) in which the philosopher analyses numerous 'improprieties' of form and content in Gioja, and of a shorter *pars construens*, containing a series of rules for critical discussion (Figure 8).

CHAPTER I: Occasion of the book

CHAPTER II: Improprieties in the forms in which ideas are presented

    1. Signs of anger. 2. Simulated docility, 3. Injuries, 4. Groundless assertions. 5. Foolishness demonstration, 6. Beastly nature, 7. Putting books together mechanically, 8. Flattering the audience. 9. Lies and impostures: (a) shortening of passages. (b) concealment of passages, (c) malicious placement of the antagonist's words, (d) sly interpretation, (e) plain lies, 10. 'Dirty' speech. 11. Irreligious speech

CHAPTER III: Improprieties in the accessory to the main argument

    1. Induce worries against the antagonist, 2. Commonplaces. 3. Disgust for high metaphysics, 4. Accusation of hating civilization, 5. False ideas about civilization, 6. Contusion of civilization with progress. 7. Wrong distinction between civilization and politeness. 8. False ideas about civilization and politeness's progress

CHAPTER IV: Improprieties in dealing with the main argument 1. Ignoring the dignity of literature, 2. Considering things from one si> authority. 6. Interest's principle

CHAPTER V: Galateo's general principles

Figure 8. Structure of the *Writers' galateo*

The first example comes from II.1:

> (4)   L'officio del letterato […] esclude essenzialmente ogni turbazion d'ira: perciocché […] lo scriver de' libri altro non sia che un grave e un permanente ragionare ad utilità degli uomini. Laonde nojosi e molesti

al pubblico riescono quegli scrittori che incontamente che vengano contraddetti, danno segni di grave dolore, e imbizzarriscono contro il loro avversario; discuoprendo così inavvedutamente agli occhi del pubblico una spiacevole deformità e debolezza in sé medesimi; […] e dandosi a credere di dover tenere a bada il mondo di questo loro privato dolore d'essere contraddetti, mentre pur non dovrebbergli parlar d'altro che de' suoi grandi interessi […].

'The writer's task essentially rules out all motions of anger because writing books is nothing other than a permanent and serious arguing for the sake of being useful to humanity. For this reason, writers who show great resentment the moment they are contradicted, and angrily criticize their adversary, are annoying and harmful to the public. This way, they inadvertently unveil before the eyes of the public an unpleasant deformity and weakness in themselves; […] and it seems that they are more interested in holding back the world with their private pain of being contradicted, when in fact all they should talk about is the world's broader interests'.

(Rosmini, 1828, p. 98)

This example shows the aim of a writer in a critical discussion: to speak about the common good. The communication involves all the three participants of the communicative situation: the writer (I), who angrily criticizes his adversary (II), is actually harming the public (III). As Figure 9 shows, the evaluative terms (which correspond to the standpoint) are "annoying and harmful"; Rosmini's argumentation, in particular, is based on the *locus from the final cause* because it shows the aim of a critical, polite discussion which accounts as the common good.
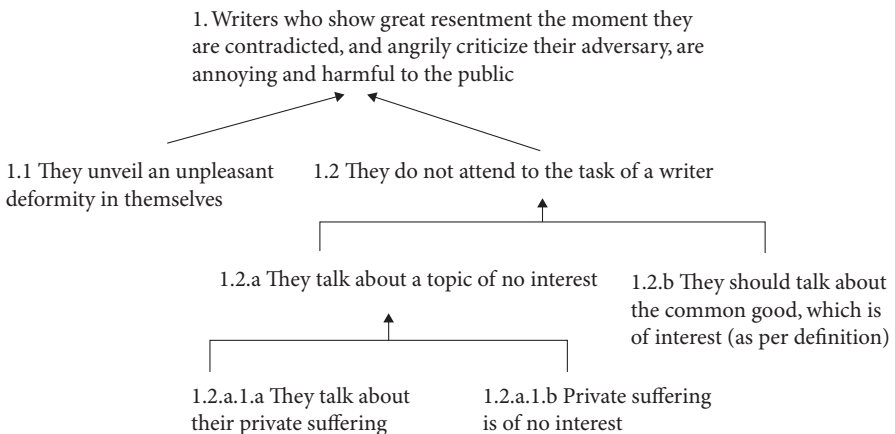
Figure 9. Argumentative representation of Example (4)

In the paragraph that follows Example (4) we find this 'impropery':

(5)   Lo scrittore del *Nuovo Galateo* con queste parole annunzia di essere stato impugnato: « *Venne in mente* all'autore delle *Memorie di religione, di morale e di letteratura* […] di farvi *voluminosa* confutazione »: e quel « voluminosa », quel solo « Venne in mente » basterebbe a svelare lo sdegno ch'egli ne prese; perciocché […] sembra significare che le idee dell'avversario non sieno da alcun vigore d'intelligenza governate […].

'The writer of the *New Galateo* uses the following words to announce that he has been contested: « The author of the *Religious, Moral and Literary Memories* [i.e. Rosmini] conceived the idea to write a *bulky* refutation »: and this « bulky », this « he conceived the idea » would be sufficient to show his anger; he seems to indicate indeed that his antagonist's ideas are not supported by any kind of intellectual vigour'.   (1828, p. 98)

Rosmini observes that Gioja personally attacks his interlocutor by showing the reader the unreliability of Rosmini's assertions. (5) shows a violation of the *freedom rule* according to which a party must not call into question a standpoint or deny the other party the right to advance or to criticize a certain standpoint. Violations such as these, which are directed at the opponent personally, are aimed at eliminating the other party and can be realized, for example, by discrediting their integrity or credibility (*argumentum ad hominem*). Here, the fallacy is linked to politeness: the civil scholar should avoid offences because they expose him as a vindictive person who is arrogant to the readers.

  Example (6) comes from II.4:

(6)   Proprie di uomo illetterato e incivile sono le affermazioni gratuite […] contro l'avversario; e da quelli che fanno professione di lettere si hanno per offese: perciocché dimostrano gran baldanza di animo, e un voler imperare colla sola autorità, e avere il pubblico in conto di così poco ragionevole. […] Questo peccato contro il *Galateo de'letterati* lo commette l'autor nostro frequentemente, dicendo, […], senza dimostrazione. « Il mio avversario trabocca d'errori », ovvero: « Egli è infinitamente inferiore all'argomento ch'egli tolse a discutere ».

'Typical of an uneducated and impolite writer are groundless assertions against the adversary: these are considered offences by the civil writer. In fact groundless assertions reveal utter boldness of the mind and the will to prevail with sheer authority. They also reveal that the writer considers his public hardly reasonable […]. Our author commits these errors against the *Galateo de'letterati* when he says, without providing any demonstration, « my antagonist overflows with mistakes », that is: « he is infinitely inferior to the argument that he decided to discuss »'.   (1828, pp. 101–102)

(6) shows that a polite writer should esteem his audience and expose his thought reasonably. The evaluative terms, related to impoliteness, are 'uneducated and impolite writer' and they refer to the public. As Figure 10 shows, this example is based on a *genus-species* relation: groundless assertions are, indeed, a subspecies of offences:
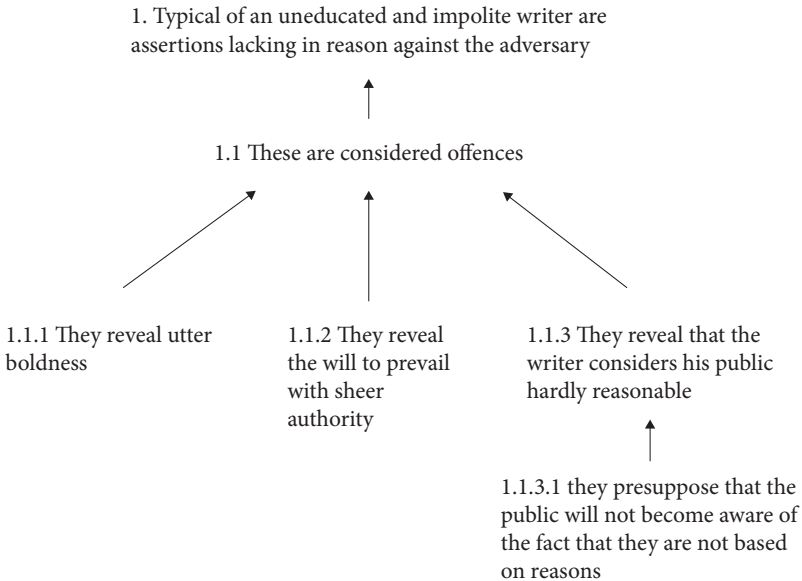

1. Typical of an uneducated and impolite writer are assertions lacking in reason against the adversary

1.1 These are considered offences

1.1.1 They reveal utter boldness

1.1.2 They reveal the will to prevail with sheer authority

1.1.3 They reveal that the writer considers his public hardly reasonable

1.1.3.1 they presuppose that the public will not become aware of the fact that they are not based on reasons

Figure 10. Argumentative representation of Example (6)

(6), moreover, shows the fallacy of the *argumentum ad verecundiam* because Gioja appeals to authority without demonstration: by denying a premise representing a common starting point, the antagonist denies the protagonist an opportunity to defend the standpoint.

Example (7) shows the violation of the *standpoint rule*, which can be violated when the antagonist or the protagonist imputes a fictitious standpoint to the other party or distorts the other party's standpoint. This is the case of the *straw man* fallacy that is, according to Dascal, the easier way to win a dispute: "if your adversary has a fairly good argument, which you *must* defeat in order to win, why not represent his argument as less good than it actually is, i.e. why not *misrepresent* it? Straw men are easier to defeat" (2003, p. 288).

(7)   Il dissimulare i luoghi forti dell'avversario, e particolarmente quelli ov'egli mette ne' propri termini la sua sentenza, e le assegna il senso chiaro e quasi evidente, è pure uno de' molti tranelli che i letterati incivili usar sogliono, […], cioè di ragionare a sproposito, e inveire contro un errore calunniosamente inventato.

> 'To conceal the antagonist's strong passages, and in particular those where he presents his point in his own terms providing a clear, almost evident, meaning, is one of the many tricks used by impolite writers [...]: they argue irrelevantly and denounce a mistake that is invented in order to defame the author'.   (1828, p. 124)

In addition to showing a case of the fallacy of the strawman, (7) is also a case of *wrenching from context* (Walton, Macagno, 2010) i.e., the extrapolation of a sentence or word from its context in order to suggest a different meaning, which is attributed to the arguer and then used to discredit his viewpoint.

The analysis of the metapragmatic comments and the fallacies shows the anthropological principles of the two authors: an utilitarian principle oriented to pleasure for Gioja and a charity principle joined to the truth for Rosmini. These considerations bring us to the final and constructive part of this small treatise where Rosmini lays down the principles that guide polite debate in the public spheres:

1. Present truth, beauty, virtue;
2. Posses truth, beauty, virtue;
3. Be benevolent to the reader and treat him as if he were a friend (1828, p. 194)

These principles are informed by an overarching principle of love towards the audience: according to Rosmini benevolence and love are fundamental for a civil public discussion.

4.   The non-conclusion of the controversy

In December 1828, when the *Writers' galateo* is published, Gioja is seriously ill and he surely has not been aware of Rosmini's answer, as claimed by Donati (1949, p. 72) (he dies a few days later, on the 2nd of January 1829). Since the controversy is interrupted by a natural event, it becomes very hard to answer the question of: who wins? Gioja's death does not allow us to know if and how he would have replied to Rosmini. On the one hand, following Raschini (1997, p. 25) we can consider the *Writers' galateo* as the ideal conclusion of this conflict because it is a testimony to the kindness and the understanding of human nature – Rosmini himself, we would like to add, is a testimony to kindness and benevolence: as soon as he becomes aware of Gioja's retraction (in which he regrets some mistakes he had made in his life) the philosopher tries everything he can to publish it, but in vain. On the other hand we can conclude with Dascal (2003, p. 281) that this conflict offers a clear example of *non solution* of a controversy, in which the positions tend to become "polarized". Both antagonists cling to their point of view, which, on the contrary, becomes increasingly "entrenched".

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CHAPTER 9

Husserl's phenomenology of inner time-consciousness and enactivism

The harmonizing argument

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In this article, I single out the characteristics of a polemical type of argument that I dub "the harmonizing argument". Contenders that use the harmonizing argument aim to persuade their audience that it is possible to harmonize two opposed positions. My case study is the enactivists' attempt to naturalize Husserl's phenomenology of inner time-consciousness. I first present Husserl's account of time-consciousness. I clarify why absolute subjectivity cannot be naturalized. I continue by interpreting the enactivists' attempt to naturalizes absolute subjectivity as exemplifying the harmonizing argument. I present the limitations of this attempt, and I conclude by pointing out the possible positive epistemic results of using this type of argument.

Keywords: harmonizing argument, enactivism, subjectivity, first-person perspective, prereflective self-awareness

1. Introduction

At the end of the 20th century, consciousness reemerged as a central theme in philosophy, in the cognitive sciences, and neuroscience. The current research of consciousness involves interdisciplinary activities. Enactivism is a current interdisciplinary research program that combines Husserlian phenomenology and the biological and neuroscientific study of the mind. The attempt to naturalize Husserlian phenomenology constitutes an essential part of this interdisciplinary research program.

Husserl explicitly denied that it is possible to naturalize phenomenology. According to Husserl (1983, p. 59), the epoché – the methodological step that constitutes phenomenology as a unique scientific enterprise – brackets all real involvement with the empirical world. In Husserl's view, phenomenology is not

concerned with empirical objects and states of affairs *qua real*, but rather with the *intentional relation* between experiences, objects and states of affairs.

The intentional structures of consciousness that phenomenology singles out are therefore completely different from the properties and relations studied by the empirical sciences. […] the synthesis of consciousness is completely different from the external combinations of natural elements… instead of spatial mutual externality, spatial intermingling and interpenetration, and spatial totality, it pertains to the essence of conscious life to contain an intentional intertwining, motivation, mutual implication by meaning, and this in a way which in its form and principle has no analogue at all in the physical (Husserl 1977: 26).

In several places, Husserl does indeed claim that phenomenology's ontological standpoint is neutral with respect to the metaphysical character of the entities it deals with. Nevertheless, in his view, one cannot identify the essential characteristics of consciousness with natural properties and the natural relations that entities bear to each other. This includes human beings qua natural entities.

Varela (1997) and Thompson (2007), the two leading enactivists, are aware of Husserl's reasons for claiming that phenomenology cannot be naturalized. They nevertheless believe that some recent developments in biology and neurophysiology provide reasons for claiming that it is possible to naturalize Husserlian phenomenology. One part of Varela (1997) and Thompson (2007) attempt to naturalize phenomenology consists in their "triple-braided" type of scientific explanation. This type of explanation consists of phenomenological, biological, and dynamical levels that are mutually irreducible to one another. Nevertheless, the relation between them is not merely that of structural isomorphism. In particular, the phenomenological investigation does not merely parallel the biological or neuro-physiological explanation. As Thompson notes (2007: 358), one of the main characteristics of the enactivists' methodological approach that singles it out as a unique scientific approach to the study of the mind is the claim that there are *mutual explanatory relations* between biology and phenomenology. Enactivists accept the presumption that guides the phenomenological investigations that the *first-person perspective* is an inherent feature of conscious mental states. As Thompson notes (2007, p. 358), the phenomenological account is required to explain why certain biological processes are realizations of selfhood and subjectivity. Yet they also presume that the realization of selfhood and subjectivity must be equivalent to the realization of certain biological entities and neurophysiological properties and relations. In other words, biology and the neurosciences are required *to explain how* subjectivity and selfhood are realized.

Husserl did indeed deny that the natural sciences could explain the phenomenological structures responsible for subjectivity and selfhood. Yet, according to Varela and Thompson, Husserl thought that it is not possible to naturalize

phenomenology because he did not possess the theoretical means available to the neuro-phenomenologist, namely, non-linear dynamical models. As we shall see below, at least one of Husserl's main reasons for denying that it is possible to naturalize consciousness consists in his account of the consciousness of time. Nevertheless, Thompson (2007, Chapter 11) believes that dynamical neuroscience *can* naturalize time-consciousness.

2.   Discussion and controversy

The above characterization of the differences between Husserl's phenomenology and the enactivists' approach to the mind seems to portray the differences manifested in the exchanges between these two positions as possessing the features of a *discussion* in Dascal's (1998) quasi-technical use of the term.[1] Supporters of the enactivists' position seem to believe that they can *resolve* the differences between their version of naturalized phenomenology and Husserl's anti-naturalist stance by pointing out what they believe is Husserl's omission. In their view, Husserl opposed naturalism because he did not have the relevant mathematical and biological theories at his disposal.[2] Nevertheless, my main claim here is that the conflict between the enactivists that attempt to naturalize Husserlian phenomenology and the supporters of Husserl's anti-naturalist view has the features of an implicit *controversy* in the quasi-technical sense of the term used by Dascal. It is a conflict between radically opposed positions that cannot be resolved merely by pointing out omissions or mistakes in the opponent's views, but is rather an exchange in which one aims to *persuade* the audience by using *arguments*.

Varela and Thompson do not explicitly acknowledge that this is the nature of the confrontation between naturalized phenomenology and Husserlian phenomenology. Nevertheless, I suggest that their latent awareness of the nature of this confrontation is indicated by the use they make of a polemical argument that I dub "the harmonizing argument".

My main intention here is to shed light on some of the main features of the harmonizing argument. I will do that by examining Varela and Thompson's attempt to naturalize Husserl's account of time-consciousness.

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1. For a discussion of this point, see Senderowicz 2010: 37–39. See also Senderowicz 2005, 2008, 2014.

2. As Dascal notes (1998), the idea that it is possible to solve a conflict between two positions is typical of discussions.

3.   The harmonizing argument

The harmonizing argument is motivated by the attempt to *integrate* radically op-posed views that share a *common theme* by harmonizing them. Let A be the po-sition the arguer supports and B the position she wishes to harmonize with A. One feature of the harmonizing argument is the explicit acknowledgment by the contender of the *significance* of B's *core theses*. Let *V* be the set of B's core theses, let *V'* be the subset of *V* that includes the theses of B that *are compatible* with A's core theses, and let *V"* be a subset of *V* that includes the theses of B that *are in-compatible* with A's core theses. Say that supporters of B have reasons to claim that *V" should be* included in *V* because they have reasons to claim that the theses in-cluded in *V"* are implied by other theses included in *V*. Contenders who support A *wish to endorse V' without endorsing V"*. The harmonizing argument they use aims to persuade the relevant audience that this is possible. It does not aim to override B, for the contenders conceive themselves as agents who wish to develop and to continue B. It rather aims to resolve the conflict between A and B by *diminishing the significance of* the theses included in *V"* by eliminating them and by underscor-ing the significance of *V'*.

The harmonizing argument involves statements that represent the source of the conflict between A and B as an *omission* or a *mistake* that could be com-pletely solved or filled in ways that allow one to *unify* A and B. Nevertheless, the presentation of the conflict as allowing a solution by pointing out mistakes or omissions on the opponent's side is, I suggest, a *rhetorical* move. Again, the goal of the harmonizing argument is to defuse or to diminish the significance of the theses included in *V"*.

The harmonizing argument may include subarguments. The subarguments used by the supporters of naturalized phenomenology that I will examine here can be roughly described as follows. Say that A stands for enactivism and B for Husserl's original views. Contenders that support B believe that a given type of phenomenon *PH* requires one to endorse a thesis T" that is incompatible with A. In order to convince the audience that it is possible to reject T", supporters of A may use an implicit distinction between two features of the entities included in *PH*, F_1 and F_2, and try to persuade their audience that:

a. F_1 is more significant than F_2.
b.   T' (that is compatible with A) could explain F_1.
c.   T" (that is incompatible with A) is not required to explain F_1.

The goal of this subargument is to persuade the relevant audience that it is pos-sible to *leave out* F_2. Usually, when an harmonizing argument is used this goal *is not explicitly stated*, but is rather implied by what is explicitly stated. The fact that

T' coheres with the rest of the theses of A supposedly provides support for leaving out F_2. In other words, this subargument aims to persuade its audience that it is possible to jettison the intractable features responsible for the conflict between A and B and to contribute in this way to the main goal of the harmonizing argument, which is to unify the two conflicting positions.

In what follows, I provide an interpretation of an argument that is part of Varela's and Thompson's attempt to harmonize enactivism and Husserlian phenomenology. This argument addresses Husserl's account of the phenomenology of inner time-consciousness. On the one hand, it emphasizes the significance of the main theses that are part of Husserl's account of time-consciousness. Nevertheless, the argument also aims to *diminish* the significance of what, according to Husserl, must be a feature of the most basic level of time-consciousness – *absolute subjectivity*. In Husserl's view, absolute subjectivity involves a basic feature that one cannot correlate with any objective fact – the immediate first-person awareness of the passage of time, of the "streaming" of consciousness. This claim manifestly conflicts with the attempt to naturalize Husserlian phenomenology.

The enactivists' argument I examine below begins with the explicit acceptance of Husserl's absolute subjectivity and by underscoring its importance for a comprehensive scientific account of time-consciousness. It aims to naturalize Husserlian phenomenology by persuading the relevant audience that it is possible to identify absolute subjectivity with features of dynamical self-organizing systems. Nevertheless, in what follows, I provide reasons for claiming that the relation between the two positions is more complex. The implicit part of the enactivists' argument, which must be added to his account of the way in which the relevant scientific discoveries can be used to naturalize phenomenology, consists in an attempt to leave out the main feature of time-consciousness that naturalized phenomenology cannot explain.

I begin with a brief sketch of Husserl's phenomenology of time-consciousness. I then state my reasons for claiming that the enactivists' attempt to naturalize it involves an attempt to leave out a significant feature of time-consciousness that cannot be naturalized. In Sections 4–6, I present the outline of Husserl's account of inner time-consciousness. In Sections 7–11, I analyze Thompson's harmonizing argument that aims to naturalize Husserl's account of time-consciousness. In Section 12, I conclude by examining the sense in which the harmonizing argument could have positive scientific results.

4.   The intentional approach to the specious present

As Husserl notes, every conscious phenomenon is temporally extended – it has *duration*. The *perception* of a moving body or an enduring object, hearing a melody, or thinking a thought have temporal duration. When I see the opening of the door or the movement of a friend's hand greeting me, I see it as *a present* occurrence. The perception of it has a duration, and it therefore must include successive phases. Nevertheless, these phases are together part of the conscious perception of the moving object. Since the earlier phase of the perceived movement and its latter phase could not be, strictly speaking, *simultaneous*, it seems natural to suppose that the earlier and later phases of a perceived temporal object or event are not really present together. William James (1952, p. 398) dubbed this aspect of conscious phenomena "the specious present".

Husserl's theory of time consciousness aims to explain the nature of the specious present. As he notes (1991, pp. 16–20), the awareness of temporal duration cannot be based, as Brentano thought, on an act of the imagination. It also cannot be considered as a type of episodic memory. Indeed, in Husserl's view, the claim that the specious present involves memory is not entirely misguided, but the concept of episodic memory qua type of *re*-presentation of past events is inadequate for an explanation of the specious present. According to Husserl, there is a *phenomenological difference* between, say, my current remembering of my arrival in NY yesterday, and my awareness of the beginning of a current perceptual event, which must be part of experiencing it as an ongoing process whose earlier phases constantly fade away and are replaced by new phases. The earlier and the later phases form together the temporally extended experience. They are both part of the awareness of a temporally extended continuous process. By contrast, I do not experience my memory of landing in NY on a given day in the past as being part of the continuous awareness of an enduring process that is occurring "now". As Husserl realized, one must correlate this difference with an appropriate cognitive capacity.

As Gallagher notes (1998), several attempts to explain the specious present involve the cognitive paradox. The supposition that the consciousness of duration is durationless seems to imply this paradox. Theories of time consciousness, according to which the temporally extended experience is constituted by an actually present momentary phase and imaginary phases (that are qualitatively identical to those that were experienced "just now" and are no longer "really present") seem to involve this paradox. For according to these theories, the temporal extension of the conscious awareness of duration is momentary or durationless, even if the intended temporal object presented in the experience has a duration.

As Gallagher (1998) notes, Husserl's theory avoids the cognitive paradox by characterizing time consciousness as an intentional structure. As Husserl notes in *Logical Investigation* (2001, p. 98), the intentional relation to an object is not a type of real relation. It is neither a real relation between a subject and a real object nor a real relation between a subject and an "inner" mental object. This aspect of Husserl's account of an intentional relation to an object is particularly relevant to the perception of time. The experience of duration includes parts that are intentionally related to phases that are not actual without requiring one to posit ersatz "inner" objects and states of affairs.

Husserl's account of time-consciousness is therefore a type of a representational theory. Each experience has a real phase of a "really present" state and multilayered past and future phases that are only intentionally meant – parts that are not "really present", neither as real phases nor as (reproduced) imaginary phases.

5.   Temporal objects and temporal experiences

According to Husserl, the experience that relates a subject to a temporal object is itself temporal. This is one of his most important insights. He distinguishes between two dimensions of temporal experiences: the temporality of the meant object and the temporality of the experience. According to Husserl (1991, p. 89), each experience contains three phases: retention, primal impression, and protention. Primal impression is the phase of the temporal experience that intends a state of an object or a process as being "really present". Retention and protention are the phases of the temporal experience that intend the past and future temporal stages of objects and states of affairs. Retention is the presentation of the just-elapsed stages of the experience *as* the just-elapsed stages, while protention is the presentation of the open horizon of what is about to come that includes the presentation of anticipated phases of the experience. Each conscious experience *must* contain the three phases of the temporal experience. This means that, from a mereological viewpoint, retention, primal impression, and protention are *dependent parts* of the temporally extended experience.

Say that the experience is listening to a melody, which is Husserl's favorite example. As Husserl notes, it is not possible to be perceptually directed to an object by means of primal impression, if the "now" phase of the melody is not connected to presentations of the tones that were "just heard" and to anticipated future phases of the experience of listening that are about to occur. Each of these modes has its unique characteristics. Nevertheless, each experience of a temporal object must include *together* phases of retention, primal impression, and protention

Primal impression, retention, and protention are temporal modes of *intending* an object. Indeed, a significant advantage of Husserl's account is its ability to represent the multilayered *intentional structure* of time consciousness. As Husserl points out, when one hears the third tone of the melody, one does not merely retain the first and the second tones. One also retains one's *retention* of the first tone that was in the past linked to one's *sensing* of the second tone. Similarly, one retains one's previous anticipation – the *protention* – that was in the past liked to the primal impression of the second tone.

It is not difficult to see, that the retention of the previous retentions and previous protentions, which constitutes the temporal modification of the experiences, is crucial for the subject to be able *to be conscious* of a temporal object or temporal process *qua temporal*. When one experiences the third tone of the melody, one is not merely conscious of the *temporal relation* between the first and the second tones. A crucial feature of the conscious perception of the melody consists in the experience of what was once "now" as being "pushed back" to the past.

Husserl's diagrams of temporal experience
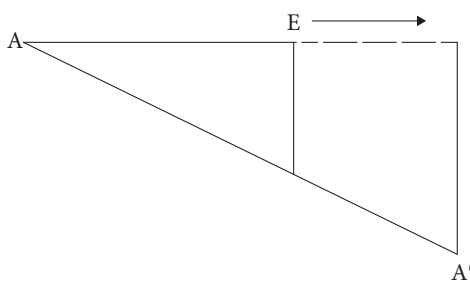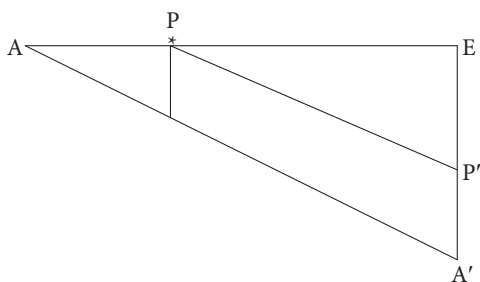
A-E The series of now-points.
A-A′ – Sinking into the past.
E-A′ Continuum of phases (now points with horizon of the past).
E → the series of nows, perhaps filled with other objects.   (Husserl 1991: 29)

Husserl's diagrams of temporal experience depict this multilayered structure of the temporal experience:

These diagrams represent both the temporal dimension of the intended *object* of the experience and the temporal dimension of the *experiences*. The horizontal line represents the temporal stages of the intended temporal object while the vertical line represents the conscious experience in which temporal object is given.

6.   Absolute subjectivity

So far, I have addressed two dimensions of temporal experiences, namely, the intended temporal object and the temporal structure of the experience that presents it. However, Husserl considers another more basic dimension of the experience of time. In Husserl's view, the perception of a melody is constituted not solely by the conscious awareness of the temporal object and by the retention-primal impression-protention structure of the experience. It also involves the *immediate* first-person awareness of the continuous *transition* "in" consciousness from momentary states of consciousness to other momentary states. According to Husserl (1991, pp. 77–80; 1991, p. 84), this *is a generic* feature of time consciousness that is constituted by a *self-unifying* act that he metaphorically describes as "the streaming of consciousness". Husserl dubbed this level of time-consciousness "absolute subjectivity".

Husserl's account of absolute subjectivity has at least the following four features:

1.   Absolute subjectivity consists of the immediate awareness of a "now," which is so to speak constantly "there".
2.   It is a *self-unifying* act that constitutes its own continual *unity* – the unity of the retained past phases, the currently occurring experiences, and the anticipated ones.
3.   It is a generic feature of the experience of time that concerns all temporal objects and all temporal processes.
4.   It involves the immediate first-person awareness of the *continuous transition* "in" consciousness from what was previously "now" to a new "now".

According to Husserl, absolute subjectivity – the most basic level of time-consciousness that underlies this theory as a whole – is not something in *objective time*:

> This flow is something we speak of *in conformity with what is constituted*, but it is not "something in objective time". "It is *absolute subjectivity* and has the absolute properties of something to be designated *metaphorically* as "flow"; of something

> that originates in the point of actuality, in the primal source point, "the now," and
> so on. In the actuality-experience we have the primal source-point and a continu-
> ity of moments of reverberation. For all of this we lack names. (Husserl 1991: 79)

The fact that the most basic level of time-consciousness does not designate some-
thing in objective time clarifies why Husserl thought that phenomenology cannot
be naturalized. Since every intentional experience involves the consciousness of
time, every experience involves a basic aspect that cannot be identified with an
objective (natural) fact.

Why does Husserl think that the awareness of the flow of time is a *subjective*
feature of temporal experience that has no objective correlate? I can only partly
answer this question here. Husserl accepts Saint Augustine's presumption that the
direct encounter with temporal objects is limited to momentary states.[3] However,
the immediate first-person awareness of the transition "in" consciousness from
one state to another state is not a momentary state. It is necessarily the awareness
together of the retained phases, the impression phase, and the protention phase in
their *continuous flow.* The specious present is not a "knife edge" (to use William
James's term), it has a dimension – a length that combines retention with primal
impression and protention. Nevertheless, the time-consciousness is not constitut-
ed merely by space-like stretches of particular temporal presentations of tempo-
ral objects and temporal processes. The immediate first-person awareness of the
continuous transition "in" consciousness – the self-unifying flow of momentary
states – must involve the immediate awareness *of a before and after together in their
constant flow*. Since what is literally given in primal impression are mere momen-
tary states, this aspect of temporal awareness cannot be based on what is given in
primal impression, and it cannot also be based merely on the conception of time-
consciousness as possessing a length.

One could have argued at this point that the fact that the "togetherness" in-
volved in the awareness of the streaming of consciousness cannot originate from
primal impression does not entail that it does not represent an *objective feature*
of temporal reality. Yet here one should note that the awareness of the passage of
time is, according to Husserl, a *generic* feature of time-consciousness that *applies*
to *all* temporal experiences independently of their *particular* characteristics. The
difficulty to identify absolute subjectivity with an objective feature of temporal
reality does not consist merely in the fact that this level of temporal experience
cannot originate from what is literally "given". It rather results from the fact that
what is given are always particular states, while absolute subjectivity qua the im-
mediate first-person awareness of the streaming of consciousness equally applies

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3. See, Saint Augustine 1961, Chapter 11. Husserl begins his lectures on internal time con-
sciousness by paying tribute to Augustine's views.

to *any* particular experience. It cannot therefore consist merely in a mereological sum of particular experiences, but is, rather, a unique *phenomenological fact* that constitutes the *subjective* aspect of time-consciousness and not an objective feature of temporal objects and objective time.

Husserl has another reason for claiming that absolute subjectivity cannot be something in objective time. According to Husserl (1991, p. 78) the first-person awareness of the streaming of consciousness seems to be a kind of *change*. Nevertheless, it does not have the basic characteristics of an objective change. More specifically, the conscious awareness of an objective change involves the awareness of an object that *endures* while it changes; the change could be fast or slow, and so forth. However, these features are not applicable to the awareness of the streaming of consciousness. One cannot depict it as a change of an *enduring object*. Presentations of particular transcendent objects that endure must be indeed part of time-consciousness. The particular experiences by means of which these objects are presented to subjects are also the objects of possible reflective acts. Nevertheless, the immediate awareness of the streaming of consciousness – a generic feature of temporal experience – cannot merely be based on the particular (transcendent) temporal objects and the particular temporal structure of particular (immanent) temporal experiences.

As Husserl notes, although the awareness of the streaming of consciousness seems to be a kind of change, no object is the subject of this change:

> […] we necessarily find a flow of continuous "change"; and this change has the absurd character that it flows precisely as it flows and can flow neither "faster" nor "slower." If that is the case, then any object that changes is missing here; and since "something" runs its course in every process, no process is in question.
>
> (Husserl 1991: 78)

When I am conscious of the movement of my friend's hand, the transcendent object of the experience is the movement of my friend's hand. However, I experience it by being immediately aware of the transition from one state to another state. Although I am conscious of my friend's hand as an *enduring object*, the immediate first person awareness together of momentary states in their continuous transition "in" consciousness – from momentary states to momentary states – does not involve an *additional* objective feature over and above the enduring transcendent object and the temporal experience in which it is given.

In Husserl's view, one can express this basic level of time-consciousness only metaphorically, presumably because literal meanings must express objects and objective states of affairs.

7.   The main two steps of the enactivists' harmonizing argument

Varela and Thompson seem to accept that time-consciousness has almost all the features that Husserl assigned it. Moreover, according to Thompson:

> […] time-consciousness is supposed to be an acid test of the neurophenom-enological enterprise, we need to see whether phenomenological accounts of the structure of time-consciousness and neuro-dynamical accounts of the brain processes relevant to consciousness can be related to each other in a mutually illuminating way. This task is precisely the one Varela undertakes in his neuro-phenomenology of time-consciousness and in his experimental research on the neurodynamics of consciousness.   (p 329)

According to Thompson, this task includes the main features of absolute subjectivity:

> We can see, if we look closely and carefully enough (adhering to the epoché and phenomenological reduction), a flowing or streaming belonging to our con-sciousness that is distinct from the objects or contents of consciousness, that is, from whatever our experience is about or directed toward, whether in the objec-tive and transcendent world, or the subjective and immanent sphere of our own intentional acts and experiences.   (Thompson 2007: 324)

Naturalizing absolute subjectivity is presumably one of the most difficult tasks that the enactivist faces.

Varela and Thompson presumably realize that Husserl's account of absolute subjectivity is not compatible with their naturalized version of phenomenology, but they do not explicitly state these differences. Their argument intends to de-fuse the differences between their version of naturalized phenomenology and Husserl's anti-naturalist view regarding the consciousness of time. This rhetorical argument – a crucial step in their overall harmonizing argument – aims to mini-mize the significance of the differences between enactivism and Husserl's original account by means of two steps. As I will attempt to demonstrate, this argument has the structure of the subargument discussed in Section 3. The first step of the argument consists of an *implicit distinction* between the features of Husserl's ab-solute subjectivity. The first class of characteristics includes (1)–(3) and the sec-ond class includes (4) and related characteristics. The second step emphasizes the significance of characteristics (1)–(3) and minimizes the significance of (4) either by ignoring it, or by presenting it as *corollary* of (1)–(3). The third step consists of a neurophysiological dynamical account of characteristics (1)–(3) of Husserl's absolute subjectivity.

The first step of this subargument is not an explicit step, but is rather implied by what the enactivists say. The second step is an exegetical step. It consists of

Varela's (1999) *interpretation* of Husserl's texts that aims to set a bridge between Husserl's account of time consciousness and the enactivist position. It does this by emphasizing the significance of characteristics (1)–(3) and by *explaining away* the fact that a natural account of these characteristics in fact leaves out the feature that, in Husserl's view, cannot be part of objective time. In what follows I primarily examine Thompson's argument.

8.   Prereflective self-awareness

The first horn of Thompson's exegetical step characterizes the structure of time-consciousness as *prereflective self-awareness*. Prereflective awareness is a one-level type of awareness. High-order theories depict conscious states as differing from the states that make them conscious. These theories depict the state of, say, pain as differing from the state that makes it a *conscious* pain.[4] By contrast, the one-level type of a theory denies that an account of a conscious state requires one to distinguish between two separate mental states: the conscious state and the state in virtue of which *another state* becomes conscious.

One notorious argument that seems to support the one-level structure of consciousness is *the regress argument*. According to this argument, higher-order theories are open to the threat of infinite regress. It seems that if a mental state M' is a conscious state only due to another different state M", M" itself could be a conscious state only due to a different state M"', and so forth. What one presupposes here is that if a given state M' renders another state M" conscious, M' itself must be conscious.

Some supporters of higher-order theories, for example, Rosenthal (1998), are aware of the threat of an infinite regress. However, in their view, the higher-order account is not open to the threat of an infinite regress, if one is willing to accept that a state M" in virtue of which another state M' is conscious must *itself be* a conscious state. Nevertheless, it seems that this response is ineffective regarding time-consciousness. For it seems that the grounds of time-consciousness must themselves be conscious. Clearly, the conscious awareness of a *temporal object* involves the implicit awareness of the *experience* of the temporal object *and* of the *flow*. These aspects of time-consciousness seem to constitute one unified whole.

Interestingly, the question of whether Husserl identified time-consciousness with prereflective self-awareness is the main point in a recent exegetical debate about Husserl's views. According to Brough (1972, 1991, 2010) and Sokolowski

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4. For two different examples of high order theories' see Armstrong (1998) and Rosenthal (1998).

(1974, 2000), time-consciousness involves three distinct levels of consciousness: the transcendent temporal object, the immanent temporal experience that intends a temporal object, and the level that makes conscious the temporal experience itself. By contrast, Zahavi denies that time-consciousness involves more than two levels of consciousness. One of Zahavi's (2005, Chapter 1) main reasons for this is the regress argument. As he notes, the claim that Husserl's theory involves three levels of time-consciousness seems to open it to the threat of an infinite regress. Yet, Husserl struggled with this threat throughout his life. [5]

Thompson accepts Zahavi's view according to which time-consciousness consist in prereflective self-awareness. This is not the only aspect of Zahavi's interpretation that he endorses. According to Thompson:

> […] our being conscious of external temporal phenomena entails that our temporally enduring experiences of those phenomena are self-aware. Inner time-consciousness is thus nothing other than prereflective self-awareness.
>
> If we understand inner time-consciousness this way, then what becomes of the absolute consciousness or absolute flow? How does it fit into this account?
>
> In answering this question, we arrive at the following fundamental idea: "The absolute flow of experiencing simply is the prereflective *self-manifestation* of our experiences" (Zahavi 2003b: 69).   (Thompson 2007: 328, my italics)

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5. Zahavi's interpretation does indeed constitute a significant exegetical development in the attempt to clarify Husserl's views. Nevertheless, it is not clear whether the interpretation of Husserl's absolute subjectivity as involving prereflective awareness facilitates the attempt to *naturalize* it. There seems to be reasons to claim that one could characterize absolute subjectivity as prereflective awareness and that it nevertheless constitutes a subjective feature of temporal experience that has no objective correlate. This possibility seems to be implied from what Brough says (2010) in his last contribution to the debate.

It should be stressed that Zahavi did not appeal to the notion of prereflective self-awareness within an attempt to naturalize time-consciousness but rather to clarify the nature of self-consciousness. As he notes (2011: 15), his main concern in his interpretation of Husserl's phenomenology of inner time-consciousness in *Self-awareness and Alterity* (Zahavi 1999) was not temporality *per se* but rather "what we might learn about the nature of self-consciousness through a study of Husserl's investigations of time consciousness". In his recent contribution to the debate, Brough (2010) seems to accept the claim that we enjoy a non-objectifying awareness of our experiences while guarding the distinction between the levels of consciousness. As Zahavi notes (2011: 18), it now seems that according to Brough "[…] experiencing (another term for the absolute time constituting flow of consciousness) is not an act with an intentional object, it is not an experience alongside others, but a primal, implicit, non-objectifying form of self-awareness". But depicting absolute subjectivity as a non-objectifying form of self-awareness does not in any sense rule out the differences between absolute subjectivity and the other levels of temporal awareness. Rather, it emphasizes the uniqueness of its *subjective* character (See also Zahavi 2003a, Zahavi 2004, Zahavi 2010)).

The identification of the *subjective* character of temporal experience with the *self-manifestation* of experiences seems to fit the goal of naturalizing time-consciousness. The attempt to naturalize time-consciousness must correlate it with some biological or neurophysiological properties. This seems to be possible if the difference between the subjective character of temporal experience and its objective correlate is merely the difference between *two perspectives* on the *same topic*. The notion of self-manifestation seems to allow characterizing the difference between the subjective character of temporal experience and its objective correlate in this manner. Temporal experience is an intentional structure that consists of an intentional relation to objective temporal objects and states of affairs. If the *subjective* character of temporal experience consists merely in the self-manifestation of its *content*, it is possible to claim that its temporal character qua *experience* is merely a *representational* (intentional) structure that represents the temporal properties of its (transcendent) *object*. If a naturalized account of the intentional (objective) content of temporal experiences can be provided – as suggested by the enactivists – this interpretation of Husserl's views seems to allow the identification of time-consciousness with some objective states of affairs.

9.   The living present

In Husserl's view, absolute subjectivity is the most basic layer of time-consciousness, and it has "no place" in objective time. As claimed in Section 6, the streaming of consciousness is not relevant to the objective content of particular temporal experiences or to the correlation between the objective temporal content of particular experiences and the temporal character of the experience. This feature of time-consciousness cannot merely be grasped by noting the necessary relation between the objective content of the experience and its temporal character qua experience. Varela and Thompson support this claim. In their view, there is indeed such a layer of time-consciousness that is revealed by Husserl's account. According to Thompson, the structure of temporal experience parallels the character of the absolute flow. Nevertheless,

> The absolute flow is *the standing streaming living present*. On the one hand, the living present is streaming because it is the continuous transformation (intentional modification) of the about-to-happen into the happening into the just-happened. On the other hand, the living present is standing, because the threefold structure of protention-primal impression-retention that constitutes the streaming is always present and unchanging.

> The crucial point now is that this description of the absolute flow or stand-ing-streaming living present also applies precisely to prereflective self-awareness. Prerflective self-awareness is streaming because it is constitutive of the streaming or flowing experiences themselves, *not a pure and empty awareness that appears on its own*. By the same token, it is standing because it is an *ever-present and un-changing* feature of consciousness. (Thompson, 2007: 328, my italics)

The awareness of the flowing of time is not possible without the continuous trans-formation of the about-to-happen into the happening and into the just-happened. Yet we experience the living present "as standing" or "unchanging". Clearly, one cannot explain this unchanging feature of the temporal character of experiences by means of its *intentional object*. Indeed, according to Thompson, this unchang-ing character is equivalent to the *unchanging structure* of all temporal experi-ences – the retention-primal impression-protention structure. In other words, ac-cording to this account, absolute subjectivity is *the prereflective self-awareness of the retention-primal impression-protention structure*.

To sum up, the exegetical step of Thompson's harmonizing argument charac-terizes temporal experiences as prereflective self-awareness. It identifies time-con-sciousness with the self-manifestation of experiences, and identifies the experi-ence of a living present with the retention-primal impression-protention structure of temporal experiences.

10. Absolute subjectivity and non-linear dynamical systems

Thompson's second step aims to provide a neurophysiological account of the re-alization of absolute subjectivity. Following Varela (1999), Thompson (Thompson 2007, p. 337) claims that it is possible to identify the standing living (streaming) present with the *self-organizing* character of *dynamical biological systems*.[6] This feature of the temporal mind is related to time-consciousness *as a whole* and not merely to the ways in which particular experiences represent particular temporal objects and states of affairs.[7] This theory was unknown to Husserl. In Varela and Thompson's view, adding dynamical neurophysiology to the phenomenological account allows one to naturalize Husserlian phenomenology by remaining faithful to Husserl's account.

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6. For a discussion of this point, see Gallagher and Zahavi, 2008, Chapter 4.

7. Cf. Varela 1999: 289.

11. Is it possible to naturalize Husserlian phenomenology?

As noted above, users of a harmonizing argument usually *do not* single out the radical differences between the position they advocate and the view they wish to replace by merging it with their own position. Their rhetorical goal is to persuade their audience that their position is a *rational development* of the view they wish to replace by integrating it with their own view. They present their position as what results from solving problems detected in the original view, or as being able to *fill gaps* in it by means of *new* information and new scientific discoveries. One can reveal the fact that this is a *misdescription* of the relation between the original (opponent) position and the proponent's position – that what is at stake is a harmonizing argument – if one can point out that some significant theses that are part of the original position are left out or explained away by the proponent's argument. This is what can be shown in the present case.

On the face of it, it seems that self-organizing dynamical systems could be correlated with at least some aspects of the self-unifying character of time-consciousness and with some aspects of the (standing) living present. This may suffice to claim that the immediate first-person awareness of the streaming of consciousness supervenes on the self-organizing character of dynamical systems discussed by dynamical neurophysiology or that this type of first-person awareness emerges from it. But the immediate first-person *awareness of the transition* "in" consciousness cannot be identified with the self-organizing character of dynamical systems. For the content of this sort of awareness cannot consist merely in the *unity* that results from a self-unifying activity of dynamical systems. Rather, it is an *awareness of unity – the immediate* awareness *together of a "now," of the "before," and the "after" in the constant process of "becoming" that unifies them*. Varela and Thompson's do indeed emphasize the self-unifying character of temporal experience in their account of it as a "living present", but they present the *streaming* of consciousness – the awareness of the transition – as being a mere *corollary* of these characteristics.[8]

As noted before, the immediate first-person awareness of the transition "in" consciousness, from momentary states of consciousness to momentary states of consciousness, is a generic feature of time-consciousness that cannot be *reductively explained* by pointing out the content of particular temporal experiences. It is indeed not possible to be immediately aware of the transition "in" consciousness without being conscious *of the unity* of retention, primal impression, and protention that constitutes the intentional relation to temporal objects. But this *immediate first-person consciousness of unity* cannot be logically equivalent to the *unity* of retention, primal impression, and protention that consists in a self-organizing

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8. This is especially notable in Thompson 2007, p. 328.

or a self-unifying act, if it is possible *to conceive* that a self-organizing act occurs without involving *the first person awareness of this unity*. Clearly this seems to be conceivable given the pure third person characterization of the neuroscientific account of the self-organizing act.

The awareness of the transition "in" consciousness cannot be therefore a mere *corollary* of the unity of retention, primal impression, and protention. Although the immediate first-person awareness of the streaming of consciousness must involve, qua awareness of unity, the *unity* of the moments of the awareness of temporal objects, this unity *does not* entail the immediate first person awareness of this unity that constitutes absolute subjectivity. Husserl is manifestly aware of the failure of this entailment. The enactivists ignore it.

12. The positive outcomes of the harmonizing argument

My account of the harmonizing argument seems to present it as an argument that leads to its results by irrational means. It seems to depict it as an attempt to *mislead* its audience to believe that the arguer's position could be merged with another position that seems to conflict with it, and it seems to do this by inducing the audience to believe certain things and not by providing reasons. In other words, if it aims to overcome the differences between the positions at stake by diminishing the significance of the source of the conflict and not by resolving these differences, can one depict this type of argument also as a rational act that may have positive results? I will conclude this article by clarifying the context in which harmonizing arguments can have such positive rational outcomes.

As I noted several times above, the use of a harmonizing argument is motivated by the arguer's *positive* assessment of the *fertility* of harmonizing her own position A with another position B that seems to be in conflict with A. The enactivist's assessment of the fertility of phenomenology's first-person approach to consciousness and the significance of Husserl's account of time consciousness to the goals of the neurosciences exemplify this type of motivation. As I claimed in Section (3), the radical differences between the positions involved may lead the arguer to separate between two sets of characteristics of the shared subject matter: characteristics that can be explained within the scope of the arguer's position and characteristics that cannot be explained within it. Overlooking the characteristics that are not within the explanatory capacities of the arguer's position does indeed seem to lead to misleading results. Nevertheless, this could also have positive outcomes.

To see why, consider first a supporter S of A that addresses B with the attempt to *exclude* it from one's own position and not to harmonize A with B.[9] S recognizes that one *cannot explain* within the scope of A's conceptual scheme some characteristics $\{F_{1...}F_m\}$ that are addressed by B's account of the given subject matter. But S *does not* attempt to separate $\{F_{1...}F_m\}$ from another set of characteristics $\{F_2...F_n\}$ that B's account also addresses, since she supposes, as do supporters of B, that $\{F_{1...}F_m\}$ must be implied by $\{F_2\text{-}F_n\}$. As a result, she *excludes* $\{F_{1...}F_m\}$ *together with* $\{F_2...F_n\}$ either by denying that they exist or by claiming that they are irrelevant to her goals. Yet if it is possible to provide an account of $\{F_2...F_n\}$ within A's scheme, the response that eliminate them from the discussion is bound to lead to impoverished results.

Clearly, if one eliminates a feature, there is no need to explain it. By contrast, supporters of A that recognize $\{F_2...F_n\}$ are motivated to search for an explanation of these features. A successful explanation that leaves out F_1 is indeed not a comprehensive explanation. Nevertheless, even this fact need not be an argument against it for the attempt to separate $\{F_{1...}F_m\}$ and $\{F_2...F_n\}$ could have positive epistemic results in at least some cases. In particular, a successful explanation of $\{F_2...F_n\}$ that leaves out $\{F_1...F_m\}$ might be able to single out *the relative autonomy* of $\{F_2...F_n\}$, which could be conceived as an important feature of the subject matter.

I suggest that this is the nature of the present case. The enactivist's attempt to naturalize Husserlian phenomenology presents an account of absolute subjectivity that seems to separate it from the immediate first-person awareness of the transition "in" consciousness, the aspect of time consciousness that, according to Husserl, is essentially subjective. The enactivist's account of how the living present – the self-unifying character of time consciousness – is realized by the self-organizing characters of dynamical systems and does indeed leave out the first-person immediate awareness of the passage of time that, according to Husserl, constitutes absolute subjectivity. Yet, in the same vein, this account seems to be able to point out the relative autonomy of these characteristics, at least according to some way of interpreting them. Husserl's theory in fact supports the possibility of doing this. His account of time consciousness contains an objective layer that is represented by his diagrams and a subjective aspect that cannot be revealed from the features of the objective layer. Yet, this in fact means that *it is possible* to *leave out* the essentially subjective aspect of time consciousness in the account of the features that have objective correlates! Although this account is not a *comprehensive* one, it singles out the partial autonomy of the characteristics explained by it.

A harmonizing argument is motivated by an attempt to merge A and B. The fact that one cannot account for all the relevant phenomena that require explanation

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9. On the nature of exclusion arguments, see Senderowicz 2014.

does not entail that other attempts are equally unable to provide a comprehensive account of them within the scope of A. Yet the persistent failure to provide such a comprehensive account might invite the use of another type of argument that I dub "the complementary argument". I will not discuss this type of argument in detail here. I will only note that this type of argument does not attempt to harmonize A and B by diminishing the significance of a core thesis of B that is incompatible with A. Rather, it aims to depict A and B as *complementing each other* by representing the relation between them as that of a partial overlapping and reciprocal restriction that does not entail any contradiction. One of the steps of this type of argument is to demonstrate that *a comprehensive* explanation of all the relevant phenomena within the scope of A's conceptual scheme is not possible. Another step is to support the claim that this failure *does not indicate the inadequacy* of the explanations of the relevant phenomena that could be given within A. As I claimed, this could be an outcome of a harmonizing argument. Hence the complementary argument may use the harmonizing argument as a *subargument*. The final step of the complementary argument is to demonstrate that the conflict regarding what is left out by A's account does not entail a contradiction.

I believe that Kant's critical theory is a paradigmatic exemplification of this type of argument, but I will not support this claim in the present context.

In any event, I suggest that there are reasons to suppose that if one wishes to provide a *comprehensive* account of time consciousness by integrating Husserlian phenomenology and the neurosciences, the type of argument that seems to fit this goal is the complementary argument and not the harmonizing one.

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Controversial images

'Listening to' the visual, for a new communication ethics

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Communicating with controversial images may be a device to draw attention to issues that are key to the interest of people and society alike. A device that can raise public awareness, or, instead, anaesthetise it may lead to make responsible or irresponsible choices. It is this ability of images that will be emphasised by communicative events involving controversial images, astride three media revolutions *ad imaginem*: printing, photography and digital technology. Lastly, emphasis will be placed on the importance of communication ethics in the choice of a "good" controversial image, one that may enable viewers to see it, 'listen to it' and understand it and, thus, to act morally.

Keywords: controversial, ethics, image, listening, social, visual communication

Foreword: The power and limits of *controversial* images

The purpose of this paper is to investigate the power and limits of images as "controversial" communication tools that can be construed in many different ways, causing people to form opinions that may be quite clashing with each other, each one justifiable on its own grounds.

Like Janus, the Roman two-faced god of transitions, the advocate of a concept as well as its opposite, images lend themselves to multiple meanings. Such meanings are reasonable insofar as they are corroborated by an ethical reflection that justifies them on the basis of the spatial and temporal dimension, context and scope of application.

And it is therefore, first and foremost, on the concept of controversy, and secondly on the application of controversy to the visual, that attention needs to be focussed. All this, to show how images, by bewildering and challenging vision, can raise people's awareness and make them form an opinion on social issues on

which they need to take a stance, and then if, and how, images can or cannot suggest responsible actions.

So, what does controversy mean? The noun comes from the Latin *contrōversĭa*, meaning 'discussion', 'debate'; as well as from the adjective *controversus*, a combination of the adverb *contro* and the past participle *versus*, a form that stands for a total change, a 'turn'; a concept that seemingly implies opposition, hostility, something about to break into a fight, a sense that heightens the feeling of uncertainty doubt and fortuitousness, as also suggested by some visual communication. But a debate aroused by controversy can also be directed to an Aristotelian common sense (*koinè aisthesis*) (Aristotle, 2001, III, 425 a27), which Kant understands as a "*sensus communis*", that includes "the Idea of *communal* sense, i.e. of the faculty of judgement, which in its reflection takes account (*a priori*) of the mode of representation of all other men in thought; in order *as it were* to compare its judgement with the collective Reason of humanity" (Kant, 2012, § 40, p. 101). This mode of representation however, in part, is specific to each culture, it depends on the imaginary it usually refers to, as is typical of something that is not univocal, like the meaning of images.

Such meaning of controversial should first be associated with the message that the image conveys and secondly to its form.

What we want to show, though, is the way the controversial dimension of visual language has taken a special scope, especially with the advent of the three media revolutions *ad imaginem* that have taken the West by storm with their mass-reproduction techniques and technology (Benjamin 1955): the invention of the movable-type printing press and therefore the paper and parchment engravings of the mid-XV century; photography in the XIX century, and, finally, the digital revolution by the end of the XX century which definitely paved the way to the birth of visual studies (Boehm, 1994; Mitchell, 1992; Pinotti & Somaini, 2016; Vercellone, 2017).

Such milestones changed the impact of the message on its audience by dramatically disrupting the relationship between communicating agents, individuals and images, and the media. And the success of the visual dimension has hugely strengthened the controversial power of the image, especially after the last revolution, which will be further investigated herein, making the real dimension somewhat incidental to representations of, and in, the virtual dimension.

It is actually in this scenario that the importance of communication ethics comes to the fore (Fabris, 2018): in the choice of the image, in the "controversial" image itself, in the ways it is spread and construed, and also in enabling the recipients to understand all the shades of its meaning; but, or above all, through a dialogue that has not been made to create consensus, in the etymological sense of controversy as 'turning against', some communication wants to show the existence and then the ambiguities and (de)generation of some events.

In some respects, controversial visual communication seems to be comparable to Latour's *iconoclash*, a neologism that combines the noun *icon,* i.e. 'image', and *clash*. It does not mean so much the process of annihilation and destruction of an image and its meaning, but rather it is "when one does not know, one hesitates, one is troubled by an action for which there is no way to know, without further enquiry, whether it is destructive or constructive". It's a sort of attention-seeking through the visual form to avoid forms of fanaticism and radicalisation or equally dangerous forms of silence, blindness and anaesthetization of the self (Latour, 2002: 16).

So, the visual dimension can arouse dissent and therefore ultimately hatred – just think of the latest studies on *hate speech* (Heinze, 2016) – as well as a reflection that is essential for the growth and development of society on issues on which many different positions may be taken, positions depending on personality and social context.

We can say, then, that these images are "ethical" in themselves just because of their controversial meaning, since they stem from the need to draw attention to issues that are essential for the conscious growth of a democratic society, to remind society of its responsibility for its choices and actions.

Therefore, the advent of image-reproducing tools brings about an increasingly *social* form of visual communication, in the sense that it pertains to society and to its effective operation, which is given new responsibilities; now, images are no longer devices to be merely looked at, they are also *listening* devices, and devices that demand to be listened to, *à la* Debray (2010: 195).

The inter-disciplinary and synesthetic dimensions of visual communication

The inter-disciplinary dimension of the visual then seems to be the decisive factor that needs investigating. Visual communication obviously encompasses multiple disciplines, from the strictly artistic, filmmaking, architectural ones to information, scientific, explanatory, political ones, and so on, several messages rolled into one or the image as the message itself. Images are *inter*-disciplinary in that they touch upon multiple disciplines, but they are also *trans*-disciplinary, because they cross or even overcome the barriers that separate one discipline from the other, for the image to be perfectly understood (Scarafile, 2016, pp. 27–31).

The *inter*-disciplinary and *trans*-disciplinary dimensions conflate knowledge, they do not break it up. Therefore, visual culture is like a multifaceted 'ground' to curb or stir controversies, to make problems visible or invisible, to raise public awareness of them, or even to go as far as to turn them into a show; at any rate, to connect individuals and society (Pinotti & Somaini, 2016, p. 21).

It naturally lends itself to different interpretations and connotations, depending on context (the spatial-temporal, cultural, individual and collective context in which communication was born or is spread) and on the eyes of those who look at it and mind it.

It is a way of looking at the image that sparks off actions and reactions. But at the same time it is the image that is seeking attention. "It is listening" and wants to be listened to, so it can act and make you act. While "[The] eyes can feel the lines, the dots, the planes, the texture or the colour", the image has taken "an auditory atmosphere" (Franzini 2010, p. 5; Debray, 2010, p. 195).

Therefore, images are complex, polyhedral "signifying surfaces", multifaceted prisms, each one with a meaning of its own. A consideration followed by the identification and study of specific features so as to glean a general picture, first by decomposing, then by recomposing the image. This is based on conventions (which are one's universe of knowledge and skills, one's interpretative ability and the stimuli it generates, including emotional stimuli) and on the opportunities offered by traditional or digital representation techniques, which may amplify meaning so much it can even wipe it away. The result is a complex, "burning" image *à la* Didi-Huberman, which holds "a secret, an unresolved crisis, a symptom of pain, hope in a different future" and that consequently burns us up. And the only way to embrace such dimension is through the "patience of the glance", an ethical deed that turns such ambiguity into a blessing for society (Didi-Huberman, 2005, p. 242).

However, such "patience" cannot be disjoined from what Flusser calls "scanning", a quick glance on the image to grasp its structure and content; this opens a space of mutual meaning, unleashing subjective interpretations and the folds of the inter-disciplinary dimension. This is an almost "magical" spatial-temporal dimension where the world and men can be mediated between. The pliability of the visual dimension is its distinctive trait, its strength, but it is also its limit. How moral is it to alter an image, not so much change it as take it out of context, and, therefore, re-connote it (Merleau-Ponty, 1964, pp. 189–191)?

Reading an image as a sign and *listening to* it, then, in the light of its inter and *trans*-disciplinary dimensions, as well as of its *controversial* potential, which only a reflection in terms of communication ethics can grasp, make sense of its controversial-ness (Flusser, 2009).

The purpose of an image is to give visibility, to connect expression and content through specific categories that define such connection. And visibility seems to be the decisive factor, since it is in showing up or blurring away some features, while representing them, that the image has its performative force. "In vision, then, the visible and the invisible always meet", to quote Merleau-Ponty, but such "invisible" is asked to be not just looked at, but listened to as well. "No thing, no side of a thing is shown unless the others are actively hidden, revealing their existence by

hiding them. Seeing is in principle seeing more than one sees, accessing a being in latency. The invisible is the relief and the depth of the visible, and the visible does not imply more of a pure positivity than invisibility" (Merleau-Ponty, p. 34). And this can only be done by using multiple senses, not just sight. One can even *see* by touching an image or by silently listening to it.

What's for sure, a controversial image, as Leon Battista Alberti wrote more generally about the painted image in his *De pictura* (1435), is like a window that opens on to a *istoria* (Alberti, 1973, pp. 56–58). The image is like a stage where something is told and, making the most of all its controversial and *inter-* and *trans-*disciplinary strength, raises awareness of issues that would otherwise be left buried and would not engage people and critical thinking, which are essential for an ethically conscious society.

And the visual, as stated by Merleau Ponty, is the sense of the show, it attracts public attention better than many well-chosen words.

And nowadays, despite many studies confirming the supremacy of visual studies and the prevalence of the theory of the *iconic turn*, oddly enough, this dimension of the visual joins listening, which implies a proneness to attention. Even by replicating printing, photography, but even more now the seamless flow of online images, the visual might sound like confused noise. So, as Debray points out, looking seems to have become "a mode of listening". The image has migrated to a synesthetic dimension, but while the eyes are freer to move, interpret, decide what or where to look at, hearing and understanding what is heard depend on a specific language that needs to be known. In addition, every language is based on specific thinking patterns that steer the meaning. So, is hearing "subservient" (2010, p. 195), given that obeying and heeding come from the same Greek verb (*upakouein*)? So, to prevent images and vision, which are naturally independent, from being passively construed as if they were a sentence read aloud, one should imagine listening to oneself in front of the image, which is completed by seeing. Listening to and seeing images at the same time blend into each other: while seeing makes listening freer, listening on the opposite does not make seeing less free, it makes seeing a more careful, conscious action that raises awareness of the inner life of the subject as well as of the image.

In this complex scenario, emphasis will be placed on some events that have been visually communicated with the advent of printing and engraving, then photography and lastly the image that can be reproduced (and consumed) an infinite number of times, in real time and across multiple media, as is typical of the infosphere. The latter one, in particular, the so-called fourth revolution, as Floridi calls it (2014), offers more food for thought, not least because "[w]hen visual media become self-referential, they turn against their images and steal our attention from them" (Belting, 2005, p. 305).

The contro-versial dimension of the visual, and opinion-forming

Therefore, while it can be deemed to be inherently controversial, in the sense that it carries a multiplicity of meanings, even clashing with each other, and otherwise all reasonably construed, the image becomes more specific, relevant to the scope of that form of communication that tries to give food for thought on issues of public interest. Over time, the image has become an increasingly significant tool to form and spreading public opinion through mass media. It is a form of public opinion that can be regarded as mediating between the power and the citizens, but above all as the mirror of "civil society" in its wide array of thinking options, aimed at influencing political and personal decisions (Habermas, 2001). It is a form of public discussion that is visually provided by the media, which are replacing the public squares, where, however, now more than in the past, there is the risk that "the public sphere may turn into a commercial advertising platform" (Habermas, 2001, p. 225), with economic importance replacing the social one. Likewise, there is the risk of *imagifying* events and weaken their meaning, reducing the image to a mere commodity, to a radical banalization of itself.

Here the decisive factor is to make communication retain a sense that we could call "social" and public at the same time, that is, communication "in the public interest" or "collective interest", a sort of civic engagement on the background of a wider and wider *civitas*, for the moral (not commercial) improvement of society (Bartoletti & Faccioli, 2013).

But what does social mean? Social means pertaining to society. Society, from the Latin *societas, atis*, comes from the noun *socius*, 'allied', 'comrade' and 'friend'. Therefore, social is an entity that concerns of group of individuals that relate to each other to achieve shared goals through a specific organisation. Something referred to oneself with others.

So, in its broadest sense, society can be defined as "any group of individuals (humans or animals) sharing some relationship in which some form of cooperation, collaboration, task-sharing are established" and pursuing a common interest (Società, 2003, p. 1697; Tönnies, 2011, pp. 61–65); while public actually means making something known to the *publicus*, that is the 'people' (*populus*), all the people involved in society not as the sum of all people but as a one single entity.

It can be said, then, that controversial images may boost social and civic engagement – in the sense of "working to make a difference in the civic life of our communities and developing the combination of knowledge, skills, values and motivation to make that difference" (Ehrlich, 2000, p. VI) – but, for them to be effective, they must show or even just suggest the connections that bind the images together and to society, so as to avoid incomplete representations, as Anders pointed out about the *ikonomanie* of the first mass media (Anders, 2007, p. 56).

So, controversial images can aspire to create a holistic society based on greater mutual support, to prevent, as already noticed by Tönnies, by subtraction, a decrease of solidarity that can lead into a crisis. While society, as Taylor points out, is still composed of "individuals who come together to form a political entity against certain preexisting moral backgrounds and with certain ends in view" (Taylor, 2004, p. 3).

And visual communication can reach a state of balance more straightforwardly, provide food for thought and take action on complex issues that pertain to society, issues that have caused fights and value crises. Controversial images may be a motivation to systematise the different positions that come to the fore, those that tend to reach a state of balance and those that try to arouse conflict, so that "society [can] come to a common mind about important matters", to create a renewed balance (Taylor, 2004, p. 95).

Social and public controversial images may make you confront obscure, questionable facts that can stir up a multitude of positions, to be understood and supported or to be curbed. They are often used to communicate actual violence, mental, physical, political violence, and even radicalise or transcend some positions. From the war against religious images by the 16th-century Reformation and Counter-Reformation to the terror of the Auschwitz concentration camps through to the 2001 Twin Towers attack, the Abu Ghraib prison or the painful phenomenon of migration by sea, still outstanding cases about which the violence committed, even through the images, makes no sense. These images have changed the perception and therefore the understanding of such events (Sontag, 2004, p. 22). As Nancy writes, after all, "violence […] always completes itself in an image (Nancy, 2005a, p. 20).

Medial caesurae and controversies from, and in, the visual

Therefore, as communicative acts, images can be so disruptive as to be "unspeakable and unimaginable" (Mitchell, 2005), still remaining "images in spite of all" (Didi-Huberman, 2005).

As Mondzain writes, when you have to do with images, the metaphor of the fight comes to mind: the visual seems to be a weapon to influence public opinion, social imaginary, and therefore the balance of power.

> Why are images always dealt with in terms of fight? Maybe because there's actually something in them that has to do with the definition of peace? Those who destroy idols because they see them as the sign of symbolic surrender, those who get hold of the visible to conquer bodies and souls, those who build visible figures

of the invisibility of sense, they are all fighters, without exceptions. Strange, indefatigable armies of a founding yet imaginary war, where the powers one wants to conquer are quite far from providing free judgement at all times. In sharing visible productions, everyone wants a share of the power, everyone wants to triumph: but peace means something different for everyone. For some, the victory of the image is tantamount to subjection, for others it means freethinking, freedom to choose. That's why the image is freedom, then it is well worth fighting for.

(Mondzain, 2011, p. 141)

They are instruments of war and peace, then, but above all they are instruments that force us to use our power of critical judgement. So, visual communication looks like an "indefinite space for a decisive debate", "a weapon for guerrilla warfare", as well as a symptom of a crisis (Debray, 2010, p. 194). After all, crisis incorporates the meaning of distinguishing and deciding, as suggested by the etymology of the Greek verb *krino*; originally, the word meant the separation of the wheat grain from the straw and chaff, or the separation of good from evil (Mondzain, 2011, p. 143). A crisis that leads therefore to a debate on something that cannot be decided *per se*, but on which an ethical choice must be made, between what is good and what is not.

The choice of a solution to the crises revealed by the visual may lie in acting out a critical, conscious look and paying attention to the image from an inter- and *trans*-disciplinary perspective.

Its ambivalent nature makes sense not so much in connection with the goals of those who created or conveyed it, but with the goals of the observer, whose judgment may influence the choices of a community, the sense of good and evil, even as part of a judgement that is not based on personal taste but one which is social, ethical, economic and political. So, images can be regarded as places of choice in which a crisis of sense-making is acted out in all its intensity, and the only way out of this is by making images *speak*, binding individuals to a more critical, collective engagement (Maragliano, 2008). It is a crisis of the image that, with the spreading of printing, first xylography, starts to play quite a different role from the past. Its technical reproducibility boosts the spreading of the iconographic message, even if in black and white and engraved in wood. Such images arouse opinions and stir debates, thus extending the area of the crisis. Still limited to the elites at the dawn of Western modernity, this phenomenon is further amplified by mass media and by the Internet.

Now, let's focus our attention on some specific cases, which are emblematic of media revolutions that pursue such technical and technological reproduction of images, which are attributable to the XVI century, as we said, and to the contemporary age, first photography, then today's digital age, and let's dwell on the controversial dimension embedded in the fluidity of the Internet, the impact and power of which were simply unthinkable before.

The first case, concerning the so-called second media revolution, introduced for the very first time the problem of the reproduction of an image through technique, from the Greek *techne*, which means craftsmanship and the ability to put it into practice (Fabris, 2018, pp. 1–2).

The most outstanding reproductions are the disturbing, controversial ones exchanged, as in a sort of contest, between the Reformed and the Counter-Reformed, emphasising the dangers and potentials of the visual in spreading confessional ideas and values, in its many forms. But it is precisely the different theory on the visual between the Reformed and the Counter-Reformed that revealed the deep confessional, cultural and political crisis of that time (Freedberg, 1985; Asselt *et al.* 2007). Images are back for good, to be banished for some, to be spread and circulated for others. A war that has happened before – which the Council of Nicaea tried to put an end to (787) – between iconodules and iconoclasts, the former for and the latter against the worship of icons, or images, reflecting the incompatibility between the two powers (Lingua, 2006, p. 163).

Let's think of Luther's words or Karlstadt's and Calvin's more draconian ones against certain images, as well as the stance of the Catholic Church emphasising the educational role and *Propaganda fidei* of the images.

Images are controversial, then, because they carry multiple opinions, each one with its own good reasons. In this climate of crisis, the Church deals with sacred iconography in the last session of the Council of Trent (1563). Cardinal Paleotti is commissioned to draw up a sort of handbook about acceptable and feasible sacred icons (Bianchi, 2008; Scavizzi, 1981).

The author of *Discorso intorno le imagini sacre et profane diviso in cinque libri* (1582), the archbishop of Bologna thought that sacred art should "enlighten the minds, stir devotion as well as prick the heart" and should be under the control of the religious authority (ibid, cap. XXXIII). He recommends that sacred art include characters and details from everyday life to engrave the image deep into memory. The visual, which is essential in a climate of widespread illiteracy, aims at making sermons more effective in spreading or reawakening the Catholic faith. Quite different from the irreverent tone of the visual communication offered by some supporters of the Protestant confession that use grotesque images such as the wood engraving *Der Bapstesel*[1] and *The Sale of Indulgences* by Jörg Breu the Elder.[2]

But meta-communicative images are produced as well – these being images that deal with the issue of images – to put the on-going controversy "right in front of their eyes" (Aristotle, III, 11, 1411b) and the different stance on the issue, also

1. Wood engraving, 1523, Universitätsbibliothek, Munich.

2. Wood engraving, 1530, Library, Gotha Castle Museum.

with an irreverent flavour, as in the anonymous wood engraving *A foolish man (Luther?) burning a statue in a stove,* sparking off discussions and debates about the role of the image, which in fact involve critical aspects that depend on each confession (Checchi, 2018, p. 55).[3]

These are images, then, that for someone are suggestive of a mystical participation in the conveyed contents, for someone else they hide dangers and shadows, because according to the strictest Reformed trends one might accept to worship the subjects shown in the icons, not the physical icons as such.

And nowadays, following another two media revolutions involving the visual dimension, first the invention of photography, then the Internet, the proliferation of images we are surrounded by increased the importance of the controversial role of the image. There is the risk, though, that the radicalisation of such proliferation, the amplification and fluidity of the visual might lead people to blindness and indifference rather than to an open debate on the disturbing dimensions of the image, this losing the (ethical) purpose of the controversial.

Photography brings about a reproducibility that is no longer technical but technological, made by machines, enabling man to develop more complex systems for practical purposes. This is the birth of a new documentary role of the image, perfecting the "effect of reality" (Debray, 2010, p. 195). As Kracauer writes, the new medium places emphasis on its ability to capture facts in their temporal, spatial, and objective dimensions (Kracauer, 1982, pp. 114–115). It's no coincidence that photographs were also used by totalitarian regimes to spread and strengthen their ideologies or, conversely, to disclose diametrically opposed positions, as in the case of the anti-Nazi montages published by John Heartfield in "AIZ" (Arbeiter-Illustrierte-Zeintung) (Pinotti & Somaini, 2016, p. 224) or the photos of the horrors committed in the concentrations camps by Sonderkommando members and taken by an unidentified Greek Jewish man (Didi-Huberman, 2005, pp. 132 ff).

These are controversial images, social actions as well as social agents. Subjects acting on the world, and the world acting instead on these images and the reception thereof. And here we can find the very first (and laborious) manipulations that can distort their meaning or multiply it so much it can wipe it out. When you see such images, you are led to wonder about the use, sense and reliability of such photos. If the dimension of absolute tragedy is trivialised or not, or whether, as Didi-Huberman claims, one has the moral duty to stand in front of such images in spite of it all, though an image can never show what cannot even be imagined.

Such controversial dimension has its highlight in terms of dissemination in digital technology and the Internet. A case in point are the photos of another

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3. Published in Murner, T. (1522). *Von dem grossen lutherischen narren.* Strasbourg: Johann Grüninger, at the Bayerische Staatsbibliothek, Munich.

horror, the Abu Ghraib prison (Sontag, 2004; Amato, 2014; Žižek, 2005), a document of unimaginable moral degradation shown in an almost spectacular way, through to the paroxysm of the Internet memes and more recently the photo of little Aylan Kurdi.

As Mirzoeff points out, online images have turned into 'weapons' at the service of the power on a global scale (Mirzoeff, 2004). Weapons that are made even more dangerous by the endless cramming we are exposed to, which saturates a person's ability to see and listen (Baudrillard, 1996, p. 8). In this sort of *horror vacui* of today's man, reality and representation might be confused.

An image posted online and on leading newspapers portraying Aylan Kurdi, a 3-year-old Syrian boy who drowned the night between September 1st and 2nd 2015 and found dead along the Turkish coast, off the Golden Beach in Bodrum, is a sad example of this.[4] A documentary yet controversial image; it forces you to engage in painful reflections, opening up a complex debate on the potential international-policy solutions that should be taken to prevent such events ever happening again.

But, throughout its online life, such image takes on multiple lives, with increasingly questionable connotations, sparking conflict in online public opinion between those who support the publication of the image and those who see it mainly as aestheticized manipulation.

The first controversial dimension is given by the representation of death, especially whether showing a dead boy's face was legitimate or not.

From an etymological and semantic point of view, the noun image is closely interrelated with the concept of death (Belting, 2005, p. 307): in Greek, the noun *èidolon*, which shares the same Indo-European root *weik- with *èikon*, 'icon', hence "idol", meaning ghost, the spirit image of a dead person, and likewise the Greek *sema*, visual sign, also means grave; after all, in the Latin world, *imago* is the funeral mask, the wax cast of a dead person's face (Debray, 2010, pp. 19–20; Neri, 2013, pp. 12–14).

In the digital *medium*, the paradox of presence/absence seems to get even stronger. As Barthes already claimed about photography, comfort at death is also social: "in the image that produces Death while trying to preserve life" (Barthes, 1980, p. 146), a way to soothe the pain of loss and the ensuing *memento mori* (Sontag, 2004, p. 15; Perna & Schiaffini, 2015, pp. 15–19, Debray 2010, p. 35).

So, images try to make up for a loss, an instrument for *mèthexis, à la* Nancy, that transcends *mìmesis*, in the sense of sharing a loss; the expression of a longing for a presence that can never be absent (Nancy, 2005b, pp. 16–20).

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4. About the proliferation of image of the death of Aylan Kurdi: Vis F., Goriunova, O. (Eds.) (2015). *The iconic image on social media: a rapid research response to the death of Aylan Kurdi.* Sheffield: Visual Social Media Lab.

The second controversial dimension lies in the very topic: how to solve such atrocities? How to make sure no more people will die in such circumstances? How to prevent such ruinous crossings ever happening again? The person who looks at and 'listens to' the image takes moral responsibility for what happened, even if it was not caused by him or her.

But, in terms of communication ethics, there is one more controversial dimension that requires wider reflections and is closely related to the first one. What appears here and now is the temporal form of an image that can move across different media and through the Internet and change into something that is other than its original self.

The digital *medium* may be used to represent the original subject by blurring its features or even changing its meaning, by displaying it elsewhere. "What is re-presenting if not a presenting again (in temporal terms) and in the place of … (in spatial terms)? The prefix "re-" instils the meaning of substitution. That which once was present and is no longer, is now made re-present (is represented)" (Marin, 2009, pp. 274–75).

In the multiplication, fluctuation and degeneration of the image shown to raise awareness of the migrant crisis, the image becomes almost blasphemous. In the copy that circulates across the media and in its many variations – instantly posted on social platforms just a few hours after the publication of the first few documentary images – what we see is a cloning, and not just a technical one but an emotional one.

What is see is the original photo of little Aylan going viral and being reprocessed, « surrogate images » that, at a perfunctory glance, replace the original ones in the attempt to mitigate their cruelty and bear the anguish, at one with that terrorism that Mitchell identifies with the so-called *cloning terror* syndrome. One of its consequences is the spreading of image of terror as an "invisible and omnipresent threat", which, moreover, could increase the terror rather than decrease it (Mitchell, 2011, p. 15); at the same time another consequence is the fear of cloning as such, called *clonophobia* (Ivi, p. 63).

Because of this, images may fail in their attempt to raise public awareness of a given event or phenomenon. The initial shock may swallow up the subject, seemingly unable to bear the sight of something that is unbearable.

These images however can draw attention again to the responsibility of personal and collective action, re-enabling individuals to take a critical position on an image of pain, to overcome the demiurgic exploitation and the violent emotional shock – replacing it with a long-term ethical reflection that may also involve listening to the image.

Here comes Flusser's warning again, that people are maybe more attracted to technical images and to their emotional and aesthetic impact (16th-century prints,

photos of death camps, photos of Aylan) than to the issues they expose (moral degradation, the Holocaust, the migrant crisis). But technical images must take back their role as mediators between human beings. They must favour that "leap into consciousness" proposed by Flusser to put a virtuous relationship between humans back at the centre through images (Flusser, 2009, p. 30).

Conclusions: *Listening to* images, for a *controversial* ethics of the visual

Therefore, controversial images are key to shedding light on some aspect of our time, arousing public opinions or raising public awareness. Such aspect has become more powerful since the advent of technological-communication revolutions. Disturbing, bewildering images and those that can be read in contradictory ways, are sources of debate. They are not beautiful images in the aesthetic sense, but they can enfold a *moral beauty* because they stimulate thinking.

Such moral beauty consists in shedding light on problematic, disturbing issues of our time – from radical religious, political, cultural positions to migration (Mondzain, 2011) –. Values are conveyed, aspects come to the fore that we are called to face and that we need to respond to, by acting responsibly through debate and discussion, pain and amazement, using (and trying not to be swallowed up by) the *trans*-disciplinary power of the visual.

So, one must learn to live with controversial images, or better, with the controversial connotation that some images may take, and turn it into an exercise in responsibility, a spur for further reflection and for prospective new choices. Hoping that one will not have to exploit some iconography to stage and turn it into a show, but to spark off social change, instead, as instrumental to improving social life (Perna & Schiaffini, 2015, pp. 5–13).

While, with the advent of xylography, the scope of the controversial has broadened, causing visual 'wars' to lead to real 'wars' too and conversely, in an age in which everyone is 'onlife' all the time, the visual level and the real level intersect and merge even more, with further ethical implications. The conveyance and assumption of the controversial may get lost in the multiple changes that the image undergoes in the virtual environment, a common space that needs to be protected by all those who live and share it. So, it can be remembered in guises that are no longer the original ones. Perhaps a new vision of the disturbing image should be developed for a critical *iconocracy, à la* Mondzain, that has power over people's bodies and souls but that people should learn to embrace without letting themselves be swallowed up by or remain indifferent to, as a form of self-defence.

Therefore, in the time of printing, the unspeakable may be suggested by images, all the more so today, with the fluidity of the digital. Everyone can have access

to a copy of everything, that maybe is no longer a copy in its own right any more, since there is no difference between the copy and the "original" now, but at the same time anyone can have access to the process for reproducing a technological image and change it. While, then, the dictatorship of today's mass reproducibility helps or actually boosts the reproduction and proliferation of images of terror, in the attempt to annihilate it, cloning generates terror *per se,* because it gets out of control and may suggest positions that go against the common good.

However, one should reflect on the limits of such dialectics between the un-imaginable and the unspeakable, to what extent can that silence and that blindness that protect our glance be forced out. Often, the phenomena of duplication do justice to some issues, bring them up to public opinion but, at the same time, fear the judgement of public opinion, as much in the age of printing as in the age of the Internet. But, compared to the past, today's judgement is instant, viral, it can unleash a storm in quite a short time without even realising it.

Some positions may become radical in a shorter time, they may drive some-one to act irresponsibly, and that's why the limits of some online images should be investigated, to what extent they raise fruitful reflections and stimulate public opinion, or whether instead they push people even more to emulate what is un-speakable and unimaginable.

Looking at, being able to observe and reading an image is not enough now. "Speaking in images" (Maragliano 2008), but – in the same synesthetic wake – lis-tening to them and keeping listening – have become decisive too.

Listening (in Italian, *ascoltare, nda)*, which in the Romance languages comes from the Latin verb *audio*, which certainly means listening but also means *heeding* and therefore *learning*, is an active process that involves a preliminary observation of the surrounding environment.

Even the unsaid needs to be listened to. Listening implies being quiet, keep-ing quiet inside, to embrace the feelings aroused by seeing and listening (Fromm, 1991). Actually, heeding is synonym with listening (Ras, 2016). Listening, as an exercise in attentiveness, may make one more aware of the sharing process that comes after, especially online, where such process is not always mediated by professionals.

The risk of not listening and "giving priority to sharing an image instead of seeing it, to commenting it instead of understanding it, and replacing first-hand experience with the simulation thereof" (Perna & Schiaffini, 2015, p. 12), must be avoided. Otherwise, the controversial will lose its social sense: it will no longer encourage social reflection but will set off a new mechanism "of terror", the com-modification of communication itself.

Therefore, the spreading of images can arouse a moral response in connec-tion with one's way of thinking and imagining or the so-called "paralysing effect"

emphasised by Sontag (1978; Zelizer, 1998, p. 1) and by Pagnoux, who writes that "Horror generates silence: it does not say it, it imposes it" (Pagnoux, 2001, p. 93). Such emotional blockage leads one to remove an event that is so shocking one cannot bear the sight of it, or even less understand it. But one can practise listening to prevent any distance between the observer and the shocking image from impairing the social power of the subject, as well as "the social and emotional relationships, with a disruptive impact on the new generations" (Perna & Schiaffini, 2015, p. 12).

Therefore, controversial images are a device to focus attention on advocacy issues, as in advocacy advertising, in the attempt to promote a debate and, whenever feasible, reach a consensus on complex issues on which positions did or do differ.

They can therefore be deemed to be 'entities' with a strong performative power that take a soul and a life of their own. They lead individuals into a wicked process of fascination and repulsion at the same time. Those involved need to reflect on that: how to use the messages, emotions and suggestions elicited by images to promote responsible choices and actions, in the interest of and for the protection of mankind. The alternative is accepting anaesthetization and emotional paralysis, a silence that can pave the way to the moral deterioration of society.

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CHAPTER 11

The role and the impact of interdisciplinarity on the relational models of intervention in the doctor-patient communication

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This paper aims to evaluate the role and the impact of Interdisciplinarity on the relational models of intervention in the doctor-patient communication. *Working Alliance* may be one of the main models for the improvement of the relationship between the dyad, analysing the degree of the patient involvement in treatment and his alignment to the purposes of therapy itself. However, to tap into this construct, the performed kind of operation is similar to a specific form of Interdisciplinarity, *Theoretical Interdisciplinarity*. Theoretical ID begins from an exploration based on the *practice*, which respects an otherness not only physical (the doctor-patient *relationship*), but above all, conceptual (the doctor-patient *system*).

Keywords: communication, interdisciplinarity, medicine, efficacy, doctor, patient, convenience, silence, philosophy, psychology, working alliance, burnout

1. Introduction: What is communication

This publication aims to evaluate the role and the impact of ID on the relational models of intervention in the doctor-patient communication. First, it is necessary to clarify the concept of communication. First of all, communication is the establishment of a relationship. The appropriate beginning of a relationship allows the exchange of information from one entity to another. The concept of communication is damaged if we take for granted what happens in a relationship when communication is absent, and it reduces communication to a mere mechanical process. In that sense, there are two models of communication which took their roots in ancient times; the Greek model and the Jewish model. The Greek model is based on a form of communication that distances the word from the element it is referred to. The "λόγος" (lògos), that meant "word" for ancient Greeks,

has an extremely important role. What happens if the distance is too much? The word loses its impact, because it is not safely linked to reality. The reality, or "lebenswelt", that Husserl (1970) draws near to the living world, far away from standardization and for this reason extremely true and strongly real. Husserl writes (1970: 109–110):

> In whatever way we may be conscious of the world as universal horizon, as coherent universe of existing objects, we, each "I-the-man" and all of us together, belong to the world as living with one another in the world; and the world is our world, valid for our consciousness as existing precisely through this 'living together.' We, as living in wakeful world-consciousness, are constantly active on the basis of our passive having of the world… Obviously this is true not only for me, the individual ego; rather we, in living together, have the world pre-given in this together, belong, the world as world for all, pre-given with this ontic meaning… The we-subjectivity… [is] constantly functioning.

The Jewish model is different from the Greek model because it underlines a close relationship between the word and the object it is related to. In the *Genesis*, Adam gives a name to every creature on Earth in order to make them his possession. But the possession is only conceptual: Adam understands the origin and the purpose of what surrounds him only when he gives it a name, and doing this he comes closer to the enigma that envelops creation. The choice of a name, for Jewish people, is very important: it does not only means giving a name, but it is the primary relationship between an individual and the absolute. What existed only partially, now exists completely and has found its place in the world. Communication is then a continuous and unestablished discover, that does not refer to an archaic and lifeless system. Each word becomes an event not only because it keeps all its strength, but above all because the subject has to be in the condition to communicate.

We give a name to everything around us in order to communicate, but this process brings to a failure because it is a way to bend reality to our lacks. Merleau-Ponty writes (1968: 125):

> The philosopher speaks, but this is a weakness in him, and an inexplicable weakness: he should keep silent, coincide in silence, and rejoin in Being a philosophy that is there ready-made. But yet everything comes to pass as though he wished to put into words a certain silence he hearkens to within himself. His entire "work" is this absurd effort. He wrote in order to state his contact with Being; he did not state it, and could not state it, since it is silence. Then he recommences.…

According to the philosopher, communication is effective if silence is also shared. Talking is a limit to communication because it reduces it to one form of expression only, and it also reduces its potential. The word becomes then a scrap, the emblem of the inability to adhere to the dimension of everything, a silent but present

dimension that the individual should enter silently without sanctioning distance but embracing the silence. Communication is always preceeded by silence.

2.   Silence and ethics of communication

Watzlawick (1971), in the axioms of communication, stated that coexistence of people in the same place already generates communication. Avoid communication is also considered a communicative act. Silence is, in fact, a multidimensional form of expression. It is not a communicative expression only related to the immediate meaning of reality, but it leads to something more. Communication is, in other words, the establishment of a relationship. The existence of a relationship allows the actual passage of information from one entity to another. This concept is at the basis not only of psychotherapy but above all of therapeutic dialogue: the other is recognized only when his presence is recognized, together with his/her specificity and his/her significance. We can obtain true dialogue only when we cease to fight unconsciously for our own ego. There is dialogue only in the recognition of a communicative equality: a good communicator must not underrate the dimension of listening. In other words, before I say something I should hear the one I have in front of me. At this point, we need to focus on a dimension of communication which is often taken for granted: silence. In fact, silence determines the main peculiarity of communication, because what we found in silence is the ontogeny of communication itself. We can only communicate starting from a reciprocal silence. Silence is the garantor of *ethic* communication, which takes several parts into account without claims of super-imposition. Ethic communication is a communication that starts from silence, from a mutual observation and consideration in reciprocal equality. An ethic dialogue can only start after a collective silence and a reciprocal introspection.

Blindly imposing our own position, in communication as well as in daily action, only generates incommunicability. The arrogance of our point of view dazes and delete judgement towards ourselves. Talking was a scrap for Merleau-Ponty, as well as a(n) (good) action was the scrap of a humble disposition, according to Scheler (1999). The subject has to revise their position of dominance over events, without flattening them to a discounted perception but approaching them with respect and reverence. Reverence is also *paticity* (Scarafile 2008), the deposition of the subject who chooses to serve events doing justice to them. In communication, we have to consider the question of method: speaking cannot exist without listening. For this reason, a relationship does not start from the subject's egoity. The event enters the predisposition of the other and while it is happening, it asks the subject to choose a dimension (deposition, humility, paticity) which can receive them.

Only when there is awareness of the communication, and of the context through which it will "dive", there will be a real incidence of it. Not a disembodied communication but a communication based on praxis. A good communicator actually does not start from an abstract idea of "good" that has to be told with a deontological approach. A good communicator starts from the request-concept and from the interlocutor that has to be put first. Working on the prerogatives of the interlocutor, the communicator has to respect and consider the presence of the interlocutor as holder of resources that put him in a specific place of the communicative process. There are several cases in which communication involve an asymmetry between the parts. As Watzlawick (2014) explained in the fifth and last axiom of human communication, all the interactions between individuals can be symmetrical or asymmetrical. In a symmetrical interaction the interlocutors treat each other equally and on the same level; in an asymmetrical interaction, on the other hand, we have the opposite situation. One of the interlocutors stands in a dominant position (one-up) and the other inexorably stands in a subordinate position (one-down). An example of this form of interaction is the one between employer and employee. Even though asymmetrical communication is necessary in certain contexts (job environment, school…), it is difficult to distinguish a respectful asymmetry from a soiled and disrespectful one.

3. The therapeutic communication

Reflecting on doctor-patient relationship as mediated by a certain kind of communication, is the goal to achieve through dialogue. Kalplan wrote (1977: 64–65): « communicate with someone is to understand him – the person, not just what he says. […] In the process of communicating, both communicants become more than they were. […]. The communication is the person; not only what you do but what you are. ». Communication is to undestand who is in front of us, respecting their prerogatives, their existence and the fact that that person chose you as a medium to express their ideas.

The *Therapeutic Alliance* or *Working Alliance*, a concept borrowed from psychotherapy, may be one of the main models for the improvement of the relationship between doctor and patient. It analyses the degree of the patient's involvement in treatment and his alignment to the purposes of therapy itself, established with the therapist and finalized to the success of the settled path. The therapist's function, in this sense, is not to try to statically reform the patient, but to work *with him*, to collaborate *dynamically* with him. The expression was coined by Elizabeth Zetzel, who explicitly formalized this concept, already found in Freud, in some of her works of the second half of the fifties (1956). Freud claimed that it was possible to

make an analysis only if patient and analyst was cooperating together and actively, sharing targets and treatment method. This construct put the accent on the fact that the patient, as the treatment goes on, identifies himself with the analytic attitude of the therapist and acquires an increasing disposition to observe his mental process and to actively cooperate with the analyst in the comprehension of his own thinking and acting. Nonetheless, the fact that the therapeutic alliance is based on a conscious and unconscious commitment need a clarification. The conscious component coincides with the voluntary and rational intention of the patient to accept the analytic contract and with his mature side, prepared to embrace the instructions of the therapist for the progressive completion of their collaboration. On the other hand, the unconscius component originates from the atavistic equipment of the patient which takes its roots in early, positive and objective relationships and that allows him to establish a connection of trust with the analyst.

If the beginning of the therapeutic relationship in psychotherapy is not in the resigned presence of a social contract between two people even in the medical therapeutic relationship it is necessary to revise that contract, dysfunctional and paradigmatic of equally dysfunctional relationships. This kind of contract causes resistance and defences. Historically, the patient lives a cyclical state of dissatisfaction with medicine, ranging from a marked hostility to a mitigation condition up to a recrimination due to lack of dialogue.

4. A troubled history

An accurate analysis about the tormented relationship between therapist and patient was done by Edward Shorter (1985). According to Shorter the relationship between analyst and patient can be historically divided into three phases: traditional, modern and post-modern. Though the scientific comprehension of human biology has an increasingly important role in medicine, what should lead the interchange is a wise combination of social, economical and psychological factors, that we often do not consider. Until the end of the seventieth century, the tradional doctor usually had an inadequate education, insufficient scientific knowledge and a low social status: as a consequence, doctors were unwelcoming and unpopular among patients, to the point that they often did not call the doctor even when they needed one. The examples in the book are many, and they demonstrate the absurdity of the remedies suggested such as the use of urine as a potent medicine and the exaggerate use of bloodletting as the right therapy to treat most of the diseases. Patient and doctor appeared at the end of the 19th century, as a consequence of scientific breakthrough in the field of microbiology and pathology: for the first time, ilnesses are connected to specific agents and concepts such as medical diagnosis

and prognosis can rely on solid groundwork. The development of new technologies such as X-ray gave more authority to the doctor, who can not only claim his qualification in medicine, but he can also sign with the patient a silent agreement of trust. For his part, the patient is no more skeptical toward doctor's profession, but now he gives a contribution to the quick development of doctor's status. Post-modern doctor, during Forties and Fifties, has a huge number of technological devices to use (advanced medicines, more precise tools for diagnosis) but he is not qualified on the human side: he lacks empathy and real contact. In other words, he lacks listening. The most common reason for this lack is the doctor's purpose to heal as many lives as possibile in the shortest period of time: post-modern doctors lives a condition of absolute urgency. Post-modern patient, on the other hand, is the obvious response to the absence of empathy, he is the furious reaction to the triumph of technology in medicine. Though the medical community brought clear results and successes to the society, many were the cases of sue in court against doctors. Shortes speaks of a social riot against the medical authority. This is a consequence to the fact that the medical profession forgot part of its art in favour of scientific development, and this phenomenon reached its climax in the late twentieth century, taking roots in the fervid consumerism of western society. In fact, we can notice how the emotional and historical journey of patients is cyclic: from a condition – in the traditional period- of distrust and hostility towards doctors to a condition of idolatry – in the modern periody –, today people prefer to go to the lawyer than to see a doctor who is incapable of starting a real therapeutic interview. Doctors did not perceive this gap that was widening as years passed: even though they went on investigating on illnesses, they were unable to investigate on patients.

On this side, medicine lives a purely "horizontal" evolution, linked to the refinement of a technique that moves away from the "human" contact with the patient. Recent paradigms such as *job demands – job resources* (Bakker et al., 2003) suggest that the excessive professional wearying (with lack of motivation as a consequence) is the answer to the imbalance between demand to respond to and available resources to do it. This paradigm can work only if we consider as aprioristic and declared the social agreement between professional and user. Psychotherapy is often called to solve troubled issues. The job demands – job resources scheme certainly cannot be applied to psychotherapy: the therapeutic relationship does not begin with the discounted presence of a social contract but with the revision of that contract, ontologically disfunctional because it is paradigmatic of disfunctional relationships as well. In psycotherapy, we cannot speak of analysis of the demand – resource relation, but mainly of the analysis of the demand. Problems brought by the person in psychoterapy should be considered, metaphorically, as a ballast and a lifebelt at the same time: the psychological aspects that damage the person are the same that give a sense to some parts of his or her existence, they

are the implicit medium of contact with the world. The difficulty of clinical work is resumed in this construct. The evident semantic of iper-specialization then cannot be the semantic of medicine itself, nor it must be, but it should come close to the semantic of organization, a completely different one. Here the same paradox is reproduced over and over again: searching for a total control of the process, it loses control of the weak link. And the weak link can break the whole chain. Through the study of some experiments of medical context (with related strengths and methodological defeats) it was demonstrated how it is inevitable to think of the therapeutic relationship as of an ethical union between classical talk and tékhne-loghìa for health (Lyons and Chamberlain, 2006).

5.   Introducing burnout

Freudenberger (1974) was the first to draw attention to one of the possible stressful events in the workplace, formulating the construct of *burnout* syndrome, a condition prevalently found in professions involving a relationship of support, help or assistance. Freudenberger wrote (1974: 159):

> Some years ago, a few of us who had been working intensively in the free clinic movement began to talk of a concept which we referred to as "burn-out." Having experienced this feeling state of burn-out myself, I began to ask myself a number of questions about it. First of all, what is burn-out? What are its signs, what type of personalities are more prone than others to its onslaught? Why is it such a common phenomenon among free clinic folk, or is it also something that strikes all or at least most staff members working in alternative self-help or crisis intervention institutions? Does it happen with the same intensity to the professional volunteer and to the volunteer service worker? Or does it affect that volunteer and paid staff member differently? What can we do about burn-out once it starts? And what criteria can we build within ourselves or our working environment to help us to safeguard against this serious occupational hazard?

The burnout syndrome is a potential risk for every job which presuppose contact with people, and it comes not from the type of job itself but from the relationship that it establishes with people. It is multifactorial and is based on stressors of the relationship that load it emotionally (but in a negative sense) through shame, anxiety, stress and hostility. It is easy then to imagine that social health job environments are the first ones to be involved in this emotional failure. The health care context is the first to record many burnout episodes. The result of a constant emotional exposure to feelings and attitudes of negativity leads the person to "burn", to exhaust himself emotionally. Maslach (1976) develops a rielaboration of this construct. Though confirming the constitutive elements supposed by Freudenberger, Maslach define

as an emotional breakdown, followed by several episodes of depersonalization and reduced motivation to professional fullfilment. Burnout is the perception of being no more able to offer our professionalism to people we work wit. In other words, the individual experiences a constant feeling of inadequacy and low self-esteem in the workplace. Maslach & Jackson (1981) theorize the *Maslach Burnout Inventory* (MBI), a multidimensional questionary addressed firstly to helping professions (doctors, nurses, psychologist and teachers), but it has become a device of evaluation even for those jobs or professions based on the constant and direct contact with people. It is hard to think of a univocal genesis of this condition. The onset factors involved many investigations in different fields (the research still goes on until today). Nonetheless, it is possible to identify two tendencies: the first one thinks of an environment-induced origin of the disorder (that means linked to extrernal factors); the second one instead is based on the incidence of personal characteristics involved in the relationship. According to this current, people react differently to stressful situations in relation to their personality. Maslach thinks that the type of worker more vulnerable to burnout is basically submissive in the relationships with other people, such as coworkers, employees or users, and is unable to distinguish the demarcation line between professional and personal involvement. For this reason, the subject finds it difficult to handle boosts of hostility, rage and aggressiveness towards the obstacles that his or her job entails: so the subject acts intolerant, or worse uniterested towards what imply an emotional involvement. Maslach writes (2003: 94–95):

> So far, we have seen how burnout is produced by the surrounding situation. The emotional intensity of involvement with people, the negative focus on problems, the lack of positive feedback, or poor peer contact in the job setting are some of the external factors that can elicit burnout. But external factors are not the entire story of burnout; internal factors play an important role as well. What a person brings to a situation is just as critical as what the situation brings out (or puts into) him or her. And why a person brings are individual characteristics such as motivations, needs, values, self-esteem, emotional expressiveness and control and personal style. These internal qualities determine how someone handles external sources of emotional stress and help explain why Person A will experience burnout in a particular work setting while Person B will not. They are also implicated in an individual's original choice of a helping profession as a career. […] Overall, men and women are fairly similar their experience of burnout.

Contemporary research wisely recognizes in this syndrome a multidimensional pathogenesis in which environmental and personal factors interact, and above all it observes the organizational conditions in which the individual works. The burnout is the result of the contemporary work condition, a non-place where a noxious competitiveness and a deleterious flexibility impose themselves. In the field of health profession, a doctor who suffers from burnout syndrome perfectly portraits

the violence of a science unable to heal. The medical mission disappears, generating a failure of the well-being both of the patient and the doctor. The constant frustration of finding themselves in front of usual situations, together with weariness, professional conflicts and personalistic behaviors, contradictory demands and ambiguity of roles and definition of tasks, administrative needs increasingly pressing and competitive can only increase the stressful feeling of doctors who, as a consequence, spend little time with their patients. In a study of 2015, Shanafelt (Shanafelt et al., 2015) has shown that a real emotional exhaustion is present not only in every medical specialization but also it exponentially increased from 2011 to 2014, with percentage points increasing by 10% in just 3 years. As we can read in the section *Risultati* of the article (2015: 1600):

> Of the 35,922 physicians who received an invitation to participate, 6880 (19.2%) completed surveys. When assessed using the Maslach Burnout Inventory, 54.4% ($n = 3680$) of the physicians reported at least 1 symptom of burnout in 2014 compared with 45.5% ($n = 3310$) in 2011 ($P < .001$). Satisfaction with work-life balance also declined in physicians between 2011 and 2014 (48.5% vs 40.9%; $P < .001$). Substantial differences in rates of burnout and satisfaction with work-life balance were observed by specialty. In contrast to the trends in physicians, minimal changes in burnout or satisfaction with work-life balance were observed between 2011 and 2014 in probability-based samples of working US adults, resulting in an increasing disparity in burnout and satisfaction with work-life balance in physicians relative to the general US working population. After pooled multivariate analysis adjusting for age, sex, relationship status, and hours worked per week, physicians remained at an increased risk of burnout (odds ratio, 1.97; 95% CI, 1.80–2.16; $P < .001$) and were less likely to be satisfied with work-life balance. (odds ratio, 0.68; 95% CI, 0.62–0.75; $P < .001$)

The Working Alliance (Bordin, 1979) is the most flexible way to prevent this kind of mechanisms. In fact, it considers these defences from an *intersubjective* and *interpersonal* point of view, no longer as an intrapsychic phenomenon. Burnout is the result of a defence mechanism, and it's a phenomenon that happens only collectively. Nonetheless, it is necessary to add what follows: it is not a prerogative of many doctors to act in a vision of involvement or empathy towards their patients. The patient, together with the demand, takes with him fears and expectations. The doctor often tends to have no curiosity for the other, but he is more interested in not activating mechanisms of recrimination, fearing a rebuke (Fuertes et al., 2015). In this way he starts a relationship that is stuck on the disease to cure and not on the patient to listen, paradoxally easing thwe stressors of the relationship. An analysis of 2017 (Peckham 2017)[1] revealed a further increase of burnout syndrome.

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1. Peckham, C. (2017). Medscape Physician Lifestyle Report 2017: Race and Ethnicity, Bias and Burnout. https://www.medscape.com/features/slideshow/lifestyle/2017/emergency-medicine

Burnout rates for all physician respondents have been trending up since 2013, the first year that Medscape asked about it, when the overall rate was 40%. This year it is 51%, over a 25% increase in just 4 years. A recent major survey supports these findings, reporting that burnout and satisfaction with work-life balance had worsened between 2011 and 2014, with more than half of physicians reporting burnout.

In this year's Medscape report, the highest percentages of burnout occurred among physicians practicing emergency medicine (59%), followed by ob/gyns (56%) and family physicians, internists, and infectious disease physicians (all at 55%). The top four are all physicians who deal directly with patients with a range of complex problems. In Medscape's 2015 and 2016 reports, emergency medicine physicians, family physicians, and internists were also within the top five. Not surprisingly, other research has found high burnout rates in these three professions.

Respondents were asked to rate the severity of their burnout on a scale of 1 to 7, where 1 equals "It does not interfere with my life" and 7 equals "It is so severe that I am thinking of leaving medicine altogether." Of note, emergency and primary care physicians – groups that are consistently at the top in reporting burnout – did not have the highest rates of burnout severity. Among physicians reporting burnout, urologists had the highest average severity rating (4.6), followed by otolaryngology and oncology (both at 4.5). Surprisingly, infectious disease physicians, who were within the top five for experiencing burnout, had the lowest severity rating. (3.9)

In Kane-Peckham 2014[2] was claimed that 68% of general doctors and 73% of the doctor category would not choose the same specialization if they could go back in time. A really alarming fact. Again, in *Second Annual Practice Profitability Index*[3] promoted by CareCloud, 87% of doctors involved claimed pressure of burocracy as one of the main causes of burnout. A data that was confirmed, according to the *Second Annual Practice Profitability Index report* (2014),[4] in which the 70% of all physicians spend at least one full day each work on paperwork and other administrative burdens – and nearly a fourth are spending more than 40% of their time on duties not directly related to patient care. A retraining of an ethic of care is possible,

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2. Kane L, Peckham C. (2014). Medscape Physician Compensation Report 2014. http://www.medscape.com/features/slideshow/compensation/2014/public/overview#24. accessed Jul 15, 2014

3. The Second Annual Practice Profitability Index. 2014 Edition. Care-Cloud. http://www.carecloud.com/blog/practice-profitability-index-2014/?lead_source=web&lead_source_detail=carecloud.com&ls_description=ppi-report-2014-resource-page

4. Physician Stress and Burnout Survey. Physician Wellness Services and Cejka Search. http://vitalworklife.com/wp-content/uploads/2015/02/2015-Stress-Burnout-Survey-Report-02–15-with-links.pdf

pushing away the purely disease-centered conception of medicine. The nature of doctor-patient relationship has to be moral and personal before than professional. Health organizations (such as, in general, care service for people), are one of field which are the most exploited, for example, by research-action, in favour of the promotion of the quality service offered to the (Colucci et al. 2008). This is an approach that turns the topic of change in one of its strengths. The focus is mainly on obstacles and resistance that can lead to a failure of the promotion of change, seen however as a resource to elaborate time after time. This type of research-action tries to reconcile representations of purely normative and hierarchic quality with qualitative perspectives that promote participation and dealing, focusing on aspects such as listening and satisfaction of the whole public. The "psychotherapeutic" construct works within the terms where awareness of disfunctional habits happens on an organizational level. The use of the focus group and interviews, the observation of more shaded dimensions of micro-organizational culture (such as the one of departments that, in fact, makes the system "work"), the use of images to favour a better communication, are all tools that allow the creation of new representations of the profession.

6. Ethics of care and interdisciplinarity

It is necessary to note, however, that this transit of contents, from psychology to medicine, should be approached in an *interdisciplinary* perspective. Nonetheless, crossing the border of each subject cannot be considered a single process, but a trend, an intellectual approach. An ethic communication, empowering who puts it in place, musters a dialogue among knowledges, because it is not linked to only one form of expression (that can be a company, a school, etc.) The ethic paradigm is once again the main character of this analysis. Contemporary knowledge is considerably fragmented: specialization represented and still represents, partly, the necessary condition to improve human knowledge in every field. The partition of knowledge in different subjects is a quite recent fact in the history of science, that sometimes assumed excessive forms. Knowledge has split to the point that it not only seems superficial, but it also underlines a condition of incommunicability between all the fields of knowledge. On the other and, the individual wants to respond to the need of a bettere and more complete reality that is more complex and articulated to him. The individual, in fact, was born in a society of information where survival is favoured by the distribution of knowledge. The hypothesis of an interdisciplinary pragmatism helps to understand how obsolete it is to think of strategies of intervention exploited separately. From that originates the hypothesis that working interdisciplinarly in the field of health can bring to the creation of a

new vocabulary mainly addressed to the well-being of people involved. In summary, rewrite the doctor-patient relationship and rethink about therapeutic communication are the purpose to fulfill through the aformentioned dialogue.

To tap into this construct, the performed kind of operation is similar to a specific form of Interdisciplinarity, the *Theoretical Interdisciplinarity*. Using Klein's taxonomy (2010), we can affirm that using the Working Alliance is equivalent to a theoretical adjustment intended to create a useful paradigm to neighbouring disciplines, without underestimating what, in this "transition", is lost or cannot be reconciled. As Klein herself remembered, taxonomy used until today has been borrowed on an international level, amplifying sometimes its range of research through further sub-specifications. Unlike the other categories, the Theoretical ID begins from an exploration based on the *practice*, which respects the diversity of the various theoretical perspectives in which it's inserted. It fits significantly to their *context*. Klein says:

> Theoretical ID connotes a more comprehensive general view and epistemological form. The outcomes include conceptual frameworks for analysis of particular problems, integration of propositions across disciplines, and new syntheses based on continuities between models and analogies. Individual projects also exhibit theoretical imperatives. One research proposal the AFIR team examined sought to develop a model of mechanisms that mediate mental stress experiences into physiological reactions and eventually coronary heart disease. Previous studies emphasized correlation of single stress factors or separate personal traits associated with the disease. In contrast, the project aimed to develop an interdisciplinary theory based on integration of psychological and medical elements and testing the conceptual tool of inherited 'temperament' […]

This stream of information, in the medical context, must not be taken for granted. The past 20 years have brought to a review of the *archetypal* medical model. This model separates theory, technique and practice as an anachronistic paradigm of the scientific method, and it is possible to state that practice is not only the *unexpected consequence* of the application of science but also -and above all- the self-correction engine of science itself. Starting from the medical model, it must be admitted that there is no application of the theory except in direct experience, unique in its kind. This last orientation is based on the need to "start from oneself", able to put in evidence also the subjective experience, often considered indication of partiality and unreliability. Theoretical ID is, in this sense, the guarantor of this application, able to respect ontologically both the theoretical dimension and the practical dimension, and carrying the most "human" element, unexpected and, therefore, necessary to consider. In terms of the doctor-patient relationship, Theoretical ID exploits a theoretical framework respectful of an otherness not only physical (the doctor-patient *relationship*), but above all, conceptual (the doctor-patient *system*).

Its purpose is to allow understanding of the mutual responsibility and indispensability of the parties in resolving the conflict; it plays not merely an auxiliary role in this dialogue, but aims to exploit a mutual participation in the creation of a broader knowledge and a more effective dialogue. The therapeutic communication in medicine, in fact, doesn't work on general patterns of individual patients: it is forced to leave space to dimensions of uniqueness, respectable as unique and not quantitatively systematized. The doctor perceives the patient's need to speak, and he does not forget that he faces a person seeking first and foremost help. A doctor who is unable to empathize with the patient before his illness cannot promote any healing element in the patient himself, he is unable to come into real contact with the patient. Though the strategies to get efficient medical performances and to promote patient listening have been actually numerous, we noticed that each of these strategies tend to be prescriptive towards the dyad. The prescriptive use of a 'good etiquette' for doctors, for instance, denies that ethical motion toward the relationship with the other, strengthening the burnout as a paradoxe. How can we reify, instead, the interactive dimension of the relationship? It is appropriate to talk about the priciple of *altruistic convenience* (Scarafile 2015). This perspective, theorized by Adam Smith (1982) towards the end of the 18th century, amplifies the utility of convenience inside the relationships, realising it from mechanisms of reification of the parts. The doctor has to include the utility of the patient into his own utility (expertise), because the utility of the patient not only justifies his profesion but also, and above all, it justifies the experience of both of them, expressed through a common language. It is not the aspiration of a single person to lever on the relationship, but it is the sense of intrinsic convenience to give a new meaning to the relationship. Only in that case we can speak of a therapy which actully considers a double otherness to respect, without deleting its natural asymmetry: the doctor then is ready to look at the patient mainly as a person and then as a sick person, instead of seeing in the patient only an illness that identifies him. The patient will see the human involvement of the doctor as well, before looking at his profession. Rewriting, in this light, the doctor-to-patient relationship is rethinking it in an *ethics of care* perspective. Communication is ethical when it actually considers the otherness of who is involved in it. An ethical communication between doctor and patient rewrites the therapeutic dialogue in terms of listening and regard. The 'reward' for this new approach to dialogue is the effectiveness that derives from it, that is the effective therapeutic validity. It is essential to recognize the role of ethics within this communication, where there are increasingly common conflicts that are seemingly irreconcilable. Using, in this case, Dascal's *Theory of Controversy* means rethinking this conflict in a much broader and rewritable perspective. According to Dascal (1998: 22)

> A controversy is a polemical exchange that occupies an intermediate position between discussion and dispute. It can begin with a specific problem, but it spreads quickly to other problems and reveals profound divergences. These involve both opposed attitudes and preferences and disagreements about the extant methods for problem solving. For this reason, the oppositions in question are not perceived simply as a matter of mistakes to be corrected, nor are there accepted procedures for deciding them – which causes the continuation of controversies and sometimes their recurrence. However, they do not reduce to mere unsolvable conflicts of preferences. The contenders pile up arguments they believe increase the weight of their positions *vis a vis* the adversaries' objections, thereby leading, if not to deciding the matter in question, at least to tilting the "balance of reason" in their favor. Controversies are neither solved nor dissolved; they are, at best, resolved. Their resolution may consist in the acknowledgment (by the contenders or by their community of reference) that enough weight has been accumulated in favor of one of the conflicting positions, or in the emergence (thanks to the controversy) of modified positions acceptable to the contenders, or simply in the mutual clarification of the nature of the differences at stake.

Considering the "broken" communication between doctor and patient as a controversy, a de-dichotomized communication is to consider both parties worthy of the same respect, not relegated to the autoreferentiality of a *dichotomized* (Dascal 2008) debate (a communication which aims to demonstrate the inadequacy of each other's ideas). According to Dascal, in fact, true dialogue comes only from listening to each other, from a flexibility far from the prejudice that can pollute the relationship and, quoting Dascal, the « *dogmatic faith* in the final and absolute nature of a conclusion » (Scarafile 2011: 12). It is useful to start from a mutual desire to restore a balance, using a communication in which there should be no winners and losers but an innovation thrust by the dyad, whose peculiarities are used as a resource and not as a limit.

If ethics considers the attitude of dialogue the best of the goods, then an interdisciplinary ethics will automatically create a dialogue that is a therapeutic communication, in the widest sense of the term. None of the parties involved will feel unheard but, on the contrary, the co-building of knowledge will take place in a climate of fairness and collective satisfaction. The interlocutor will realize, in this way, that he has an integrity that is independent of the occupation he carries out. He does not claim to prevail his/her positions, on the contrary he seeks to exploit the mutual participation in the creation of a wider, more complete and comprehensive knowledge. When we talk about ethical communication it is imperative to talk about effectiveness. Firstly, an effective and ethical communication has to start again from the convenience of its proposal. A proposal, to be effective, has to be accepted from all the parts involved, and it has to be convenient (Scarafile

2015). This theory is shared also by the psychotherapeutic model: the other is recognized only when we notice his or her presence, which has its own specificity and meaning. An effective proposal has to be convenient to work: it has to focus on the peculiarity of the other to make him know that he exists and that he is considered. This can be done only if the proposal is ethical: a communicative modality which is not efficient is not ethical, because it is unable to look at the other for who he really is, id est another person. Kaplan writes (1977: 64–65) « communicate with someone is to understand him – the person, not just what he says. […] In the process of communicating, both communicants become more than they were. […]. The communication is the person; not only what you do but what you are. ». The ethic of communication is an option addressed to everyone, not only to some professional categories. In other words, the interlocutor is empowered to an awareness that prescinds his profession.

7.   Conclusions

Why propose an ethic paradigm in communication? Why underline the indispensability of the union ethic/effectiveness in the field of health? First of all, because it is impossible to think of a therapeutic communication that does not respect the mutual recognition of identity between the interlocutors. It is this mutual respect that outlines the path detected by interdisciplinarity. How can we think about an ethical communication that is effective at the same time? Scarafile writes about it (2015: X):

> Abbiamo così provato ad interrogare lo stesso concetto di efficacia, scoprendo che esso include una rinnovata attenzione proprio all'alterità dell'interlocutore. L'efficacia risemantizzata comporta non solo l'individuazione di strumenti e tecniche per comunicare. Essa, infatti, mentre cerca con ostinazione tali strumenti, ponendosi sempre pià in relazione con l'altro scopre la forza dell'ascolto attivo. Esso si dispiega in una retrocessione delle pretese dell'io. Questo movimento dell'io, equivalente ad una detronizzazione, è intimamente etico. […] Non etica o efficacia, dunque, ma etica e efficacia![5]

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5. So, we tried to question the very concept of efficacy, finding that it includes a renewed focus on the otherness of the interlocutor. The reshaped efficacy involves not only the identification of tools and techniques to communicate. In fact, while it seeks these instruments with obstinacy, placing herself more and more in relation with the other, it discovers the strength of active listening. It is deployed in a relegation of the claims of the ego. This ego movement, equivalent to a dethronement, is intimately ethical. […] Not ethics or efficacy, therefore, but ethics and efficacy!

Only in this case it possible to speak of a therapy that really considers the double alterity to respect, without eliminating his natural asymmetry: the doctor is ready to look at the patient mainly as a person and then as a sick person, instead of seeing in the patient only an illness that identifies him. The patient will see the human involvement of the doctor as well, before looking at his profession. Using the model of Working Alliance as a natural declination of the medical communication provides, in my opinion, this mutual recognition. WA is, in fact, the main nonspecific factor common to all types of psychotherapy which can predict the success of treatment. Engaging Working Alliance in the debate between doctor and patient restores that *human* component that has been lost over the years within the relationship, filling a clear gap.

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The pointer finger and the pilgrim shell

Ethics of listening, resistance to change and interdisciplinarity

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One of the risks to the study of interdisciplinary dynamics is to limit the analysis to a description of the visible structures through which it is in action.

Indeed, there are a number of factors which, although invisible, may contribute to the success or failure of an interdisciplinary enterprise.

Through the examination of two case studies, I examine these implicit factors, which underlie the development of interdisciplinarity. In particular, the role of habits, identity factors and the very inadequacy of rational arguments are examined. In a dialectic between invisible and visible emerges the picture of a complex phenomenon to which Caravaggio's *Seven Works of Mercy* alludes in the final part of the essay.

Keywords: reframing, change, connection, invisibility, human factor

University research, by its internal nature, is often isolating. Because of this isolation, the successful investigator sometimes loses touch with the changing times and even with colleagues in neighboring fields.   E. H. Hopkins, 1958
(Brightman 1958: 38)

1. Beyond theoreticism: Research perspectives on interdisciplinarity

In this essay, my attempt is to show the reasons for the plausibility of the thesis that effective interdisciplinarity should be based on an ethics of listening.

As is well known, the ethics of listening represents part of the philosophy that studies communication – focusing attention on the requirements of human interaction, assumed in its complexity; and starting from the insufficiency of theoretical approaches aimed at capturing the interlocutor of the communicative process

as a mere decryptor of messages formulated outside the same context in which the communication takes place.[1]

For this reason, the starting point consists in the exact determination of the perspective from which to consider the theme. In fact, there are several of them. I would like to refer to what Beauchamp says in this connection: "Moral philosophers have traditionally formulated theories of the right, the good, and the virtuous that are set out in the most general terms. A practical price is paid for this theoretical generality: it is usually hazy whether and, if so, how theory is to be applied to generate public policy, settle moral problems, and reduce controversy in controversial cases" (Frey and Wellman 2003: 1).

In an attempt to take account of this theoreticist[2] tendency of contemporary thought, I will try to reserve a suitable space for examples taken from the contexts in which an effective interdisciplinary practice has been conducted.

For this reason, I prefer to recall the ethics of listening not so much in general terms, according to the usual top-down model, but on the contrary, speaking of contexts according to the bottom-up perspective. It is not a question, therefore, of starting first from a theory to be subsequently put into contexts, but, on the contrary, of considering very carefully what happens in contexts, in order to bring out the profound instances useful for a determination of the rules. It is therefore necessary to listen to the contexts as a preliminary condition for the determination of the rules of action. Wishing to take this approach into account already in the initial sections of this paper, I have chosen to refer to two experiences of interdisciplinary practice.

The first dates back to 1958, the second to 2006. In the description of both practices, those who took part in them reflect on the conditions of possibility and limits of de facto interdisciplinarity. Despite the undoubted temporal distance between the two experiences and the difference in the areas in which they have matured, I decided to put the two reports side by side, because it seemed to me that they sufficiently indicate the factors that make it possible to cross unknown territories in which, in the final analysis, interdisciplinarity consists.

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1. I dealt with the issue of the relevance of an ethics of listening in the essay *The ethics of communication and the Terra Terra project* (Barrotta and Scarafile 2018, pp. 145–164).

2. By the term theoreticism, I mean an excessively theoretical way of studying scientific and philosophical problems. It is an outcome that can affect all branches of philosophy, not excluding applied ethics. One of the forms taken by theoreticism is the commentary on philosophical texts, considered a philosophical activity *par excellence*. When this happens, we are in fact overlooking the fact that the responsibility of the philosopher requires the courage to think about original philosophical solutions. In order to do this, it is obviously necessary not to renounce the value of tradition, but to be able to make that same tradition alive, not to be content with philological approaches.

For these reasons, I could also say that this paper stems from the following basic question: What can motivate a researcher to change his own disciplinary mindset, to embrace another completely different one? Responding to this question has meant first of all considering a number of reports on interdisciplinary work (§ 1). I was interested in trying to isolate any constants and recurrences in the problems encountered.

Secondly, I decided to focus my analysis on what "change" means. My interest was not so much in a theoretical problematization of the theme, but in grasping its connections with the so-called "human factor" (§ 2). I am interested in highlighting those aspects that link the theme to the personal dynamics that make it possible or hinder it, such as resistance to change of a conscious (§ 2.1) and unconscious (§ 2.2) type. The mentioned attention to the concretion of situations, which allows us to talk about interdisciplinary practices, has required us finally to try to isolate one of the eminent characteristics of the context in which we live: the idea of connection (§ 3). I wondered how this characteristic should be taken into account in our actions, what we can learn from it and, above all, what its link with invisibility is.

1.1   The "I don't know what they represent, but I'm against them" syndrome

In 1958, I. Jay Brightman, an internist and public health administrator, wrote an article published in the *Annals of the New York Academy of Sciences* (Brightman 1958), listing the problems actually encountered in an interdisciplinary practice within the Interdepartmental Health Resources Board, a structure whose purpose was to stimulate joint planning and the promotion of research in areas of health where two or more state agencies were involved. Although more than half a century old, Dr. Brightman's article seemed to me to be interesting because it contains a clear recognition of the problems that have arisen in the field of interdisciplinary practice. Therefore, before analysing in detail some of the problems that have emerged, it is advisable to make a rapid reconnaissance of them:

1. lack of knowledge of the basic nature of other disciplines;
2. lack of an effective mechanism for communication between disciplines;
3. confidentiality of information;
4. lack of utilization of all disciplines concerned in initial planning;
5. lack of an adequate medium of exchange of information among disciplines;
6. lack of coordination;
7. improper allocation or channeling of funds;
8. personal and interpersonal problems.

After having recalled, in general terms, the problems, let's analyze some of them in detail.

1.1.1 *Lack of knowledge of the basic nature of other disciplines*

Working in one discipline, explains Dr. Brightman, we should be prepared to admit that we know little or nothing about the fundamental postulates of another discipline or how another discipline can contribute to or strengthen our commitment. Within the Interdepartmental Health Resources Board, this issue has been addressed by preparing some initial orientation sessions. Although these sessions are not further specified in the text, it is easy to argue what function they have fulfilled: to fill the knowledge gaps, related to other disciplinary approaches, and also to overcome the predictable presumption of knowledge.

1.1.2 *Lack of an effective mechanism for communication between disciplines*

If you want to fully achieve the goal, you need to establish adequate communication channels (Brightman 1958: 36) with those who need to work on the same goal.

1.1.3 *Lack of an adequate medium of exchange of information among disciplines*

Specialist journals or literature provide useful information on what your colleagues are working on. The problem arises when we want to know what experts from other disciplines are doing. In fact, as much as we can commit ourselves to reading what they are writing, there is no doubt that there are insurmountable difficulties in understanding their essays, which are oriented more from an intradisciplinary perspective than anything else. Specialist language and technical jargon are therefore real difficulties. Dr. Brightman cites as an example to follow the *Quarterly Journal of Studies of Alcohol*, which has the merit of preparing abstracts of articles from all disciplines in relation to the themes to which the same journal is dedicated.

1.1.4 *Improper allocation or channeling of funds*

Since any research requires the allocation of funds, interdisciplinary research sometimes receives smaller funds. Brightman explains that "the common occurrence of pressure groups, led by persons with vested interests who have been influential in procuring the funds may, because of their demand for a quick answer to a limited field, obstruct such an interdisciplinary approach" (Brightman 1958: 39). This raises the question of the correspondence between the interests of funders and the research fields of scientists. The more specific the research fields are, the more attractive they are to funders. Generally and with significant exceptions, an

interdisciplinary research field, involving different disciplines, is not able to be attractive to any stakeholders.

1.1.5   *Personal and interpersonal problems*

The so-called human factor is an issue that risks being underestimated not because it is absent, but – on the contrary – precisely because of its pervasiveness, by which it is generally believed that nothing can be done. Cautiously, but not without subtle irony, Dr. Brightman observes, "I shall not hazard a guess as to how common the personal and interpersonal factors are, and I am certainly not suggesting that a significant number of research workers should see a psychiatrist" (Brightman 1958: 39). The emergence of different types of obstacles in the practice of interdisciplinarity leads to the creation and, where already existing, the reinforcement of relational barriers between those involved. When this happens, any communicative exchange becomes more difficult, because a general lack of trust has now emerged which, inevitably, comes to negatively affect the environment in which interdisciplinarity should be implemented. Dr. Brightman reserves an effective definition for this dynamic, speaking of the attitude "I don't know what they represent, but I'm against them." A realistic work on interdisciplinarity should start from an exact recognition of the forces in the field, recognizing that the same interdisciplinarity is never a fact already available, but the result of the joint action of several actors available to overcome the securities generally offered by a stable station within their discipline, to move towards what, at least at the beginning, is an unknown land. Obviously, there may be different models to make this "unknown land" a common area for those involved in interdisciplinary work. However, what should be kept constantly in mind is the effort to escape the natural force of gravity that binds and connects each of us to our own discipline. Without such an eccentric force,[3] which leads outside the comfort zones of one's own discipline, interdisciplinarity is simply destined to remain a theoretical concept. At the same time, we must realise that one of the main factors capable of influencing this eccentricity is the relational component.

1.2   Make interdisciplinarity work

The second experience of interdisciplinary practice was recounted in 2006, when Mariella Marzano, David N. Carss and Sandra Bell, researchers at the University of Durham and the Centre for Ecology & Idrology in Banchory,

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3. I refer to a force that leads away from the center, in accordance with the etymology of the adjective "eccentric," derived from the late Latin "eccentrus" and the Greek term ἔκκεντρος, composed of ἐκ ("outside") and κέντρον ("center").

Kincardineshire, England, write an article published in the *Journal of Agricultural Economics* (Marzano, Carss, and Bell 2006). The article, entitled Working to make Interdisciplinarity Work, reports the results of a field study in which participants in an interdisciplinary research project, developed within the UK's Rural Economy and Land Use (RELU) Programme, were interviewed. The aim of this research programme was to improve the understanding of how interdisciplinarity can support the challenges that rural areas increasingly face.

The authors of the paper write, "There is a growing body of literature on interdisciplinary theory and methods, but we identified a need to access the views, opinions and, most significantly, the experiences of researches facing the challenges of interdisciplinarity" (Marzano, Carss, and Bell 2006: 186). This is exactly the point: on the one hand, in the field of interdisciplinarity we are faced with a large number of interesting theoretical studies. On the other hand, we tend to overlook the fact that the application of such studies – and of the models presented in them – depends on the ability to listen to what the contexts have to say. In other words, models and contexts are related. This correlation, however, is not in itself sufficient, because it can always be converted into incommunicability.[4] When this happens, we find ourselves within that previously referred to theoreticalist tendency.

In the RELU Programme, natural and social scientist did cooperate, but they encountered difficulties in integrating their own research perspectives and different types of data. The focus is, therefore, on communication: "People struggle to penetrate the knowledge and ideas informing other researches' disciplines, as well as to explain their own disciplinary ideas and activities to others" (Marzano, Carss, and Bell 2006: 189). When these communication problems arise, people assume defensive attitudes: "Several respondents believe that researches tend to be defensive about their own discipline and that this inhibits successful collaborations" (Marzano, Carss, and Bell 2006: ivi). More specifically, the problems of communication concern the possibility of orienting oneself within the specialist linguistic codes of each discipline, the so-called "esoteric terminology" (Marzano, Carss, and Bell 2006: 191).

Solving the reported problems requires not only the provision of tools for field contamination. For these tools to be effective, it is necessary to work on a preliminary condition that concerns the quality of relations between people; and that, once again, concerns practices: "Interviewees frequently expressed the opinion

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4. The risks of such incommunicability have been highlighted by Barrotta and Montuschi (Barrotta and Scarafile 2018 pp. 17–33), with particular reference to the Vajont tragedy. And it is precisely because of this possible incommunicability that they have come to formulate the need for a "community of inquirers" that connects the knowledge of experts and that of laypeople.

that success or failure within interdisciplinary projects is heavily dependent on the strength of interpersonal relations among team members. Working across interdisciplinary boundaries entails close contact between people from different reference groups" (Marzano, Carss, and Bell 2006: 190). In other words, there can be effective communication if a communicative relationship is established. As the authors of the article explain, "Our data indicate that the circumstances where self-assurance flowers are those where individuals feel they are receiving respect from colleagues" (Marzano, Carss, and Bell 2006: 189). For this to happen, "The speakers appeal for time to develop trust between participants, creating a sense of security within the group" (Marzano, Carss, and Bell 2006: 190). Moreover, it must be kept in mind that interdisciplinarity must be implemented between experts who, belonging to different disciplines, do not share the same languages, making the task of understanding each other difficult. "A problem for the person speaking is that they need to be able to imagine their knowledge outside of their usual working context and practice in order to be able to communicate effectively" (Bracken and Oughton 2006: 378).

For this very reason, some studies have focused on the dynamics of communication.[5] A study by Bracken and Oughton (2006) has the merit of having identified, through the consideration of concrete interdisciplinary practices, a triple way in which better communication can be implemented. It is based on the difference between the following three aspects:

1. Dialects
   "It indicates the difference between the daily use of a term and the ways in which different disciplines use the same word to mean different things" (Bracken and Oughton 2006: 376). Since the determination of the exact meaning of a term depends on the context, it is not necessarily possible to arrive at its exact determination, precisely because of the different origins of the experts.

2. Metaphor
   In general terms, the metaphor is the replacement of an own term with a figured one, following a symbolic transposition of images. The metaphor can have a heuristic value when it allows us to understand in a way not allowed by a text. This peculiarity of the metaphor is particularly useful in cases where it is addressed to experts from different disciplines who do not share the same theoretical and conceptual background.

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5. See, in particular: Holbrook (2013), who questions the meaning of interdisciplinary communication, appropriately considering the issue not so much from an ontological point of view, as with reference to some possible models.

3. Articulation

    It is a real process. It consists in deconstructing some assumptions of one's own discipline together with those of other disciplines in order to identify in this way the building blocks of both. They can be reassembled in different ways to reach a more shared knowledge.

2.   The human factor and change

Therefore, a realistic consideration of interdisciplinary practice, aimed at identifying its fundamental conditions of possibility, should not exclude the so-called "human factor." From this perspective, it must be recognized that if, as I said, the beginning of a path of interdisciplinarity requires us to leave the comfort zone constituted by the security of our discipline, this "escape" will inevitably be accompanied by resistance of various kinds, precisely by those who will have to – convincingly or not – put it into practice.[6]

The first kind of resistance I would like to refer to is, in some ways, "structural." Interdisciplinarity, in fact, is not – and could never obviously be – a discipline. It could probably be more effectively defined as an attitude. The fact is that, nowadays, the role of disciplines in the transmission of knowledge is inalienable. Such a statement is also true when we want to verify it with reference to different cultural and geographical contexts. Talking about disciplines does not only mean referring to the form taken by knowledge.[7]

For this form to function, in fact, we need a structure that supports it. In turn, talking about structure means referring to precise hierarchies through which the transmission of knowledge takes place. One of these hierarchies concerns the distinction between structured and unstructured personnel within universities. In general terms, structured personnel is made up of those who have a permanent contract, while the so-called unstructured personnel includes all those who,

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6. Obviously, this does not exclude the possibility that completely different and, so to speak, less linear starting conditions may exist than those described in this paragraph. What seems to me to be common to many situations is the fact that, with the exception of rare cases of interdisciplinary specialists, an interdisciplinary practice always takes place between experts anchored in a given discipline and willing to "transgress." An underlying principle is thus identified that motivates transgression. It is a question (and the task that I propose in this paragraph) of isolating certain conditions of possibility and, at the same time, of outlining a morphology of the resistance that these "transgressive" experts encounter.

7. See, in particular, Gibbons (1994), who, identifying features of the new mode of knowledge production – reflexivity, transdisciplinarity, heterogeneity – shows how these features connect with the changing role of knowledge in social relations.

although involved in research or teaching activities, perform this function for a fixed period of time.

One of the factors that most – though not exclusively – determine the transition from one position to another within this ideal pyramid is now represented by intradisciplinary specialization. The more you possess this specialization, the more you have the chance to advance in your academic career. On the contrary, the more interdisciplinary research you carry out, the more you risk going into the background when you access an assessment for advancement from an academic position to a higher one. It then becomes quite understandable what Anne Balsamo and Carl Mitcham observe: "In the discipline of philosophy, those who become involved in interdisciplinary work are often professionally marginalized" (Frodeman 2010: 267); with the sad warning that this dynamic does not refer only to scholars of philosophy.

On the basis of the above, the practice of interdisciplinarity is to be considered as a "windward" practice, unless one already has an apical position within the hierarchy of academic life. In order to deal with a given research in an interdisciplinary perspective, the individual researcher must take into account, or at least not exclude, negative consequences on his or her career. If, on the other hand, the top of a consolidated academic position has been reached, it is not certain that we are willing to set aside everything for which we have fought in years of intradisciplinary confrontation in order to venture into unknown territories. Obviously, there are significant exceptions that can motivate us to undertake an interdisciplinary path. For example, embracing an interdisciplinary perspective can be interesting, if new areas of academic power are identified to be conquered, even if the intrinsic limit to such an approach is, in some ways, "epistemic," since interdisciplinarity can never be reduced to discipline, except at the cost of a logical short circuit.

These notations are not intended to discourage the pursuit of a clear interdisciplinary orientation. On the contrary, they aim to try to frame as precisely as possible the conditions under which this pursuit can actually be achieved.[8]

For the reasons given so far, therefore, except for significant exceptions, the basic level of involvement in interdisciplinary research must be based on overcoming forms of resistance. Precisely for this reason, it is reasonable to suppose that one is more willing to embrace an interdisciplinary perspective if one is able to identify some convenience. Talking about "convenience" does not necessarily

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8. Among these conditions, should be noted what Bracken and Oughton (2006: 380) write: "The notional hierarchies of disciplines, the personal ambitions and competitiveness of colleagues, not to mention the implicit and longstanding issues of power surrounding gender relation, all pay an important part in determining interactions within the research group."

mean referring to a selfish motive as the basis of a researcher's conduct.[9] At the same time, it would be unrealistic to deny that the level of involvement in an interdisciplinary practice is the result of careful evaluation, consisting in weighing the pros and cons, by those involved.

2.1 Aware and unconscious resistance: The role of reframing

What has been said so far is valid for those resistances that we can define as "conscious" – that is, well identifiable in the light of a rational consideration. Scholars of change, however, have long felt that the most subtle resistances are "unconscious," such as to act within our way of thinking without us realizing it.

I would like, in this regard, to recall a specific sequence from the mockumentary film *Zelig*, written, directed and interpreted in 1983 by Woody Allen. The film was dedicated to the figure of Leonard Zelig, called the human chameleon for his characteristic of resembling to the point of paroxysm those with whom he related. From this point of view, Zelig can be considered the very emblem of transformation, the attitude of those who practice identity mobility, used to hide one's attempt to always remain identical to oneself. It's a form of resistance to change, paradoxical though it may be, and that's why I'm interested in the present essay. In the scene of a therapeutic dialogue, Dr. Eudora Nesbitt Fletcher, in order to avoid facing the same failure as the psychologists who had already visited Zelig before her, decides to adopt a different technique, aimed at exposing the "game" of Zelig. In an attempt to unravel the true identity of the man, it is, therefore, the doctor herself who confesses that she is not a true doctor and indeed that she has always pretended to be a true doctor for the sole purpose of pleasing others. In the face of such an offside of her own prerogatives, Zelig is out in the open. It will be the beginning of the real cure.

With regard to the resistance to change that I am talking about with reference to interdisciplinarity, I do not intend a direct attribution of "Zelig syndrome" to some of the participants in interdisciplinary practices. Rather, it is a matter of using the reframing method, which consists in showing the protagonists themselves the terms of the issue from a new and completely unexpected point of view.[10]

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9. I developed this theme in "Controversies on Body" (Scarafile 2016).

10. Oughton and Bracken (2009) have studied the difference in the meaning of framing/reframing depending on whether it refers to disciplinary or interdisciplinary practices. In this regard, they observe "Actors bring to the discussion different perspectives related to their values, training, interests and political stance. The most obvious being their disciplinary background, which influences training and experiences.… The need to generate data that are considered valid, or at least accepted by all, means that methodologies may have to redesignated or renegotiated" (Oughton and Bracken 2009: 390).

Reframing is not a standardized technique to be used regardless of the individual characteristics of the participants. It becomes possible as long as you are able to take on the specificity of your interlocutors. As Watzlawick recalls (Watzlawick, Weakland, and Fisch 1974: 104), "This rule stands in sharp contrast to the teachings of most schools of psychotherapy, which either tend to apply mechanically one and the same procedure to the most disparate patients, or find it necessary first to teach the patient a new language, to have him begin to think in terms of this new language, and then to attempt change by communicating in this language." Being able to take on the specificity of the interlocutors means practicing a particular idea of communication, based on the model of listening rather than on that of mere effectiveness in the transmission of a message.

When this goal is achieved, it is possible to make the reframe which, therefore, according to the description given by Watzlawick,[11] means "to change the conceptual and/or emotional setting or viewpoint in relation to which a situation is experienced and to place it in another frame which fits the 'facts' of the same concrete situation equally well or even better, and thereby changes its entire meaning" (Watzlawick, Weakland, and Fisch 1974: 95).

To conceptually explain the conditions of possibility of reframing, it is necessary to refer to a component of the perceptual activity. In the perception of a single fact, situation or event, in fact, the perceived element is always placed within a reference system.[12] The link between fact and class of belonging becomes something "natural," and never would one think of being able to separate this relationship. In reframing, on the other hand, exactly this change is made, inserting the single event perceived within a different class of belonging. Such a change of location ends up transforming the meaning of the single event. In practice, it is like looking at reality with new eyes. Generally, this kind of transformation is practiced by a therapist, who thus helps the patient to see in less traumatic or negative terms a certain situation which has been perceived as problematic. Watzlawick himself introduced the reference to reframing, quoting a famous passage from Mark Twain's book, *The Adventures of Tom Sawyer*. Tom is given the punishment of painting a long, high fence. To the boy the punishment seems absurd, all the more so because he has to perform that unwelcome task on Saturday afternoon, while all the other boys enjoy the holiday. As if that weren't enough, one of them, Ben, has just approached Tom and has, with the subtle cruelty of the boys, started teasing him, contrasting that boring activity with the fact that he is about to go to the pool. You don't want to come to the pool, Ben asks, rather than do that job?

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11. See also Watzlawick (1978).

12. In this sense, Gestaltpsychologie had spoken of the unattainability of the relationship between figure and background.

It's at this point that Tom has an unsettling answer. If I like to paint this fence?, he asks Ben. Then, he continues: – I don't see why I shouldn't like it. After all, when does a guy ever have the opportunity to paint a fence?

Those words produce the desired effect, as Twain points out: "That put the thing in a new light. Ben stopped nibbling his apple. Tom swept his brush daintily back and forth – stepped back to note the effect – added a touch here and there – criticised the effect again – Ben watching every move and getting more and more interested, more and more absorbed. Presently he said: "Say, Tom, let me white-wash a little" (Twain and Stoneley 2007: 21). Reframing, therefore, corresponds to the condition of possibility of that transgression to which I referred earlier. Transgression originates from the feeling that one's own reference categories are not sufficient to face a given problem.

From this perspective, it is important to remember what was stated by one of the experts interviewed by Elizabeth Oughton and Louise Bracken (2009: 391): "Framing is for me always partial and open to reframing.… So I think that is the central tension really in doing research, that research is about finding things out, but yet all the time we are kind of implicitly structuring and framing our observa-tion." Since reframing should be referred to interdisciplinarity, I suggest that atten-tion be paid to the following factors, as discussed below.

2.1.1   *Insufficiency of rational arguments*

It may seem paradoxical, but several studies have indicated that, for a change to be effective, it is necessary that, in addition to the rational dimension, the emotional dimension must come into play. Every change is accompanied by emotions. If emotions are neglected, if they are not kept in mind, then it is possible that the mo-tivation for change does not last long. Managing the emotions of those involved in interdisciplinary work is something extremely rare. Yet, one should take into account those particular "regressive drives" that are able to push back those who have rationally decided to advance along the path that leads to explore unknown spaces, beyond the confines of their own discipline of reference. Therefore, a "mo-tivational accompaniment" should be provided, capable of providing support to those who, on the one hand or on the other, engage in interdisciplinary research and abandon the comfort zones of their discipline. How would such a request be accepted by the academic bodies that finance the research?

2.1.2   *Change and identity*

Another factor to keep in mind – because the change we hope to achieve is con-stantly pursued – is to connect the results of the change to the identity of those who achieve it. Sometimes, we resist a transformation simply because we do not

identify with it. Along the way, it is entirely realistic that, as we pursue change, it is felt to be a threat to our established position rents.

2.1.3 *The role of habits*

For this reason, it is not irrelevant to ask ourselves the question of how we should take into account the habits that generally account for about 40 percent in determining our actions. Habits can be considered as real repeated actions. They consist of three moments: (1) The stimulus. We perceive an external stimulus (for example, the bell ringing). This perception creates a peak in our attention, after which our brain determines if there is a predefined habit able to deal with the solicitation just received; (2) The routine. Once we hear the sound of the bell, we get up and go to the intercom. It is a semi-automatic action, as if we were acting on autopilot; (3) The reward. After having performed the first two moments of the habit, we feel within us the gratification for the completion of the activity in which we were engaged.

This three-part scheme shows why in many situations it is difficult to act outside of a well-established habit. Abandoning a habit is difficult, because it is difficult to manage the expectation of the reward, that is, the particular gratification I expect to receive after I have completed a certain task. Can we not rely exclusively on routine when we have to solve a task?

2.1.4 *Role of best practices*

Often, the focus is exclusively on the task to be performed. The same thing happens in interdisciplinary research. Not only is the level of motivation of those involved in the projects taken for granted, but it is mostly mistakenly assumed that it does not fluctuate. For this very reason, the comparison with best practices is very important.[13]

In 1990, Jerry Sternin, an American scholar and activist, was called by the Governor of Vietnam to find an innovative strategy to combat child malnutrition. Instead of dwelling on the multiple causes of that situation (health conditions, poverty, etc.), Sternin decided to look in that very context, as paradoxical as it might seem, for "the positive side."[14] In this way, he discovered that in a small local village, some children did not present the dramatic problems of malnutrition found in the rest of the country. The parents of these children had solved the

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13. The principle set out in this point recalls, by analogy, the letters that the missionaries, engaged in distant mission lands, sent to their communities of origin. Those letters, in fact, were not by chance defined as "edifying," precisely because they had the effect of motivating to charity those who were, in various ways, recipients. See, in this regard, Citati et al. (2008).

14. See Pascale, Sternin, and Sternin (2010).

problem with the few resources available to them. Sternin observed these families and discovered that there were important differences in the way these children were fed. For example, while they received the same amount of food as the others, a difference could be seen in the choice of mothers who, by preparing smaller portions, were able to feed them more frequently, thus meeting the nutritional needs of the children. By that time Sternin's work had become somewhat simpler: it was enough to spread this virtuous attitude also to the other villages whose inhabitants had no problem in receiving a change that came from their own community instead of being imported from outside. The impact of these small changes was surprising: six months later, 65 percent of the children were no longer malnourished. The strategy of innovating through the positive side had produced an incredible result. Sternin's method gave rise to an approach to change called Positive Deviance, based on the observation that in every community there are people who are able to put in place innovative solutions. Identifying these people requires listening, an attitude that is often overlooked because it is considered secondary to allegedly more effective approaches to communication.

Are we able to put in place such practices of listening to contexts?

2.1.5   *Threshold guardians*

Resistance to change can also take the form of a person who systematically carries out one of the following actions: discouraging, advising against, warning against, criticising. Some scholars[15] have spoken in this sense of the "guardian of the threshold." The idea is borrowed from mythology and from esoteric tales in which it is represented by a spectral figure whom one must confront while walking along a path of inner purification. Some studies by Jung have shown that it is a sort of archetype, or an impersonal function, comparable to a mask, which can be worn from time to time by a different person. To venture into the territories of interdisciplinarity can be understood, as I have tried to explain, as the will to go beyond what is considered legitimate. Precisely in this sense, then, we must be aware of the resistance that can arise from the choice to continue along a path considered incongruous. The right way to deal with such resistance is not to increase its contrasting value, turning it into conflict.

The opposition of the guardian of the threshold must, instead, be listened to. It is an opportunity to see whether our actions are well founded. In the face of a deliberation which arises from our careful examination of conscience, in fact, the guardian of the threshold can do nothing. The last action he will have to take will be to move away and let you pass. At that point, if you have been constant in your intentions and consistent with your vocation, you will be a bit like the kites that,

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15. I'm referring to Vogler (1998), but also to Rudolf Steiner.

to fly really high, need a headwind. Listening, perseverance and motivation once again play an important role. Will we be able to live them in the right sequence and without overlapping?

3.   Existing inside the maps: Connection and visibility

In previous sections of this paper, I tried to outline the characteristics of the mindset required in interdisciplinary practices. In what follows, however, I intend to analyze the notion of "connection," given the relevance of its implications for the purposes of this paper. In my opinion, such a theme is fundamental in order to contextualize my study on interdisciplinarity in the most exact possible way.

I would like to start from an ordinary consideration: while I'm writing this article I am tempted to check if I have received any emails or to read the latest news on the Web.[16] This distraction is a possibility offered to me by the fact that I have at my disposal an Internet connection through which, even if I am closed in my studio, I am still permeable to external influences.

Those who are spatially distant from me can be present no less than my daughter who, from time to time, enters the studio to ask me to play. Our condition is to be connected.

This idea of a connection that we cannot do without now accompanies us, as if it were a background, in an almost constant way. One could therefore observe that it has become an integral part of our way of conceiving the whole of reality. In fact, it is really difficult to imagine that we are not connected. Even the possible voluntary suspension of any communication with the outside world would be only an exception to a custom that has now begun whereby we are permanently connected to one another, in the different forms in which this is possible. If, for example, I telephone someone, my phone calls are tracked by location, and the geography of my connections is continuously updated; if I drive to pick up my wife who has finished her karate lesson, the traffic information provided to me in real time by the navigator is further proof that I move within a web of connections, continuously updated. I fly over the ethical aspects,[17] however essential, because

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16. In trying to cope with this kind of distraction, I am inspired, albeit with modest results, by the famous writer Zadie Smith, who recently declared that when she writes she uses software that blocks the Internet, in order not to be distracted. See Vinter (2012).

17. The presence of Big Data poses the problem of the implications of "impersonal data." This is a real challenge, since it questions the effectiveness of one of the historical assumptions of ethics itself, namely the principle of individual responsibility. This principle is based on the identifiability of the consequences of actions by the individual agent (moral agency), a well-known

here I am interested in reflecting on the fact that, regardless of our level of awareness, our entire life develops within such a network whose presence also affects my way of thinking. Yes, because connections do not only mean the availability of access to information in real time. They constitute a database that, growing indefinitely, is like a collective memory that I can consult (or perhaps I delude myself that I can consult) at any time. If I notice a reddening on the skin, even before talking to the doctor, I will go to consult a site specializing in skin diseases and, immediately after, one to treat the symptoms of hypochondria that, in doing so, I have induced myself.

I use these examples to make it clear that human territories are now mapped. Whatever the theme, territory or area we refer to, there will be a map already drawn. The maps, after all, are real testimonies. They show that the territories represented have actually been visited by someone else before me and that he has drawn the boundaries.

Obviously, I can go back in time to understand if a particular map has been drawn in the most correct way, but it is also true that the time required for such an operation is not always available. In other words, we can't start the adventure of knowledge again and again every time. If I want to be contemporary, I have to, in a certain sense, trust the available maps, without giving up my critical spirit.

This presence of maps reveals two aspects at the same time: on the one hand, it is reassuring: in fact, it is difficult for me to find myself alone and lost during my research. In this sense, I will always have the possibility to refer to coordinates – that is, to a system of references – and, in this way, it will be more difficult to get lost. On the other hand, this discreet presence of already available maps on every aspect of life is at least a little disturbing. What is, in fact, the exclusivity and uniqueness of a person's experience if what he can do or think has been, for the most part, already done or thought about? It is certainly important to question the meaning of an existence conducted through pre-existing maps. At the same time,

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problem within studies on the ethical implications of Big Data (the so called "many hands" problem (see Noorman 2018). In fact, the presence of Big Data itself demonstrates the overcoming of the concept of traditional reality, in favour of the creation of a digital image of our reality, into which enormous amounts of data are poured. In this sense, we have spoken of "datafication." Within this "datafied world" – that is, within the digital representation of the traditionally understood world – there are undoubtedly problems of privacy. However, they are still the result of a traditional vision, completely surpassed by the new scenarios in which a real paradigm shift in representation is taking shape. In fact, in the presence of an almost unlimited amount of data, the representation of reality not only allows us to see the trend lines of behavior in progress in reality, as happened, for example, through the use of statistical tools; with Big Data, representation can become a real prediction of behaviors. It is on this front that ethics is called upon to equip itself, also through an updating of its own operational tools (cf. Zwitter 2014).

it is necessary to return to questioning the operation that underlies it, and that can be made to coincide with the question, only apparently trivial, "What does it mean to live in a territory?"

Bonnett ecently wrote to that effect: "A place is a storied landscape, some*where* that has a human meaning. But another thing we have started to learn, or relearn, is that places aren't just about people; *that they reflect our attempt to grasp and make sense of the non-human*; the land and its many inhabitants that are forever around and beyond us" (Bonnett 2017: 4; my emphasis).

In reality, being in a territory doesn't refer in the first instance to one's own localization, but to something else, well indicated in the previous track by referring to the attempt to give meaning to the non-human. This attempt should be understood, it seems to me, as the manifestation of the need to look for the other, what we are not rather than the confirmation of our presence and our identity. So, even before we put in place a representation, our presence in a given territory speaks to us of our need to seek what we are not. Looking for what we are not – "the non-human," in Bonnett's words – is not a play on words.

Does what is mentioned in these words only represent a kind of suggestion, or is it able to suggest a precise intentional direction?

3.1   Existing outside the maps: Invisibility and connection

On 23 May 1945, two weeks after the end of the Second World War in Europe, Lucian Marie, captain of the fishing vessel *Les Trois Frères*, while searching the horizon, suddenly noticed the presence of some men on a small group of rocks, near the islet of Jersey, in the waters off the French coast. Captain Marie's surprise grew when, having approached in his boat, he realized that it was a group of German soldiers who, exhausted, were by then determined to surrender. In practice, these soldiers had been forgotten. This event which really happened is exceptional for several reasons. Certainly the human story of the German soldiers is surprising, but no less important is the discovery of Captain Marie that on those islets there could be human life. Those rocks, in fact, are part of an archipelago of tiny islets, known by the name Les Minquiers, which are not present on most maps. They, in fact, have a particular configuration so that they become more or less visible depending on the tides.

As small as they may be, Les Minquiers represent a particularly significant exception for the purposes of our discourse, because they can be called to symbolize all those territories, not only physical, that escape any attempt at categorizing or representation.[18] With respect to these invisible territories, our usual repre-

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18. See Bonnett (2017).

sentative activity has come to an end. There are no predefined maps to question or coordinates to help. Only the knowledge of those who live nearby can help to find an orientation.

Referring to our theme, this example implies that if we really want to understand the dynamics of interdisciplinarity, we must imagine entering into territories not yet defined. Embarking on such navigation is very often not the result of a free choice. We are forced; that is the truth. We are forced by the fact that we have to face – with regard to energy, water, climate, food, health – problems with indefinite contours, and we must proceed in this direction without particular fears, in the same way that the presence of sea monsters, which today we know to be imaginary, did not prevent the first navigators from going beyond the boundaries of what was licit, towards unexplored lands.

What I am talking about is not just a manner of speaking. Going beyond the boundaries of what is known means concretely imagining the paths on which the specialists of individual knowledge must walk – renouncing, at least in part, the conceptual tools with which they work every day. Above all, we must give up all emphasis and recognise that this is a difficult undertaking, if taken seriously. Effective interdisciplinarity is a process in which you gradually try to define a common language as you set aside your own securities. If you stay in your own securities, in fact, it will be more difficult to make yourself understood and, consequently, to understand what others want to tell us. Wind navigation is much more difficult than assisted navigation. Out of metaphor, this means changing one's mindset, recognizing resistance in the different forms in which it manifests itself.

4.   Conclusion: The pointer finger and the pilgrim shell

Sette opere di Misericordia (*Seven Works of Mercy*) is the name of a painting by Caravaggio, made between the end of 1606 and 1607. In the work, some of the characters give life in a synchronic way to different actions that together form the face of mercy. Looking at the canvas on the right, we see a deacon holding the feet of a deceased person. It is the action that brought about the first work of mercy: "burying the dead." On the right, lower than the action just described, there are two figures: an old man in front of whom you can see a young woman, portrayed in the act of pulling out a breast. It is Cimone, sentenced to death by hunger in prison, who was secretly fed from the breast of his daughter Pero. With this second scene, the second work of mercy is realized: to visit the prisoners.

In the central part of the painting, you can see a young knight, St. Martin, giving his cloak to a man, portrayed from behind. We have thus come to the third work, "Dressing the Naked."

The fourth work, "giving drink to the thirsty," is represented by a man who drinks from a donkey's jaw. It is Samson, which is mentioned in the Book of Judges of the Bible.

Then there is the fifth work, "Hosting the pilgrims," represented by two figures, which we can see on the left of the painting and which are represented by Caravaggio one in front of the other. One of them, the man on the right, wears a hat on which a shell is visible. It is the symbol of the pilgrims. The left-handed man with the index finger indicates something that is placed towards the left frame of the painting, but outside the scene. It is presumable that he indicates the destination of the pilgrim and that destination is not on the order of the visible.

The painting, therefore, shows a series of different actions that, on the whole, give substance to the practice of mercy. The culminating point of these actions, however, is outside the painting, in the invisible. It is precisely the invisible, then, which becomes the pivot of the entire action. Mercy, therefore, is not only a question connected to the order of doing; but to be fully interpreted it requires the ability to go beyond the usual expectations.

Looking beyond what is ordinary, feeling the need for it, finding ways to set out towards such a destination is, as I have tried to write, the matrix of interdisciplinary work itself. It is for this reason that, as if it were a good viaticum in the journey that awaits us, the index finger of the hand of the man depicted on the left and the shell on the hat of the pilgrim, represent two symbols that we do not want to give up, because they constantly remind us of the meaning of our search.

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CHAPTER 13

Science and democracy

A complex relationship

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The article analyses the relationship between science and democracy on basis of a very specific point of view. Three arguments are put forward to defend that. In its historical origin, in its linguistic roots and in its institutional basis, science is (and continues to be) a democratic endeavor. The article very briefly discusses the decisive changings in the relation between science and political, economic and military power that took place during the XX century and stresses the cognitive relevance of a set of universal institutions which, all along the history of science, provide the conditions of possibility for science to exist and develop. Finally, even if today those universal institutions face big transformations, the possibility for science to remain a free democratic endeavor is questioned and argued.

Keywords: philosophy of science, science, democracy, cognitive universal institutions, historical *a priori*, big science, technoscience, citizen science

To think out the relationship between science and democracy is an interdisciplinary task demanding the contribution of a large scope of disciplines: political sciences, philosophy, history, science policy, economics, semiology, sociology, environmental studies, etc.

However, the aim of this article is just to make some suggestions for the analysis of that relationship from the point of a very peculiar approach in the context of philosophy of science. The aim is not to question the similarities of science and democracy, as for instance, to look for what the structural regime of science has inherited from democratic processes or how much the usual qualities of the scientific *habitus* are replicas of the democratic virtues. Nor it is the aim of this article to enter in the discussion of the broad and more programmatic topics of the so-called "politics of science" covering the features concerned with the articulation between

knowledge production and social impact of science, such as state and private funding, expertise, equipment, research policies, etc. The aim is to focus on the internal structural regime on basis of which science and democracy are grounded.

1.   I propose to star on basis of the working hypothesis according to which science is, in its origin, in its root and in its basis a democratic endeavor. Of course, the demonstration of this thesis would claim for great developments, impossible to provide in the context of an article. I will thus reduce the task to just three very brief appointments regarding three levels of analysis: historical, linguistic and transcendental.

In a first (historical) level, science is a democratic endeavor because science and democracy were born together. They had the same origin, that is, the emergence of science largely coincides with the emergence of democracy. In fact, democracy was a Greek invention. Before Greek classical civilization, power was gained by inheritance or by conquest, never before it had been decided by the vote of the citizens. Science was also a Greek invention. Before, important sum of wisdom, huge amount of traditional knowledge, verbally transmitted from the old to the new generations, quantity of empirical results and useful recipes were constituted (Egypt), but only with the Greeks science got the necessary theoretical configuration and demonstrative structure. Now, what it is marvelous to recognize is that the emergence of science largely coincides with the emergence of democracy. Science was born in the Greek democratic *polis.* And – I would add – it could not have been otherwise.

In a second (linguistic) level, science is a democratic endeavor because science and democracy have a common intimate discursive structure, that is, science and democracy share the same discursive requirements at their root. In opposition to the narrative discourse grounded in the past, locally determined, having as its only means of transmission the oral word and the paradigmatic figure of the *oldest*, it emerged in the Greek democratic city a new kind of discourse. A discourse not turned to the past (tradition) but facing what it is, now, in the present (science). A (rational) discourse able to establish and observe a set of normative (logical) rules. The participants were able to get a tacit agreement based in the respect for a set of norms which enable them to coordinate their views, to rule their acts, to validate their statements and to promote the inter-subjective acknowledgement of truth. A demonstrative discourse proceeding by a chain of reasons which any man (even a slave) may approve, share and refute.

What I mean is that science has incorporated the logical procedures emerging in the democratic city. Science has integrated the dialogical practices developed in the city (controversy, rational arguing). Science has absorbed the discussion practices and the legitimating strategies put forward by the wide educated and

curious audiences that inhabited the democratic city. It is enough to read one of Plato's dialogues for understanding in which way Greek democratic city is the place, as Stengers says, of "simultaneous emergence of a science of the politics and of a politics of science, a place where it becomes explicit the double problem of the legitimacy of power and of the legitimacy of knowledge" (Stengers, 1998, p. 72).

See the exemplary case of Plato's *Protagoras*. In a lively theatrical way, Plato's *Protagoras* is a fantastic point of observation of the discursive practices in use in V century Greek cities. The dialogue exemplifies and exhibits diverse kinds of arguments. It clarifies the nature of the discursive mechanisms responsible for the invention of the occidental rationality, its formal determinations, its rules and procedures. It allows us to observe the deep changes in human societies where dialogue has just been invented – a technology that is going to change the world, giving rise to the discursive rationality in which science and philosophy have their roots.

The dialectical intensity, the intellectual debate put forward in that memorable meeting at Calias' house points indeed to a series of novelties. The first novelty concerns **equality**, the fact that we are face to a language interchange established among equals, members of a democratic city, linked among them by a similar will of knowledge.[1] The second novelty is the **refusal of authority**, a feature which clearly shows a world in which the spoken word of the older loses the unidirectional road it had before. Now, above the truth, any authority of the older is from now on respected (Socrates is younger than Protagoras). What matters in the democratic city is the capacity of each one (be it a newer) to define with accuracy the concepts under analysis and to build with them a well justified chain of reasons. The third novelty relates **collectiveness and universality**,[2] that is, the fact that, since its very beginning, science is constituted as a collective task, an endeavor which needs to be cooperatively researched. That is why Socrates, in a crucial moment, quotes Homer (*Iliad* X 225): "When too man walk on together, one may see before the other".[3] Science ought to be a largely open joint activity. Scientific truth only makes sense if it belongs to us all. The fourth novelty is **dialectics**, showing how much science is made of a new kind of discursive mechanisms, of new formal determinations, rules and procedures, namely discussion, controversy, argument. Plato's *Protagoras* is the moment in which the very nature of that discursive novelty is questioned and thematized. As Socrates stresses, what matters is not

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1. What is not so usual in Plato. See, for instance, *Timeus*' long monologs by Critias, Timeus, Hermocrates and Socrates.

2. Collectiveness and, in fact, universality. However, while collectiveness is a necessary procedure, universality is an endeavor. Science is universal insofar as it aims at universality.

3. Plato, *Protagoras*, 348d.

to seduce with long, beautiful (mythic, poetic) discourses but to formulate short, precise arguments whose diverse kinds Plato exemplifies and exhibits. The issue is not to persuade, to convince, but to make it clear, to explain, to open the way for universal understanding. The sixth novelty concerns **freedom of thought**. In Calias' house there is no restriction or imposition concerning the subjects to be discussed. People decide upon the questions to be pursued according to the conceptual needs of the very investigation. It is precisely because science supposes freedom in the development of its research that it does not work well with antidemocratic regimes. See the exemplary case of Galileo, that foremost sun of the city (Pisa) or Lysenko, or Marr.

But, in my point of view, there is a third (transcendental) level that must be considered. Science is a democratic endeavor because the (institutional) conditions of possibility for science to exist and develop are provided by the democratic city. In other words, it is the democratic city that provides the main institutional basis which make possible the future continuity and advances of scientific knowledge. At a certain moment (precisely that of the invention of democracy) the community of humans organized in a city gave rise, from its own interior and inner forces, to the cognitive configurations that allow the existence of science and make possible its development. From that moment on, a set of institutional practices and material means are prepared to guarantee the new forms of production, conservation, transmission and legitimation of scientific knowledge. Those cognitive configurations are the *Scientific Community* ("République des Savants"), the *School* (namely, the *University*), the *Library* and the *Encyclopedia*,[4] that is, a set of universal institutions, concrete practices and structural procedures pointed out for preserving and organizing knowledge already constituted, for promoting disciplinary coordination and for creating the necessary conditions for future development of scientific knowledge.

> How could science exist without a community of researchers passionately and in full time regime dedicated to the search of truth, free men (not obliged to hard, manual labor) who could entirely devote themselves to contemplation, that is, theory workers. In the Greek democratic city, for the first time appeared these professionals of theory. They were not only allowed, but accepted, stimulated and reimbursed (see Protagoras, the best payed of all sophists). Their work was recognized, admired and praised (the condemnation of Socrates being a mistake and a crime that Plato never accepted and never forgave).

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4. Also the Museum (that will not be mentioned here as it implied further developments), while a depurated and typified projection of the world's entities which science aims to understand and which are presented at the museum free of redundancies, is a transcendental cognitive configuration (cf. Pombo, 2011).

How could science exist without School (University), an institution which offers the new generations the possibility of acquiring the patrimony of knowledge conquered by earlier generations, thus preparing them to continue the adventure of knowledge? See Plato's Academia, Aristotle's Lyceum, or Alexandria's Museion. Those institutions offered the necessary conditions for the constitution of new kinds of knowledge determined by a set of (logical, rational) rules to which both pupil and teacher were submitted, mainly mathematics (precisely that which may better be learned and taught).[5]

How would it be possible for science to exist without the invention of Library in whose armoires were ranged the rolls of papyri, the codices, the incunabula, the manuscripts, the letters, the treatises, the books (300.000 in Pergamos's, 700.000 in Alexandria's Library), today, the journals and revues, the dissertations, the papers, the articles and the proceedings, the press and digital documents of all sorts (nowadays, mostly electronic) in which knowledge is condensed, materialized and offered to future generations?[6]

And how could Library function without the Encyclopedia as knowledge articulatory device? How was (is) it possible to go deep in knowledge without a map, a cartography, an imagetic horizon of the actual articulation of knowledge domains, a "système des savoirs", as Diderot used to say.

What I mean is that, since its beginnings and throughout its entire historical development, science relies on these universal institutions. Each advancement in knowledge production is prepared by the functioning of these cognitive configurations. They constitute the institutional shadow of science, their material condition of possibility, their historical *a priori* (to put it in Foucauldian terms),[7] simultaneously necessary and tangible, universal and historical.

What I mean is that there will be no science if the Greeks have not invented, in parallel with science, together with it, the scientific community, the school, the library and the encyclopedia.[8] What I mean is that, since the emergence of science and all along its history, those cognitive institutions express, materialize and guarantee the existence of scientific activity, its progress and its democratic nature.

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5. From the Greek word *mathemata* (what is taught), *mathematein* (to teach), *mathesis* (what may be taught). For a celebrated exploration of these etymologies, cf. Martin Heidegger (1962, pp. 75–82).

6. We are of course here very close to Popper's 3rd world (Popper, 1972).

7. The expression appears in the "Preface" to *Les Mots et les Choses* (1966), when Foucault defines the analytic work of his book as a quest for the "historical *a priori*" upon which could sciences be constituted.

8. For further developments in the demonstration of precisely this thesis, cf. Pombo (2011).

2. Let us now leave the Greeks behind. They created a splendorous world. But the return is impossible. We must go on.

Since the scientific revolution, it is fair to say that science has always been at the service of the city, even when the city was not democratic. And most of the time, it was not. The case of Giordano Bruno is the extreme example of what could happen when science dare not to obey the well-established social beliefs. Since the scientific revolution it is also fair to say that science had the aim – or, at least, the effect – of contributing for the development of human communities, for the resolution of their problems and for answering their explicative needs. The case of Bacon is eloquent. In the early XVII century, Bacon glorified the enormous services science was prepared to offer the city. As he writes: "the empire of man over things depends wholly on the arts and sciences. For we cannot command nature except by obeying her laws" (Bacon, 1620, p. 129). Later, in the XVIII century, Diderot's *Encyclopédie des Science, Arts et Métiers* (1751–1772) is guided by the enlightened project of showing the universal usefulness of science and its vast applications in the industrial revolution that was emerging in that moment. That is why, according to Diderot, the *Encyclopédie* is "not a state's book but a people's book" (Diderot, 1994, p. 428), able "to gather the knowledge scattered over the surface of the earth, to expose the general system of that knowledge to the men with whom we live and to transmit it to the men who come after us so that the works of the past centuries are not useless for the centuries to come" (Diderot, 1994, p. 363). That is why, in addition to the sciences, the arts and the crafts, the *Encyclopédie* extends to the balance of the practical activities of the human genius, shows the virtues of work in its various dimensions, revalues the manual activity of the artisan giving it a dignity equivalent to that of the wise or the poet.[9]

But – it is also fair to say – if science has served the city, in turn, the city has sometimes served the science. Aware of how much it was beneficiary of scientific discoveries, the city has now and then protected the men of science (see the patronage of Galileo by the Florentine family of the Medici), has occasionally provided places for their work (see the *Uranienborg* observatory constructed by Frederic the II to Tycho Brahe). The city has even accepted to finance scientific activity without imposing any constraint to the liberty of research. A marvelous example is the reform of German university undertaken by Humboldt, in 1810, under three great pillars: complete liberty of research, full independence face to the state which

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9. For further information on this practical dimension of the *Encyclopedie* and its iconic translation in the numerous engravings of its pages, cf. O. Pombo (2006).

ought to protect the autonomy of science and to pay for its activity and unrestricted cooperation among all those who are devoted to the service of truth.[10]

However, today, this disinterested relationship is no longer recognizable. Even if science and democracy were united by an intimate, constitutive and balanced relationship in the classical Greek world, and even if such reciprocity was maintained in certain periods and in some specific contexts of European History, the fact is that, today, we witness a much diverse state of affairs.

The situation begun to change in the beginning of the XX century. Science became more and more submitted to economic and political interests. And, in doing so, science seems not seeking anymore to understand the world and to search for the benefits it could provide to the city, as Bacon stressed. It seems to look for simply producing effects able to be useful to a private, minority sector of society, or to some military strategic plans. In a word, science has lost its original *ethos,* as Merton proposed to say,[11] and appears to have become nothing but an interested, pragmatic endeavour.

It is interesting to recover, even if in a much brief way, some illustrative moments of that process. In the very beginning of the XX century, the industrial and military scientific research structures which are being developed in Europe and in the USA are already visible. Unconnected with the university, those structures are directly financed by the economic power. See the case of the *Rockfeller Institute for Medical Reseach*, created in 1901, or the *Carnige Institute* of Washington, funded in 1902. In 1938, in the celebrated Szilard Appeal, scientific community accepted as legitimate not to publish the research results in areas connected with state defence plans. At the London conference of 1941, put forward by the *British Association for the Advancement of Science* in order to prepare the post-war, it was established that science ought to become the "effective laboratory of the best minds against war, poverty, all forms of discrimination, economic and political anarchy, and for the defence of human dignity, European awareness and world citizenship" (Sá

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10. For the first time in the history of university, Humboldt's reform of Berlin University was rooted in the contributions – explicitly done for that purpose – by some of the most remarkable spirits of the time, namely Hegel, Fichte, Schleiermacher e Schelling. Cf. the volume edited by Jean-Luc Luc Ferry and Alain Renault (1979) where those foundational texts by Hegel, Fichte, Schleiermacher, Schelling and Humboldt are transcribed.

11. The term was coined by the American sociologist Robert K. Merton (1942) corresponding to the norms that should determine the *ethos* of scientific community, namely, universalism, communalism, disinterest and scepticism. A set of four norms to which was later added a fifth principle (Originality) thus giving rise CUDOS, the classical acronym used to designate the normative principles of true science. It is yet to be noted that these norms are close to the five novelties we have above signalized in Greek science (equality, refusal of authority, collectiveness/universality, dialectics, freedom of thought).

da Costa and Rémy Freire, 1943, p. 127). Almost at the same time, in September 1942, it was put forward the *Los Alamos Laboratory*, in *New Mexico*, directed by general Leslie Groves where, as well know, was developed the *Manhatan Project,* coordinated by Oppenheimer, in which were produced the three atomic bombs of 1945 of Trinity, Hiroshima and Nagasaki.

After the war, Alvin Weinberg (1961) and Solla Price (1963) identified what they named as "Big Science", the giant phenomenon which transformed scientific community in a set of employees, not anymore old *amateurs* and respected professors, but professionals who become obliged to respect a strict timetable, to fight for contracts, to design huge projects, to advertise their labs, to administrate large funds, etc. As a last example, in 1977, during the so called "cold war", circa of 1 million scientists worked in military projects and the third part of world scientific research was dedicated to the production of new weapons (Bridger, 2015). That is, during the XX century, decisive changings in the relation between science and political, economic and military power took place. Scientific community was obliged to negotiate its freedom and autonomy offering industrial applications, profit, prestige, military power in exchange of financial backing, grants, subsidies. By its side, political and economic power were able to more and more dominate, control and direct scientific activity. And that was done – we must not forget – in favour of their exclusive interest and profit, not in the interests of the social body in its all. As Jean Hamburger wrote, yet in the 90's of the past century, the political and economic power attitude towards science was not anymore, the (Humboldtian) "*laisser-faire*" and massive support, but instead the "*faire faire*" (Hamburger, 1991, p. 8). By other words, Humboldt become, each day more and more, a mirage.[12] Between science and university, which for Humboldt were the two faces of a same coin, it emerged the technological civilization and the competitive and market economy.

For its part, the philosophy of science prior to second world war tended to consider this situation as resulting from the *corruption* of the *Idea of Science*. Science is believed to be a clean cognitive endeavour, a pure theoretical activity away from any kind of practical objectives or technical purposes. That is the case of Husserl for whom the *Crisis of European Sciences* comes from the reduction of knowledge to material interests, from the technological domination of Nature

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12. For Humboldt, University must be free of any exterior constraint and fully dedicated the search of truth. It ought to defend an autonomous, politically neutral science, freed from the tutelage of the church, freed from the authority and interests of the state, immune to pressure from bourgeois civil society interested in the usefulness of its results. The state was responsible for protecting the autonomy of university, guaranteeing its freedom and paying for science. On the reform of the German university, cf. Ferry, Pesron and Renault (1979).

and from the science's disregard towards the pursuit of the universal, ideal truth. On the contrary, for Husserl, what was important to safeguard was a contemplative, purely theoretical attitude. For Husserl, the theoretical attitude, based on a deliberate *epoche,* is fully unpractical, far from all applicatory, pragmatic interests (Husserl, 1936). In a parallel way, for Logical Positivism too, science is considered in its ideality, as a theoretical undertaking without any contact with the material conditions of its production. The meaning of a scientific statement comes exclusively from their internal linguistic components without any concern with the individual or the social conditions of its enunciation. As Carnap states, philosophy of science must take as its object the scientific statements in abstraction of the psychological and sociological conditions of its enunciation (Carnap, 1938, p. 43).

After Hiroshima and the awareness of the perverse effects of scientific activity over men's life and over world's equilibrium that was expanded since the second half of the XX century, philosophy of science came to recognize that the situation, namely the reduction of science to technoscience,[13] was a result of the very interested nature of science itself or, at least, of its actual condition. That is the case of Heidegger (1962), according to whom technoscientific developments are not the effect of a degenerated science. On the contrary, they are the extreme chapter of the Platonic and Aristotelian way of approaching Nature. Like Heidegger, Habermas (1968) recognises in technology, not a form of degeneration, but the very essence of knowledge which, in all its forms, is always oriented by some kind of interests.[14] And Lyotard (1979) stressed further that technoscience is neither the destiny of the scientific search for truth (Heidegger), nor the expression of an interested reason (Habermas), but the actual condition of human knowledge. His sceptical conclusion is that one of the main features of our post-modernity is the fact that science does not anymore intends to construct a theoretical description of the world but is reduced to the production of good performances, so to say, to a technological endeavour. As Lyotard writes: "What matters today is not the truth but the performance" (Lyotard, 1979: 91).

Now, the question is: Is it true that after Hiroshima, the traditional image of science and of its autonomy face to the political powers cannot be anymore

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13. It is interesting to notice that the new term invented to designate this state of affairs – technoscience – instead of stressing the dependence of technique from scientific knowledge, points to the inverse situation: the dependence of science from technology. The dependence is so deep that the radical *logos* (still present in the word technology) disappears. (cf. Pombo, 2013, p. 57).

14. Behind hermeneutical interest (which constitutes the ground of the human sciences) and behind the emancipatory interest (which constitutes the root of philosophy), Habermas points out the technological interest (the one guiding the natural sciences), where knowledge is directed for the domination of Nature (Habermas, 1968).

maintained? Are we in fact condemned to the political promiscuity between the scientist and the sovereign? Between the scientist and the general? Between the scientist and the businessmen, that small parcel of the human community who, indeed, explores science for its own benefit and is greatly responsible by the perverse effects of science which we all regret? Or, even if often reduced to a merely operatory rationality submitted to the economic values and the strategies of domination of the planet, is it yet science, in the profundity of its equations, in the secret of its institutions, a pure and free activity?

Is it true that science does not anymore aim at giving meaning to the natural phenomena but just looks to produce operational, practical results able to answer private interests? Do we really face a radical alteration in the functioning regime of the very science? Or, what exists is just a change in the appropriation by political and economic powers of scientific results?

Is it true that science, which has always been instrumentalized by economic and political powers, today, it just continues to be so, but in a deepest way? Or, on the contrary, even if today scientific activity needs huge, gigantic financings, science is not at the service of any economic or political interests? Is it not that science, although its applications produce vast richness and its research activity requires today enormous amounts of funding, science as such is not – nor has ever been – at the service of any economic interests?

3. Now, I believe that the situation described above does not entirely corresponds to our present. In the last three decades, in addition to the interlocutors of the classic triangle constituted by the university, the state and the industry that prevailed during the XIX and XX century, science started to respond to new challenges, this time, not so much coming from political and economic power, but from civil society. We refer to a series of signs, each time more significant, that make us realize that science is today under the fire of a new public, more critical and intervening. A public that asks for accounts, sets conditions, demands compliance with certain rules, discusses the results and effects of scientific activity, that confronts science with new problems. As Isabel Stengers says, science today is faced with problems that it did not pose, but which are raised, or at least signalized, by the development of new public competences, "groups of citizens able to ask questions to which their interests make them sensitive, to demand explanations, to put conditions, to suggest modalities, to participate in the invention" (Stengers, 1993, p. 180).

Public opinion, which began to take shape in the salons, cafes and gazettes of the eighteenth century in France and in clubs and reading societies in England and

Germany,[15] is today an active interlocutor of science, a positive element that raises problems, determines objects of study, validates analyzes, supports research. It forces science to return to the concrete problems from which science had moved away. It forces science to look for integrated (interdisciplinary) solutions to the holistic issues it proposes. So are the countless pressure groups made up of citizens of different types, residents of a certain area, hemophiliacs, groups of students, pacifists, ecologists, environmentalists, etc. Concentrating large capacities of protest, these groups – which, according to Deleuze, should not be seen as new social classes but simply as "minorities" characterized by their ability to produce events, even if ephemeral, and by their "rebellious spontaneity" (Deleuze, 1990, p. 238) – are interested in the devastation of forests, hunger, energy, demographic explosion, environmental disasters. And they are strong enough to take the initiative of commenting, claiming, protesting on issues of safety, pollution, protection of species, nuclear winter, aids, atmospheric regime, ozone layer, in short, they have the capacity to jeopardize the mechanisms and results of science.

In other words, science is no longer dependent exclusively on political and economic powers, but also on the capacity of interrogation and on the critical intervention that the citizens and the public opinion hold today. A capacity which, as well known, is largely enhanced by the new mass media and digital technologies. Beyond an *authoritarian* science, in which scientists "know" and the public "does not know" and, therefore, cannot participate (and is not allowed to participate), what is currently underway is a participatory regime of science in which a new public, better informed, better prepared, better organized is willing to participate (and is welcomed to do so). What is currently in progress is a new science that accepts the alteration of the relations between those who ask the questions and those who answer them. A science that needs, and wants and requests an informed public, an interested public, a cultivated public able to participate, to criticize, to resist, to protest, in a word, a public able to exercise the healthy principle of civil surveillance.

4. However – and this is a key point of my argument – the democratic regime of science entails, both the development of the capacity of intervention and participation of citizens in the critical definition of science, and the reinforcement of the universal institutions that, as stressed above, constitute the necessary (transcendental) conditions for the autonomous advancement of scientific knowledge in its endless journey towards the truth.

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15. On this subject, see the relevant work by Jurgen Habermas (1962) "Structural Change of the Public Sphere", pp. 46–93.

Only the effective and vigorous functioning of those universal configurations – the *scientific community*, the *school* (the *university*), the *library* and the *encyclopedia* – may counteract the effects of the domination over science by the authoritarian so-called "protection" or so-called "monetary support" of the political, economic, military powers. Only the healthy and accurate working of those cognitive institutions may guarantee an unbiased, self-directed, progressive scientific activity, guided by a genuine search for the truth.

We know that those universal institutions, have suffered a frightening erosion. As a result of the incomprehension of what constitutes their elevated destiny, each of them has been overwhelmed with the most diverse and strange tasks and functions. *School* has served to take care of the children while parents go to work. *Universities* claim to be professional instances, intended above all to hierarchically distribute the individuals in the labor market. *Library* can serve today to read the daily newspaper. Belonging to *scientific community* can be a means of gaining prestige and earning at the end of the month. And the *encyclopedia* (that is, the *internet)* can be used just to buy a domestic utensil, to know the time of a train or simply to send an email to a friend.

Nevertheless, however disfigured they may be, however violented they have been in their deepest purpose, they continue to serve science, its continuity and its democratic nature. And we all continue to understand that. We all know that, without them, science would be impossible. That is why we keep stressing that *school* must contribute to the formation of active citizens – the more knowledgeable the citizens are, the better the democratic process and the scientific activity will work. That is why *university*, even if submitted to quantity of pressures, continues to be a source of hope for scientific knowledge. That is why we keep fighting for the enrichment and actualisation of our *libraries*. Last but not least, that is why we vigorously defend the free, universal spread of internet (the *encyclopaedia* of today) as a force for the democratic transformation of science and for the relevant development of research: it enables the admission, the scope, the choice of scientific training, teaching, guidance to a large number of students independently of where they live and how much money they have (*school and university*), it allows easy, actualized and each day broader access to scientific bibliography (*library)*, it facilitates communication within *scientific community* and between the scientists and public.

Science has been (and continues to be) instrumentalized by exterior armed forces and external superpowers. But science did (does) not die. Not even the relativistic theory of double truth, the explosion of fake news, has succeeded to make it disappear men's desire of knowledge, men's will of truth. Scientific *ethos* has been severely threatened but, even though it has capitulated in many cases, it has not disappeared. It continues to live in the humble actions and functions and activities

of the *librarians*, in the daily practices and technical procedures of the members of the *scientific community*, in the hard work and enthusiastic efforts of the *school masters and university professor*s as well as in the innovative performances of those young informaticians and engineers who, each day, produce the spectacular improvements of internet, that is, the *encyclopaedia* of our time.

Hence, in the perspective of a certain philosophy of science that I dare to defend here, what matters today – here and now – is to contribute for the reconstitution of those (transcendental) conditions of possibility of science, to invest in their restructuring, to reinforce their cognitive destiny and their capacity for contradicting the effects of the extrinsic domination of science, that is, for defending a democratic science. What is at stake is therefore a renewed attention to those universal institutions that are the library, the republic of the wise, the school and the encyclopedia. To be attentive to their current developments, to the trivial (sometimes bizarre) functions and tasks that, today, may be attributed to them, to the challenges to which they are faced. To recognize in them the shadow, both material and universal, both necessary and temporary, of science and democracy.

To finish, let me add that it is urgent to question of whether science, which was born in close conjunction with the democracy invented in Greece, which continues to have an internal democratic structure because of its ability to discuss its hypotheses, to test its results, to measure its own arguments and those of others, to establish discussions and controversies animated by the will of truth, and to accept the participation of public opinion and critical citizens, whether or not science is able to expand and reinforce its constitutive democratic nature. That can only be achieved by reinforcing the universal institutions that constitute the transcendental condition of possibility of both its cognitive development towards truth and its autonomy face to the political, military and economic interests, and, simultaneously, by opening the range of its interlocutors, by accepting the intervention of collective, interdisciplinary inventiveness in what has always been its own (private, specialized, cloistered) "domain" of work.

We rediscover here the issue of interdisciplinarity. Not so much in its cognitive dimension (as a decisive phenomenon of contemporary science which, since the middle of the XX century, is entering a process of transversal rationality, a process that entails sensitivity to complexity, ability to look for common mechanisms, attention to deep structures that can articulate what apparently cannot be articulated) but also as a open attitude of curiosity, of enjoying collaboration, cooperation, work in common. Without real interest in what the other has to say, interdisciplinarity is not possible. Interdisciplinarity implies to share our small domain of knowledge, to have the courage of abandoning the comfort of our technical language and to venture into a domain that belongs to everyone and of which nobody is the owner.

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Nowadays, the forms assumed by knowledge indicate an unhinging of traditional structures conceived on the model of discipline.

Consequently, what was once strictly disciplinary becomes interdisciplinary, what was homogeneous becomes heterogeneous and what was hierarchical becomes heterarchical.

When we look for a matrix of interdisciplinarity, that is to say, a primary basis or an essential dimension of all the complex phenomena we are surrounded by, we see the need to break with the disciplinary self-restraint in which, often completely inadvertently, many of us lock ourselves up, remaining anchored to our own competences, ignoring what goes beyond our own sphere of reference.

However, *interdisciplinarity* is still a vague concept and a much demanding practice. It presupposes the continuous search for convergent theoretical perspectives and methodologies, and the definition of common spaces and languages, as well as a true dialogical and open mind of several scholars.

From ethics to science, from communication to medicine, from climate change to human evolution the volume *Controversies and Interdisciplinarity* offers a series of original insights beyond disciplinary fragmentation for a new knowledge model.

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