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Disentangling Discursive Spaces of Knowledge Refused by Science: An Analysis of the Epistemic Structures in the Narratives Repertoires on Health During the Covid-19 Pandemic

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6.1 Introduction

Epistemic positioning matters in defining the social worlds that build knowledge claims. As Chap. 1 argued, the research project of which this study forms part labels its object of study *refused knowledge* (RK), taking into account the positioning of science, which situates RK claims outside the boundaries of knowledge corpora that it considers legitimate. Consistent with the symmetric perspective of STS, this chapter aims to understand how refused knowledge communities (RKCs) position science with respect to their knowledge claims, to comprehend if these social worlds refuse the science that denies them validity or adopt strategies designed to enrol science—i.e. scientific knowledge's claims,

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technoscientific devices, scientists' institutions, scientists and scientific papers. To this end, we will enquire into the meaning-making processes regarding health within social worlds made up of people who, within RKCs, work with shared objects to legitimise their knowledge claims. The hypothesis of this work is that knowledge can be analysed as a discursive assemblage made up of both *knowledge claims* and *heterogeneous actors* enrolled to legitimise this knowledge. We have therefore enquired into the association processes via which RKCs enrol claims and actors *within their discursive universes* and, thus, the ways in which they build meanings and attribute credibility to knowledge about health. As we shall see, a particular kind of enrolment process concerns how science is recruited by RKCs in legitimising the knowledge they build.

The methodology chosen is based on quantitative and qualitative procedures combined in a nested research design. More specifically, ours is a narrative approach (Czarniawska, 2004) integrated with the methodological framework of social network analysis (SNA; Wasserman & Faust, 1994; Scott, 2000). This set of techniques allowed us to visualise and analyse the relational properties of knowledge assemblages shared by RKCs, thus uncovering the structures of discursive configurations that build, maintain and legitimise these forms of knowledge. Finally, analysing the narrative repertoires shared in different discursive configurations permitted us to identify the primary narrative structures within the RKCs' discursive universes.

The analysis focuses on the online discourses shared in the Alkaline Water (AW) and Five Biological Laws (5BLs) RKCs from January 2020 to December 2021 during a time span characterised by the emergence of the Covid-19 pandemic and the management of the related health crisis. Health issues gained prominence during the pandemic not only for RKCs but also in society as a whole. Our interest in these social worlds was motivated by the fact that RKCs developed a corpus of knowledge on health and wellbeing which is refused by scientific institutions, but without refusing institutional science. This peculiarity makes such RKCs of interest in the study of the ways in which they incorporate science into their discourses.

This chapter is organised as follows. The next section focuses on concepts borrowed from the theory of social worlds and employed them in the network analysis performed in our study. Section 6.3 describes the

methodology and empirical material used in this study. This section clarifies the use of SNA in the context of the theoretical framework of social worlds, considering the use of SNA in Science and Technology Studies (STS), which has been the subject of much debate. Section 6.4 focuses on describing the analysis and its main results. Finally, the last section focuses on discussion and conclusions.

6.2 Analysing Spaces of Epistemic Enrolment Within RK Social Worlds

To understand how, within their discourse universes, RKCs enrol diverse claims and actors to legitimise their knowledge, we will borrow a number of key concepts from the social worlds' perspective. According to Clarke and Star (2008), the social world framework focuses on meaning-making processes within groups of actors 'doing things together' (Becker, 1986) and working with shared objects. Here, the focus is not on the 'doing' but on the linguistic utterances as part of the discursive construction of such objects, which can also be pieces of knowledge and play a central role in our analysis. It is around these objects that knowledge claims are built and conveyed in these social worlds. Our main reference is thus to the definition of social worlds as *universes of discourse* (Strauss, 1978), namely shared discursive spaces that are profoundly relational in nature, which prompted us to adopt a narrative approach (Czarniawska, 2004) to enquire into the most significant forms of narratives used by RKCs to legitimise and thus stabilise the knowledge they perceive as being refused by science and mainstream world views.

To identify the configurations on which RK relies, we opted for an approach derived from the *sociology of associations* (Callon, 1984; Latour, 2005) designed to trace the connections between knowledge claims and heterogeneous actors enrolled within these discursive worlds to support those claims. Analysing knowledge as an assemblage of claims and actors underlines the profoundly relational nature of knowledge itself and understands the latter's sharing within a community as one of the main

factors attributing it the status of knowledge, regardless of the truthfulness or falsity of its contents (Bloor, 1976).

Claims of knowledge are defined here as the cognitive elements considered true within a social world and constituting segments of its corpus of shared knowledge. The *epistemic enrolment space* is the set of discursive structures that guide, focus and delimit RK credibility attribution processes by assembling and re-assembling epistemic, social and political structures. In the case studies considered here, epistemic enrolment space analysis focuses on the discursive texture built by RKCs' *entrepreneurs* (Clarke & Star, 2008), namely individuals, or groups of individuals, who are deeply committed to, and active in, promoting RK in online spaces within the social worlds observed.

In accordance with the social worlds' perspective, we will also examine the role played in these discursive universes by *implicated actor*s, i.e. 'actors silenced or only discursively present—constructed by others for their own purposes' (Clarke & Star, 2008, p. 119). As discursively constructed primarily by RKC entrepreneurs to sustain RK, implicated actors are neither actively involved in negotiating self-representation in social worlds nor considered for what they say, write and argue; yet they can play a determinant role in enrolment processes into forms of knowledge. Finally, we will consider how both human and non-human actors are mobilised in the making up of epistemic configurations and thus we use the term *actors* to refer to both human and non-human actors.

Hence, within the epistemic enrolment space we will investigate knowledge claims concerning health as it is maintained by RKCs, along with the networks of enrolment and counter-enrolment (Callon & Law, 1982) built to affirm this knowledge. The elements assembled in such networks were identified via web-ethnography during our research to enable us to explore RKC narratives as proxies to the *re-assembling of the social* (Latour, 2005), i.e. as a way to grasp how the various narratives bring heterogeneous elements together and into meaningful wholes (Czarniawska, 2004). The narratives constructed by RKC entrepreneurs contribute to sustaining wider *narrative structures* through which meanings and their relation to social worlds can be built and shared. Diverse sets of actors are enrolled into these narrative structures, to support and entangle the discourse universes deemed significant by RKCs. Moreover,

in these discursive structures, our interest was identifying the objects (claims and actors) coexisting in the diverse structures making up the epistemic enrolment space and building narratives centred on a range of repertoires. Our analysis will focus on *boundary objects* (Star & Griesemer, 1989), nodes in the narrative structure network where various social worlds meet in arenas of mutual concern. Our interest in these objects was based on the key role they play within the translation processes (re)constructing meanings to meet the specific needs or demands of the various social worlds involved (Star, 1989).

6.3   Methodology and Data

Our analysis used a mixed methods perspective by combining the narrative approach (Czarniawska, 2004), designed to identify the discursive structures of the social worlds, and SNA.[1] This methodological strategy was chosen with a view to examining the relational structures at play in the enrolment of the various types of actors supporting RK claims within RKCs' online discursive spaces and the narrative structures that inform the epistemic enrolment space of these social worlds. The stages in our analysis are shown in Fig. 6.1. As the entire data collection and analytical process dealt with qualitative data and prioritised the interpretation and analysis of texts and network graphs over formalisation, we consider our work to be concerned with qualitative networks (Bellotti, 2014; Hollstein, 2011).

In the first step in this research, from January 2020 to December 2021, our research group conducted web-ethnography on AW and 5BLs RKCs' online spaces (blogs, Facebook pages and profiles, YouTube channels and the like) (Chap. 1). Using content analysis tools (Lieblich et al., 1998), we analysed the diaries resulting from this web-ethnography and, through an iterative coding and recoding process, we identified: (a) the health-related claims constituting the core of the corpus of refused

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[1] 'The tools of SNA are invaluable to a proper analysis of such worlds. They allow us to identify structures that would not otherwise be apparent and to measure important properties of those structures in a precise and reliable manner' (Crossley, 2010, p. 31).
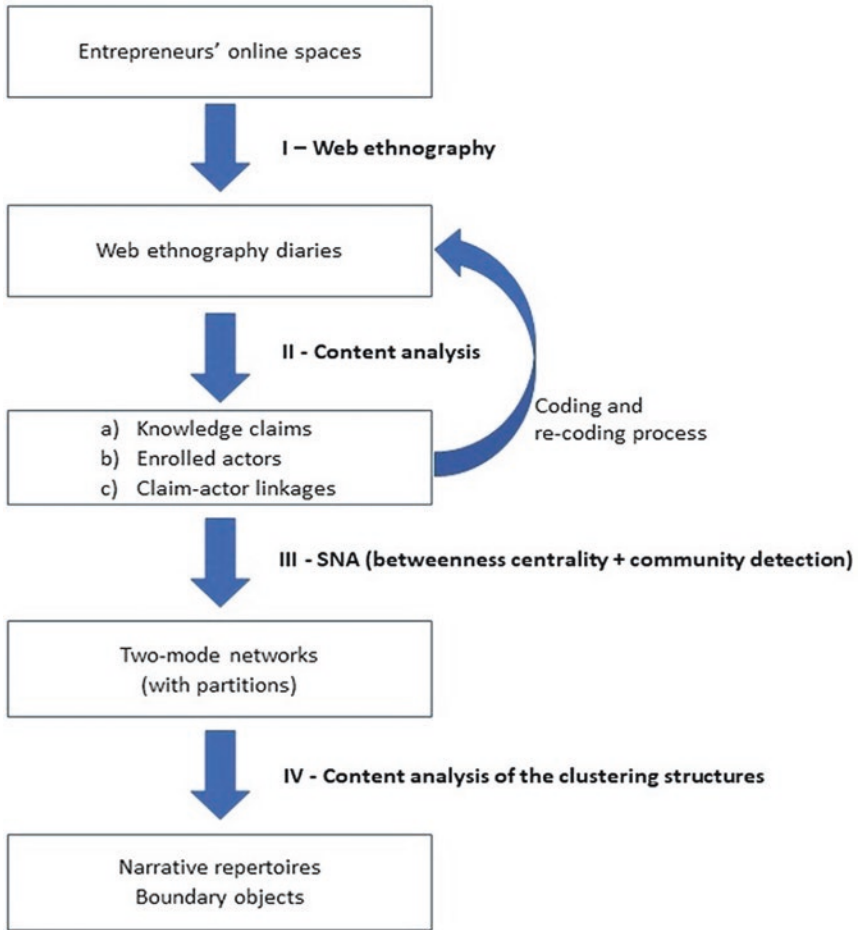
Fig. 6.1 Analytical process in each case study

knowledge;[2] (b) the enrolled actors interacting in the discursive universes (including implicated actors); (c) the linkages between claims and enrolled actors.

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[2] Each claim is constructed by elaborating from the diaries' content (including observer's notes, utterances, and audiovisual material) the corresponding discursive unit, whereas the actors are extracted by selecting those enrolled to sustain the claims within the discursive content as a whole.

The three entity classes were translated into the elements constituting the two-mode networks discussed below. We also considered *mimicry practices* to be one of the strategies pursued by RKCs to give epistemic legitimacy to an RK corpus and depict it as an attribute of claim–actor linkages (see Chap. 1). Of the four enrolment strategies identified by the project, we chose to focus only on mimicry because of its significance in RKCs' attempts to enrol in science. Performing mimicry strategies—from the simplest reference (either textual or visual) to technoscientific devices, e.g. a microscope or an oxidation-reduction potential (ORP) metre to more sophisticated biological elements and processes, e.g. extracellular pH, tumour micro-environment or T cell apoptosis—means borrowing science's constitutive 'marks' of scientific authority, including scientific institutions, scientists and scientific papers. The third step formalised the connections between claims and actors through two-mode networks, which proved to be useful in operationalising linkages between heterogeneous actors (Mützel, 2009)[3] and emerged as appropriate to the kind of relational structure we intended to analyse. In fact, in two-mode networks, ties are allowed only between nodes belonging to two distinct node sets, as is the case with claims (Set 1) connected to actors (Set 2). These two-mode networks permitted us to visually explore the way claims are connected to actors, and thus the way actors aggregate around narratives expressed by claims. The analytical strategy we pursued therefore implied that actor–actor connections are mediated by the claims they jointly support whilst, conversely, claims are connected to each other insofar as they are sustained by the same enrolled actors—which is precisely one of the main features of two-mode (affiliation) networks, i.e. their *duality* (Breiger, 1974).

Adopting Actor Network Theory's perspective (Latour, 2005) led us to consider the associations between these elements as *social* in that such networks constitute a representation of social worlds as assemblages of heterogeneous actors and claims at work in discursive enrolment. As far as actor heterogeneity is concerned, it is well known that two-mode affiliation networks can help scholars produce 'heterogeneous maps', but do

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[3] See Contractor et al. (2011) for an example of a two-mode, multi-relational human–technology network. In STS, two key examples of such studies are Cambrosio et al. (2004) and Callon (2006).

not allow distinctions between the nodes or ties comprised in a single 'mode', which is considered a limitation (Cambrosio et al., 2004; Mützel, 2009, p. 874, 878; Venturini et al., 2019, p. 515). There is no doubt that, in our analysis, heterogeneous associations coalesce into a single set of linkages—whilst paying attention to the diverse strategies pursued to sustain claims through actors' enrolment (see below)—but the differences between types of actors are retained as a node attribute (see Sect. 6.4).

Our network graphs were drawn up using *Gephi 0.9.7* software which we also used to obtain network statistics. We made use of a *force-directed layout* named *ForceAtlas2* (Jacomy et al., 2014) to spatialise networks and thus exploit the potential of visual network analysis (Venturini et al., 2021). As a basic centrality measure, we considered betweenness centrality for two-mode networks (Faust, 1997; Brandes, 2001; Everett & Borgatti, 2005). Notably, betweenness centrality expresses the potential for a node to act as broker or intermediary in a network (Scott, 2000, p. 86), which means a claim or actor connects different areas of the graph. In addition, we performed a community detection analysis using the Louvain modularity algorithm implemented in *Gephi* (Blondel et al., 2008). Each cluster (or *modularity class*) emerging from this analysis combined densely connected claims and actors.[4] As far as the *mimicry* strategy was concerned, we highlighted this in the network graph by tie colour (see below).

Lastly, we qualitatively analysed the narratives assembled in each clustering structure by assigning a given repertoire to each of them, where this repertoire was the result of a further content analysis of the ensemble of claims and actors making up the clusters.[5] This also enabled us to detect several sub-structures within these networks, namely different

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[4] However, the inclusion of actors within a given cluster may not be completely consistent with the main theme of the cluster: this is due to the probability of inclusion of a node within one cluster or another depending on the algorithm's potential to yield 'good' partitions. After all, the 'community structure of networks is, for instance, notoriously ambiguous' and 'for many networks, very different partitions are equally valid' (Venturini et al., 2021, p. 9). In addition, the different clusters emerged as linked by inter-partition ties that often break their separation, which is a key feature of RKC network structures (and, in turn, represents one of the complexities of community detection).

[5] Note that we will avoid speaking of communities in relation to the results of community detection procedure and refer to clusters or partitions (or modularity classes) instead, to prevent confusion with the term 'community' in the RKC sense.

sub-worlds each of which can be made of distinct clusters or even a combination of different clusters. This last step drew on the qualitative side of our analysis to interpret the betweenness centrality scores: when a high betweenness score expresses a 'flexibility' of objects in connecting diverse sub-groups of nodes that relate to it for different purposes, these objects (claims or actors) can be regarded as boundary objects that 'inhabit several intersecting social worlds' (Star & Griesemer, 1989, p. 393).

Finally, we analysed the network obtained from a union between the two social world networks examined. This analysis allowed us to identify the crucial statements and actors present in both RKCs, thus understanding which Covid-19 pandemic period actors and statements helped legitimise the construction and dissemination of forms of RK and which discursive structures were activated within these social worlds to provide epistemic credibility to these forms of knowledge.

6.4   Analysis

The content analysis of the entrepreneur actors' discursive universes performed in the first step of the study provided two sets of claims (192 for the AW RKC; 365 for the 5BLs RKC) and actors (1939 for AW RKC, 1940 for 5BLs RKC) which, as a whole, constitute the 'dual' health-related knowledge cores of each of these universes. By enrolling these actors and setting forth these claims, entrepreneurs handle the knowledge cores assembled to build and legitimise RKCs' claims. We identified various categories of enrolled actors, such as (1) organs, tissues and cells; (2) diseases; (3) polluting pathogens; (4) scientific disciplines; (5) distinguished international scientific scholars; (6) authors of scientific papers; (7) public figures active in the debate on Covid-19; (8) media and social networks; (9) scientific journals; (10) scientific institutions; (11) people who participate in chats (e.g. with comments) on the online spaces run by the entrepreneurs and (12) other concerned actors (e.g. children, the elderly and shopkeepers).

Following the steps outlined in the previous section, we translated these knowledge cores regarding health into networked form by focusing on the links between each claim and the various actors, which were in

Table 6.1 Number of nodes in the networks built for the two RKCs and their unions

	Alkaline water RKC		Five biological laws RKC		AW RKC ∪ 5BLs RKC	
Node type	Whole graph	3*k*-core	Whole graph	3*k*-core	Whole graph	3*k*-core
Claims	192	126	365	292	550	428
Actors	1939	371	1940	715	3740	1082

turn connected to other claims. The assemblage as a whole thus resulted in a complex configuration of network nodes constituting one possible representation of these RKCs and provided a map of their shared knowledge.

Indeed, a first examination of the networks analysed revealed a degree of complexity that hindered their readability due to excessive relational data 'noise'. In other words, using these networks as maps required moving upward from a poorly informative terrain in which claims and actors may be associated with a minimum of one or two nodes (actors or claims, respectively) to a richer analytical framework in which associations involve at least three units for each claim or actor. We therefore focused analysis on a sub-network of each RKC extracted through a degree-based procedure called *k*-cores[6] (Seidman, 1983) and then chose to limit our analysis to a subgraph with *k* = 3, that is, a 3*k*-core (Scott, 2000, p. 110; see Table 6.1).

For both RKCs, the community detection algorithm generated a clusterisation of claims and actors. This was the first main finding in our analysis, i.e. that the discursive spaces depicted via SNA were organised around various narrative repertoires that could be seen in the clusters resulting from modularity analysis. The structures observed rendered the heterogeneity of assemblages and highlighted the differential associations revolving around knowledge-specific cores represented by the repertoires characterising the clusters. We thus analysed the structural configuration of claims and actors emerging from modularity analysis and identified

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[6] 'A *k*-core is a maximal subgraph in which each point is adjacent to at least *k* other points: all the points within the *k*-core have a degree greater than or equal to *k*. […] A *k*-core, then, is an area of relatively high cohesion within the whole graph' (Scott, 2000, pp. 110–111).

the main repertoire within each cluster. Indeed, the clustering of the discursive universes showed not only that RKCs use a range of repertoires but also that such repertoires adopt enrolled actor types that are specific to them. For instance, Cluster 5 in the AW RKC (see below) was concerned with cancer and chronic disease prevention through an alkaline diet and its actors included two scientific institutions, namely the *American Association for Cancer Research* and the *American Society for Biochemistry and Molecular Biology*, along with two papers (published in the journal *Cancer Research*), tumour cells and metabolic processes.

The node colours in the graphs shown below for the two RKCs and their combination denote modularity class. Edge colours denote the presence (black) or absence (grey) of a mimicry strategy. A caption in each figure shows modularity class number and colour, plus the percentage (in parentheses) of nodes included in each class.

6.4.1 The Structure of Discursive Universes Legitimising RK Within the Alkaline Water RKC

Figure 6.2 illustrates the clustering structure of the claim–actor network within the AW RKC (modularity = 0.645). The content analysis of the claims showed a high degree of homogeneity of repertoires in each cluster, consequently different partitions can be classified as belonging to the narrative repertoires shown in Table 6.2.

By visually analysing the network, we detected some central clusters (i.e. those with modularity classes 8-9-6-4-0-1-2-3) and some peripheral ones (modularity classes 5-10-7). As far as the related narratives are concerned, Clusters 8-9-6—those mostly scattered across the core of the network—provided the primary repertoires used by RKC members to sustain alkaline water's and food's ability to purify the body and defend it against the effects of toxic and carcinogenic pathogens, including the power of the alkaline lifestyle to enhance the immune system. Note also that clusters 9-6 (which are identically labelled) refer to the same repertoire, although they are distinct in the modularity analysis because of their different network connection patterns. As far as actors are concerned, biomolecular actors prevail in Cluster 9, while Cluster 6 includes
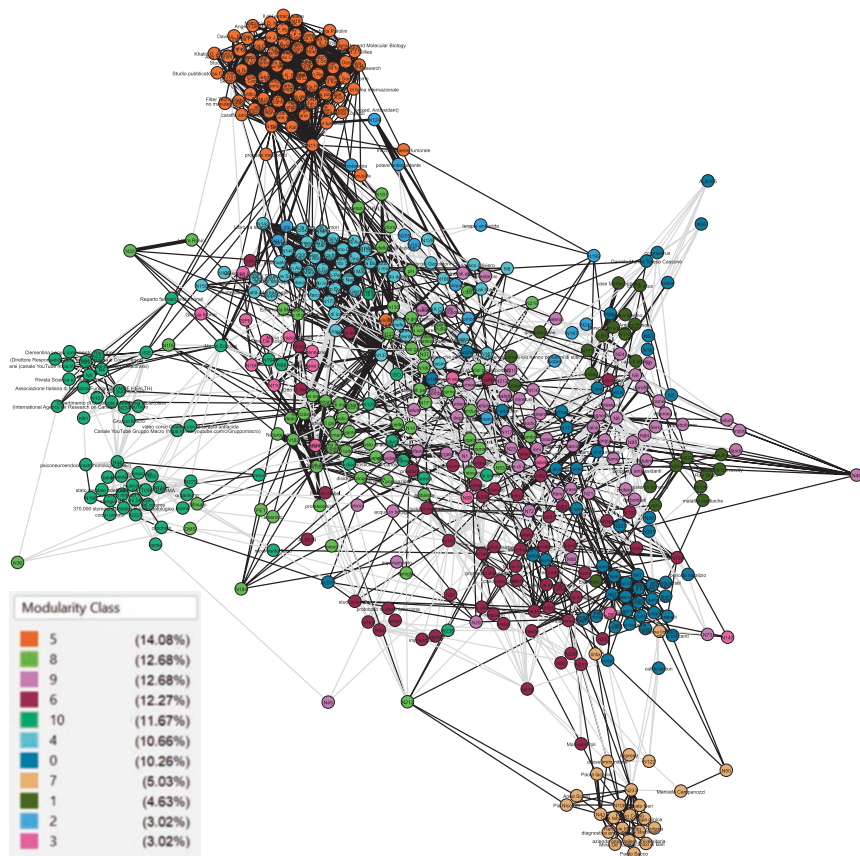
Fig. 6.2 Two-mode network of claims and enrolled actors: the case of AW RKC
(black lines = mimicry strategy)

actors better fitting the highly energetic lifestyle idea. Both Clusters 9 and
6—along with Cluster 3—encompassed claims asserting that water and
alkaline nutrition improve physical and mental performance, stimulate
fertility, are beneficial during pregnancy and counteract inflammation
caused by acidosis of tissues responsible for serious diseases and tumours.
In the central Clusters 4 and 0, the promotion of water and alkaline food
as a healthy lifestyle focused on different repertoires: acid–base balance as
a characterising element for a healthy body and as an anti-ageing factor

Table 6.2 Clusters and related narrative repertoires within the AW RKC

Modularity class	Narrative repertoire
5	Alkaline water and food as a way of preventing tumours and chronic diseases.
8	The purifying effect of alkaline water and food capable of counteracting the effects of toxic and carcinogenic pathogens present in ordinary water and food. The alkaline lifestyle is seen as a way of preventing disease and reinforcing the immune system.
9	Water and food as ways to cleanse the body by eliminating acidity from it, improve health and mind/body performance and prevent disease.
6	Water and food as ways to cleanse the body by eliminating acidity from it, improve health and mind/body performance and prevent disease.
10	Modern medicine is not capable of understanding and getting rid of disease as it does not consider the mind–body relationship.
4	Acid–base balance as a key feature of bodily health and its anti-ageing effects.
0	Alkaline water and diet are a cure against viruses (including SARS-CoV-2) and opposition to governments' health policies to combat the dissemination of the virus.
7	Alkaline water to improve physical performance and strengthen the immune system.
1	Cure as a route to personal awareness.
2	Conflict with science's approach to the treatment of tumours, chronic diseases and Covid-19.
3	Health benefits of alkaline water.

(Cluster 4); alkaline water and diet as a defence against viruses, including the SARS-CoV-2 coronavirus (Cluster 0). The latter cluster includes claims contesting government anti-Covid-19 health policies. Cluster 1 is strongly connected to Cluster 0 and presents alkaline treatment as a way of enhancing personal awareness. Cluster 2 is less pervasive in the graph but still significant in its focus on claims arguing against the scientific approach to cancer, chronic diseases and Covid-19 treatment.

Another area is made up of peripheral Clusters 5-10-7. The Cluster 5 repertoire focused on alkaline water and food's ability to prevent cancer and chronic disease. Although claims relating to causes of tumours and their treatment were distributed across all clusters, this one featured

claim–actor relationships seeming to favour the enrolment of scientific actors in arguments for alkaline water as a way of preventing and treating tumours, such as scientific journal articles, their authors or tumour physiology subjects. In addition, science also plays an important part in the Cluster 10 repertoire although, in this case, it is not enrolled to legitimise the AW RKC corpus of knowledge but rather falls into this repertoire for its perceived inability to understand and treat diseases, given its failure to consider the mind–body relationship. Cluster 7 includes claims arguing for the use of alkaline water to improve physical performance and strengthen the immune system, mainly on the basis of actors in the biology and physiology spheres, as well as scientific institutions or physicians.

Tables 6.3 and 6.4 show the claims and actors with the highest betweenness centrality values. We noted that although both SARS-CoV-2 and Covid-19 are present in alkaline RKC narratives and feature in Cluster 0-2 repertoires, they do not play a key bridging role in them–either as a component in the claims or as actors. The narratives revolve

Table 6.3 Betweenness centrality of claims in the AW RKC network

Claim code	Claim	Betweenness centrality
N113	Acidosis causes chronic diseases.	0.149
N137	Alkaline water has an anti-ageing effect.	0.146
N125	Alkaline water cures human, animal, plant and the planet's health.	0.070
N157	Alkaline water prevents tumour formation.	0.066
N112	Acidosis causes tumours.	0.056
N145	Alkaline water enhances physical performance.	0.056
N185	Bottled water is harmful to health.	0.050
N182	Tap water is harmful to health.	0.049
N233	An alkaline lymphatic system enhances energy and concentration.	0.041
N6	Alkalinity reinforces improved organ function.	0.037
N44	The human body is an integrated and interconnected organism.	0.034
N47	Sick people have a capacity for self-recovery.	0.033
N127	Alkaline water cleanses organisms.	0.029
N86	Illness is caused by the accumulation of scum.	0.029
N87	Illness is a manifestation of the body's self-recovery process.	0.029

Table 6.4 Betweenness centrality of actors in the AW RKC

Enrolled actor	Betweenness centrality
RK publisher	0.062
Ionisers	0.055
Inflammation	0.037
Mind	0.037
Tumours	0.032
Energy	0.032
Joint pain	0.030
Sugars	0.027
Plastic bottles	0.024
The elderly	0.023
Medicines	0.022
Headache	0.020
Mental clarity	0.019
Italian Higher Institute of Health (Istituto Superiore di Sanità)	0.019
Alkaline minerals	0.018

mainly around associations between acidic and alkaline body conditions and their consequences. In this sense, claim N113 ('Acidosis causes chronic diseases') bridged Cluster 5 and the rest of the network by focusing on chronic diseases as a consequence of acidity, while claim N137 ('Alkaline water has an anti-ageing effect') lay mainly in a central position, arguing for the anti-ageing effects of alkaline water, i.e. a less extreme assertion that helps explain this location in the network. The following are the three most central actors: (1) publishers, because of their ability to provide RK with a readership; (2) ionisers, for their chief role as 'flexible' technological devices—as they serve various needs and have a range of possible uses and purposes (drinking, cleaning, saving money, avoiding plastic, etc.); (3) inflammation, as a widespread condition impacting health and wellbeing with various degrees of severity. Finally, the ties in the network denote the widespread use of mimicry practices (64.6% of the ties) to legitimise RKC entrepreneurs' knowledge claims. Here, mimicry also goes along with the enrolment of scientific and institutional sphere actors. Exceptions to the prevalence of mimicry are provided in Cluster 10, visibly peripheral and related to criticisms of institutional

medicine, and in other more central areas of the network, mostly involving Clusters 9-6-0, where the strategy is partly mixed.

Finally, we noted that the analysis highlights not only the significant role in holding different narrative repertoires together played by 'tumour' enrolment but also by knowledge claims relating to the use of alkaline water to prevent tumours and 'acidosis' (combated by the alkaline diet) as a cause of tumours.

6.4.2 The Structure of Discursive Universes Legitimising RK Within the Five Biological Laws RKC

The 5BLs RKC network would seem to be more complex than AW (Fig. 6.3). Basically, both the network and its $3k$-core partition are larger than the other cases (see Table 6.1). This is due to (1) the higher level of interaction observed in the relevant online spaces, also evidenced by a large number of online users coded as actors, and (2) the wider spectrum of the knowledge contents coded as claims. As in the former case, the networked 5BLs RKC was divided up into different areas identified using the modularity algorithm. Its community structure (modularity = 0.762) was rather fragmented with the algorithm yielding 17 modularity classes. Similar to AW, these clusters form both a core area (bottom centre of the graph) and a number of peripheral areas, plus several clusters occupying less dense areas and with sparser distribution than the others.

Starting from partitions with the largest proportion of nodes, Cluster 7, with its 'Causes of disease: fear and psycho-social conflicts' repertoire, is located bottom left in the graph and divided up into two parts, one of which is highly cohesive and peripheral while the other is sparser and closer to the core of the graph. The two parts of Cluster 7 are mainly held together by one of the claims with the highest betweenness in this graph, namely CLB186 ('Fear of death causes pneumonia'), which is representative of the repertoire of this cluster and also one of the claims relating health narratives to the Covid-19 crisis. Interestingly, the connection between this claim and the right half of the cluster is based on strategies other than mimicry: the separation, then, concerns the way this claim's
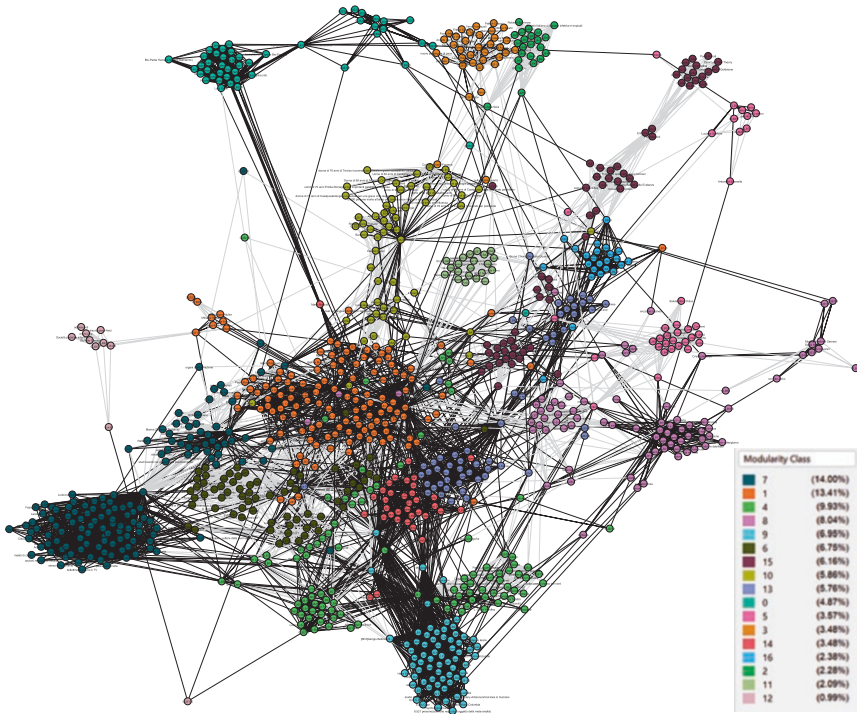
Fig. 6.3 Two-mode network of claims and enrolled actors: the case of 5BLs

narrative is oriented towards enrolled actors, which form two seemingly unrelated sub-groups[7] joined up by a 'boundary claim'—which owes its role to its connection to actors from other clusters (Table 6.5).

Cluster 1's repertoire relates to Covid-19 counter-narratives and occupies a central position in the graph, with some ramifications towards other nearby areas. This cluster comprises the two central claims CLB84 ('Covid-19 is no more harmful than seasonal flu') and CLB80 ('Mortality rates from Covid-19 are very low', see Table 6.6), both of which are related to denying the dangers of Covid-19 (Table 6.7). These two claims

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[7] In actual fact, setting the modularity procedure's 'resolution' parameter to less than 1—to produce a larger number of modularity classes (Blondel et al., 2008)—yields a clustering in which the two sub-parts of Cluster 7 belong to different clusters. By default, all the analysis presented was performed with a resolution set on 1.

Table 6.5 Clustering of narrative repertoires within the 5BLs RKC

Cluster	Narrative repertoire
7	Causes of disease: fear and psycho-social conflicts.
1	Covid-19 counter-narratives.
4	Viruses not harmful to health.
8	Functioning of biological laws.
9	Hamer medicine vs institutional medicine.
6	Links between institutional medicine, economic interests and policies.
15	Pandemic as a social experiment vs self-determination in health matters.
10	Causes of disease: diagnostics and prevention measures.
13	Epistemic relativism on Covid-19 and health.
0	Functioning of biological conflicts.
5	Causes of disease: childhood trauma and inner conflict.
3	'Warmongering' and violent science.
14	Unreliability of experts and institutions.
16	Opacity of health institutions.
2	Technocratic and hyper-interventionist medicine for economic interests.
11	Media terrorism.
12	Enslavement of the psyche.

are responsible, to a considerable extent, for Cluster 1's central position because of their connections with nodes from other clusters—notably often related to people who comment on content online (one of which has the highest betweenness of all the actors). Cluster 4's location (bottom of the graph) in the network is also a subtle one. The narrative repertoire of this cluster is about denying the dangers of viruses in general. It is split up into two sub-partitions, plus other sparse nodes. The two-halves of the cluster are kept connected by the highly central CLB134 claim, which states that 'The virus is not dangerous'. In sum, the positions of the first three clusters reflect the way in which the Covid-19-related repertoire tends to spread across the RKC, albeit in different forms.

A further set of repertoires belongs to clusters intersecting with the above. This is the case of Cluster 6 ('Links between institutional medicine, economic interests and policies'), Cluster 13 ('Epistemic relativism on Covid-19 and health') and Cluster 14 ('Unreliability of experts and institutions'), which lie at the core of the graph, though with some ramifications. This is a set of repertoires that more directly question the

Table 6.6 Betweenness centrality of claims for the 5BLs RKC network

Claim code	Claim	Betweenness centrality
CLB84	Covid-19 is no more harmful than seasonal flu.	0.093
CLB478	Social distancing brings about health-related and social damage.	0.082
CLB186	Fear of death causes pneumonia.	0.080
CLB80	Mortality rates from Covid-19 are very low.	0.070
CLB289	Seasonal flu is more dangerous to health than Covid-19.	0.069
CLB134	The virus is not dangerous.	0.066
CLB492	The media provide epidemiological data which is not to be trusted.	0.049
CLB262	Restrictions such as quarantine and isolation are of no use in combating the spread of Covid-19.	0.045
CLB475	Asymptomatic patients are not affected by Covid-19.	0.032
CLB483	Approval procedures for the Covid-19 vaccine are neither transparent nor reliable.	0.028
CLB224	Avoiding restrictions is of use in reducing the effects of Covid-19.	0.028
CLB169	Molecular medicine neglects the processes by which diseases originate.	0.020
CLB197	The psyche is the underlying origin of disease-related processes.	0.020
CLB204	The real world is made up of intangible factors impacting health.	0.020
CLB28	Systemic reality impacts health.	0.020

Table 6.7 Betweenness centrality of enrolled actors for the 5BLs RKC network

Enrolled actor	Betweenness centrality
Children	0.0545
Symptoms	0.0444
Parents	0.0393
Physicians	0.0252
WHO	0.0205
La Stampa (Italian newspaper)	0.0168

validity and legitimacy of science and medicine. Furthermore, Cluster 13 is split into two-halves joined by the central CLB478 claim ('Social distancing brings about health-related and social damage'—see right-hand side of the graph), and the upper-right branch of this cluster extends to

another area where Cluster 16 ('Opacity of health institutions') and top-ics more closely related to 5BLs and the latter's interpretation of conflict and trauma (Clusters 8 and 5) are located.

Hence, Covid-19 and health institution narratives are scattered across the RKC and intersect one another, especially those related to clusters with more ties towards the core of the network than towards its edges. In this respect, Clusters 5-8-9-0 are located along the periphery. These denote narrative repertoires specific to the 5BLs and are thus more extreme than other narratives, such as more Covid-19 and related counter-narrative focused ones. As far as the presence of mimicry as a strategy is concerned, the graph shows not only how prevalent this is (67% of all ties) but also how it flows through several branches of the network, following traces of Covid-19 pandemic counter-narratives and criticisms of medicine and science. In this respect, the way Cluster 15 ('Pandemic as a social experiment vs self-determination in health mat-ters') is positioned merits consideration. This partition's subsets are detached from one another, denoting a presence within the core of the graph, along with more 'relaxed' narrative repertoires, and also towards the periphery (upper-right-hand side)—hence with more extreme sub-jects (such as totalitarianisms or 'quantum field theory'). The extreme sub-partitions also differ in strategy; the nodes in the upper branch of Cluster 15 are bound together by linkages unrelated to mimicry, while the opposite is true of the lower branch. Finally, this strategy also charac-terises the peripheral cluster ties related to 5BLs specific repertoires.

6.4.3 Combining the Network Structures of the Two RKCs

The network combining the two RKCs (Fig. 6.4) is modular in structure (modularity = 0.762) with a complex appearance in that it at least partly parallels the two distinct RKC groupings but also, at the same time, reveals some merging between the AW and 5BLs RKC repertoires. The clustering results shown in Table 6.8 indicate that several clusters share the same repertoire and relate to claims from one of the two social worlds or to their combinations. The repertoires of the two RKCs tend to
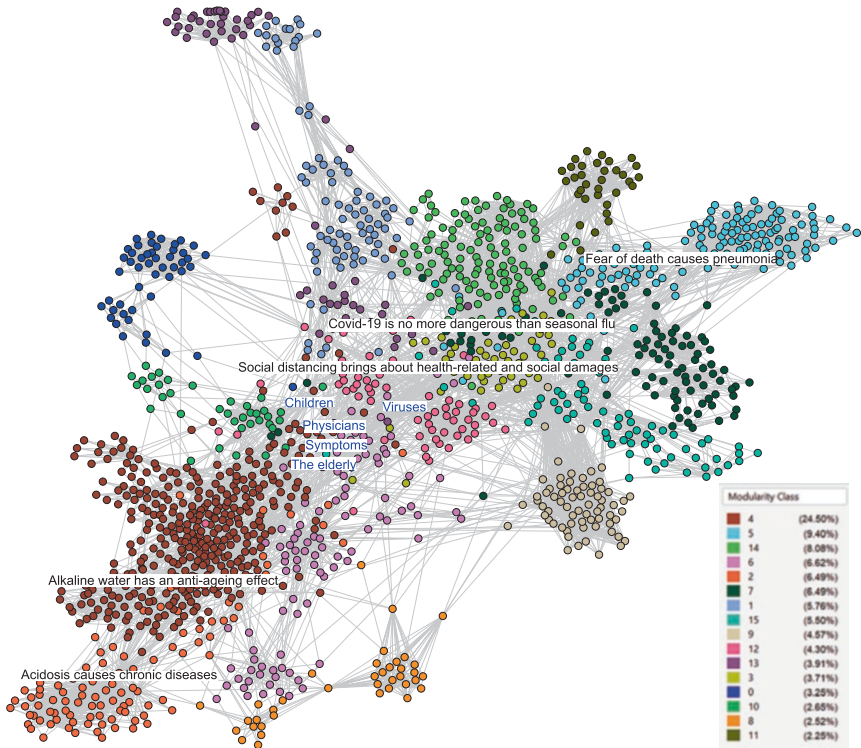
Fig. 6.4 Two-mode network of claims and enrolled actors obtained by joining the AW and 5BLs RKCs

preserve their specificity. The 5BLs RKC focuses on criticisms of the way governments and health institutions have managed the pandemic (modularity Classes 13–14), general criticism of institutional medicine along with the denial of the Covid-19 pandemic (modularity Classes 1-7-8-12-15, even though Clusters 7 and 8 include a minimum of alkaline RKC claims) and 5BLs' interpretation of the psychological and social causes of the pandemic and the damaging effects of social distancing and protection devices (links to a counter-narrative on vaccines, Clusters 0-3-5). Clusters 2 and 4 are related to the AW RKC repertoires; namely, the acidity-alkalinity dichotomy and the beneficial effects of food and water for health and wellbeing (the latter with a minimum of claims from

Table 6.8 Clustering of narrative repertoires within the network obtained by joining the AW and 5BLs RKCs

Modularity class	Narrative repertoire 1	Narrative repertoire 2	Claim origin
13	Pandemic management criticisms (1).		5BLs
14	Pandemic management criticisms (2).	5BLs vs institutional medicine.	5BLs
0	Damaging effects of face masks and distancing from the 5BLs point of view.		5BLs
1	Criticism of scientific and health institutions, the pharmaceutical industry and related communications.	Healthcare despotism.	5BLs
5	Fear and psycho-social factors as causes of disease and the dissemination of Covid-19.		5BLs
4	Alkaline water and food as sources of health and wellbeing.	Criticism of the conventional vision of healthcare and disease.	Prevalently alkaline
6	Individuals' internal conflicts, body reactions and holistic view of organisms.		5BLs/ Alkaline
11	Awareness.		5BLs
9	5BLs subject matter (generic).	Criticism of science from the 5BLs point of view.	5BLs
7	Criticism of institutional medicine (1).	Denial of Covid-19 pandemic (1).	Prevalently 5BLs
8	Criticism of institutional medicine (2).		Prevalently 5BLs
12	Criticism of institutional medicine (3).	Denial of Covid-19 pandemic (2).	5BLs
10	Symptoms and malaise as a reaction to past trauma.		5BLs
2	Alkaline vs acidic condition and tumours.		Alkaline
3	Criticism of the Covid-19 vaccine and vaccines in general.		5BLs
15	Criticism of prevention and medical intervention.	Denial of Covid-19 pandemic (3).	5BLs

Table 6.9 Betweenness centrality of claims for the joint AW and 5BLs RKC network

Claim code	Claim content	Betweenness centrality	Modularity class
CLB186	Fear of death causes pneumonia.	0.074	5
CLB84	Covid-19 is no more dangerous than seasonal flu.	0.073	14
N137	Alkaline water has an anti-ageing effect.	0.060	4
CLB478	Social distancing causes health-related and social damage.	0.056	3
N113	Acidosis causes chronic diseases.	0.053	2
ALB195	Governments and the media spread fake news about the pandemic along with false epidemiological data.	0.049	14
CLB80	Mortality rates for Covid-19 are very low.	0.042	14
CLB289	Seasonal flu is more dangerous to health than Covid-19.	0.041	15
CLB134	The virus is not dangerous.	0.036	7
CLB262	Restrictions such as quarantine and isolation are of no use in combating the dissemination of Covid-19.	0.031	15
ALB13	Personal protective equipment and technologies promoted by the institutions to combat the spread of Covid-19, such as gloves and face masks, and vaccines, are harmful and dangerous.	0.030	0
N125	Alkaline water cures human, animal, plant and the planet's health.	0.029	4
N145	Alkaline water enhances physical performance.	0.028	4
N185	Bottled water is harmful to health.	0.027	4
CLB492	The media provide epidemiological data which cannot be trusted.	0.024	14

the 5BLs RKC). Cluster 6 is the only truly mixed one in terms of the origins of its claims.

Despite this apparent segmentation, the two RKCs seem to interact in some way, particularly if we look at the claims and enrolled actors with the highest betweenness centrality scores (Tables 6.9 and 6.10). The graph in Fig. 6.4 shows the labels of the nodes with the highest scores for

Table 6.10 Betweenness centrality of claims for the joint alkaline and 5BLs SW network

Actor	Betweenness centrality	Modularity class
Children	0.073	10
Physicians	0.050	12
Viruses	0.035	13
The elderly	0.023	4
Symptoms	0.021	10
Medicines	0.019	6
Inflammation	0.019	4
Researchers	0.018	4
Vaccines	0.018	5
Tissues	0.018	6
WHO	0.017	8

betweenness only. As far as the claims are concerned, the first five sorted by betweenness score lie on the upper (5BLs) and lower (AW) sides of the graph and concern, respectively, Covid-19-related narratives and those regarding acidic/alkaline polarities in relation to health; this also means that the network is virtually divided up into these two RKCs.[8]

As far as the five enrolled actors (*children*, *physicians*, *viruses*, *the elderly* and *symptoms*) with the highest betweenness score are concerned, it is noteworthy that these are the actors that truly connect the two-halves of the graph and, more generally, the two different RKCs in them. Topologically, they are also exactly central in the graph, and when their connections are observed in detail, they link claims from both social worlds. More importantly, these actors can be considered boundary objects for their potential to translate interests from the different RKCs.

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[8] Another claim—not shown in the graph—comes from both these two RKCs and is explicitly coded as such: ALB195 ('Governments and the media spread fake news about the pandemic along with false epidemiological data'). Nonetheless, it is the only such claim in a cluster made up entirely of 5BLs RKC claims.

6.5   Discussion and Conclusions: Disassembling and Re-assembling Science

This chapter presented an enquiry into the epistemic structures constituting the AW and 5BLs RKCs, in an attempt to discover (1) the core RK claims concerning health within the discursive universes in which they are constructed and disseminated, (2) enrolment by advocates of RK and (3) how entrepreneurial actors position their claims vis-à-vis science. In this respect, the choice to pursue a combination of qualitative analysis and network analysis techniques is in line with the chapter's aim to study RKCs as social worlds and map their organisation as assemblages among claims and heterogeneous actors. The aim of the chapter's modularity analysis was to cast light on the structure of these social worlds and make them more understandable. This analysis provides the reader with an overview of the associations that emerged as significant in their support for RK, but with an eye to how entrepreneurial actors enrol other heterogeneous actors.

Thus, the clustering of the online discursive universes examined showed not only that entrepreneurial actors use differentiated repertoires but also that these repertoires rely on specific types of enrolled actors. The configuration of the assemblages involving claims and actors relates to RKCs' shared purposes and practices, however the latter are internally differentiated. Thus, one or more clusters may comprise elements whose association emanates from a given 'commitment' regarding health (e.g. alkaline water as a cure, symptoms as psychic-bodily reactions, etc.). This commitment is highlighted as the analysis displays the different repertoires constituting the knowledge core represented by the clusters obtained through community detection. In this respect, this analysis revealed that knowledge about health as it is practised within social worlds may be constituted through commitment to, and participation in, one or more RKCs, leading to broader arenas made up of multiple worlds organised ecologically around issues of mutual concern and commitment to action (Clarke & Star, 2008; Shibutani, 1955; Strauss, 1959). What is of chief interest in the configuration of the RKCs examined here is that

discursive enrolment occurs with a deployment of different actors functioning as allies irrespective of their origin, usage or function.

Thus, the analysis showed the *hybrid nature of the RKC epistemic enrolment space*. Reticular representation of the discursive universes of entrepreneurial actors who play a leading role in RK legitimisation processes allowed us to analyse the way such RK is supported by networks constructed by assembling actors and claims from different RKCs. In the transposition from one social world to another, the roles and interests of actors and claims change. These latter, as elements in assemblages, are arranged and aligned to respond to the cognitive needs defined in the various clusters identified in the analysis, but without being forced to conform entirely to the different local settings in which they are enrolled.

In this regard, observing the science transposition processes, which are enrolled in various forms in an attempt to support the legitimation of RK, is particularly significant. In the discursive universes designed to increase RK credibility, ongoing processes involving moving closer to and further away from science were observable. Within the RKCs epistemic enrolment space, the enrolment of science emerges as the result of a continuous (re)negotiation of science *contestation* processes, on one hand, and science *purification* processes, on the other. These two trends emerged from our analysis as follows.

The narrative repertoires marshalled to contest science revolve around the *medicine betrayed* theme. Having abandoned a holistic vision of treatment that conceives of wellbeing as an expression of an integrated mind–body organism and the medical profession's ethical principles as set out in the Hippocratic Oath, modern medicine is unable to understand the causes of diseases. Institutional medicine focuses on treatment of disease rather than healthcare. In science-critique narratives, a key role is played by interpretations of cancer treatment and the practices pursued to limit the dissemination of Covid-19. Both the scientific community and communication structures are enrolled in these narratives as organisations manipulated by lobbies which include denying scientific claims, thus providing alternative claims to explain health problems. The methods and tools of institutional medicine (including diagnostic ones) are rejected, as they focus on disease rather than health and on a conceptualisation of the body as a set of distinct organs, including the mind, rather

than the unitary organism propounded by holistic models. Epidemiological data is denied, i.e. deemed untrustworthy on the grounds of institutional medicine's distorted perspectives or corruption in the scientific community and information systems. Finally, official views of the causes of disease are considered to be wrong. In the case of the AW RKC, diseases are attributable to a state of acidosis in the body's tissues, while in that of 5BLs, they are to be explained by conflicts bound up with past psychic traumas leaving biomolecular scars in human tissues.

Thus, for these RKCs health is a matter of rebuilding a state of lost equilibrium. In the AW RKC, the equilibrium referred to is the acid–base equilibrium. Displacement from this balance causes cellular ageing, inflammation, malaise, chronic and/or degenerative diseases and tumours. Alkaline water is thus considered capable of restoring this balance, and a wellbeing and prevention practice as well as a treatment for diseases and tumours. The body of knowledge advocated by the 5BLs, on the other hand, refers to a body–mind balance. Diseases are, in fact, interpreted as imbalances generated by psychic conflicts deriving from prenatal and natal traumas. Care practices within this narrative infrastructure are presented as paths of awareness requiring subjects' active agency. And it is essentially through this process of acquiring—strongly practical and experiential—scientific knowledge that science is purified. Science itself is enrolled to legitimise forms of RK, e.g. the biomolecular claims attesting to the benefits of alkaline water on health or the scientific evidence marshalled to testify to the veracity of Hamer's psychobiological framework model.

These disassembling and re-assembling science processes are driven by a constant reworking of claims and actors within the RKC epistemic enrolment space. A key role in these processes is played by the boundary objects identified in the analysis of the unions between the two RKCs. The merging of the repertoires belonging to the two RKCs highlights claims and enrolled actors acting as boundary objects in the narratives examined. What counts in this respect is the role played by these boundary objects in the processes of *translation* between different repertoires: indeed, these objects allow us to move from, say, a biomolecular repertoire to a political repertoire—as happens, for e.g. with viruses, a recombinant agent in these repertoires. Narrative structures are also sustained by these translations.

Within this heterogeneous epistemic enrolment space, the tension deriving from these science disassembling and re-assembling processes is balanced by boundary objects responding to the need for network coherence. Paradoxically, our analysis showed that a key role in holding different social worlds together is played by actors such as *children*, *physicians*, *viruses*, *the elderly* and *symptoms*, together contributing to reinforcing a narrative on health entirely played out within the contested narratives of these RKCs.

In this sense, a key role is played by Covid-19, which acts as an arena within these social worlds and allows further elements designed to augment RK credibility to be added. The SARS-CoV-2 virus, infection, Covid-19 symptoms, social distancing and the health-related and social damage it causes, pandemic fake news allegations and the epidemiological death and infection figures spread by governments and the media are all enrolled to bring together elements from different social worlds (among these, the social worlds of science) to further legitimise the forms of knowledge advocated. In this sense, an analysis of RKCs focusing on the assemblages at work within these discursive spaces can increase our understanding of the extent to which RK is the result of bricolage processes and a reworking of conceptions and practices which acquire meaning in relation to one another, even when the pieces of knowledge thus deployed and articulated come from science itself and are reframed and recombined, as needed, to make sense of these assemblages.

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