

The Idea of Social Space by Pierre Bourdieu¹

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“Social space” constitutes a key idea of Bourdieu’s sociology. According to this concept, social reality in its objectivist aspect can be fundamentally characterized by a multidimensional distribution of agents across social positions. The metatheoretical principle of Bourdieu’s sociology is expressed by the thesis that, by postulating the existence of spatial structure, one can overcome the epistemic difficulties associated with sociological concepts that support a flat ontology within the framework of object-oriented realism. Spatial structure can supply solutions to three major challenges: the first one concerns the tendency for the reification of social order and social phenomena, the second — attributivism, which reduces relationships to characteristics, and the third — the predominance of positivist methodology in sociology. Although Bourdieu claims that spatial structure can be interpreted in terms of a social survey as social space, he goes beyond the boundaries of empirical generalizations. The paper examines the ontology of the idea of “social space”. The authors argue that the postulated spatial structure, which calls for realistic treatment by sociologists, constitutes a metaphysical entity that does not lend itself to complete scientific confirmation. To maintain relative proximity of this metaphysical postulate to scientific practice, Bourdieu identifies the fundamental structure of social reality with topological structure, a concept borrowed from mathematics. Topological structure is perceived as a non-phenomenological law that describes relationships between social positions, interpreted as points in social space. The idea of social space claims the priority of topological structure over social positions, which do not exist before, or separately from, the structure. The article considers three layers in the ontology of “social space”: mathematical, theoretical, and empirical.

Keywords: social space; Pierre Bourdieu; topological structure; philosophy of science; structural realism; theoretical sociology

Introduction

By placing Pierre Bourdieu’s “idea of social space” in the title, we want to emphasize that this sociological approach has not yet been sufficiently established to talk about an established theory. The idea of social space serves as a heuristic principle that helps to systematize and explain disparate sociological concepts. Nevertheless, it is important as

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it is often the ideas rather than theories that form the basis for the development of sociological trends.

The “social space” is the center of crystallization of an influential research program initiated by Pierre Bourdieu². This makes the study of social space one of the key ideas of modern sociology. The study of the problem field that is formed around the social space is of particular importance, since it can serve as a guideline for social and cultural policy.

Bourdieu’s sociology implies a rejection of the ontology of self-existing social agents and a systematic critique of substantialism, understood as naive realism (Bourdieu, Wacquant, 1992). For Bourdieu, social space is a multidimensional distribution of agents according to objective social positions, which makes it possible to scientifically explain and predict practices, strategies, dispositions, representations, etc. (Bourdieu, 1979). Social positions are constructed on the basis of socially effective dispositional properties of agents. A position is characterized by its location in a metric space (the relation of this position to all others) and the measure of socially effective resources or “active properties” that it objectifies. “Social space” is a justification or reification of a logically conceivable topological structure. This structure denotes what is common to all social positions and serves as the environment in which they are implemented. The position becomes a part of the space, its “accident”. And the part/whole relationship acts as an abbreviated description of complex processes. Yet there is a conceptual shift: the meaningful hierarchical social order of theories of social stratification and social structure is replaced by a universal form, where spatially similar relationships are fixed. In order to avoid incorrect interpretations, we emphasize that the concept of social space in no way claims to be a “general theory” of society — it can only be considered as a necessary moment of a composite whole. In Bourdieu’s sociology, reality is described using the “trialectic” of symbolic, social and physical spaces (Wacquant, 2023: 6–10).

The Bourdieu research program provides neither detailed theoretical explanations of the “social space”³ nor the axiomatic–logical construction, as is common in formalized theories. Historically, it looks as if Bourdieu analyzed possible empirical manifestations of social space, and then proposed a topological structure that fixed the set-theoretic representation of the characteristics of these manifestations and thus combined them, making the transition from empirical forms of representation to a basic concept (Saint Martin, 2015). The idea of social space arises in the process of a complex interplay of empirical interpretations and *a priori* reflection.

Bourdieu emphasizes that “social space” is defined only within the framework of his other concepts (Bourdieu, Wacquant, 1992: 96), and implicitly — through a relationship with the philosophical (G. Bachelard, G. W. Leibniz, E. Cassirer) and sociological (M.

2. See, e.g., (Atkinson, 2023; Atkinson, Schmitz, 2024; Blasius et al., 2019; Flemmen et al., 2018; Garcia et al., 2023; Jarness, 2018; Reed-Danahay, 2020; Wacquant, 2023).

3. “Bourdieu was insistent that he did not ‘do theory’. He constantly warns us against the seductions of pure conceptual disquisition and the dangers of ‘theorizing’, which so easily veers into scholasticism. ... Around 1989, he turned down an invitation by Jeffrey Alexander... to hold a sort of ‘world summit’ of social theory with Jürgen Habermas, simply because that agenda just did not make sense to him...” (Wacquant, Akçaoğlu, 2017: 40).

Weber, I. Hoffman, E. Durkheim, A. Schutz) ideas of predecessors (Bourdieu, 1989; Vandenberghe, 1999).

The content of the “social space” is not exhausted by its definition as a multidimensional distribution of agents on the basis of socially effective properties. No less significant, if not more, are the results of Bourdieu’s vast and in-depth empirical research, which, simultaneously serves as a practical definition, operationalization, and “meaning” of the concept for the working sociologist.

For Bourdieu, the construction of social space was not only the art of multidimensional statistical analysis of heterogeneous empirical data (Blasius, Schmitz, 2014). It was also the result of deep philosophical and sociological reflections that depended on the expected results and each time required creativity and theoretical imagination (Lebaron, 2015). However, from some point on, the “social space” ceased to need independent imagination and understanding. His development largely came down to the systematic application of what was the fruit of research intuition. This has given rise to the illusory representation that there is a universal social space of modern societies (Glevareck, 2023; Hardy, 2013; Vandebroek, 2018). Nowadays, the “social space” is a quite respectable research program with its own methodology, its own procedures for collecting, processing and interpreting sociological information (Blasius et al., 2019). The transformation of conceptual insight into a recognized research field routinizes scientific breakthrough, constantly pushing back the boundary beyond which discovery begins. This is exactly the effect produced by works (Grenfell, Lebaron, 2014; Robson, Sanders, 2009) and others. If 30–40 years ago, only sharp minds were able to obtain significant scientific results without falling into various kinds of methodological traps, then the efforts of subsequent generations of sociologists have made the “social space” accessible for wider application. Here it should be noted that these efforts have bypassed one essential aspect of the concept of social space, namely, the ontological one (Maton, 2003).

The ontology of sociological theory answers the question: “What is the social reality?” The ontology of the concept of social space is important because all statements about social space can be interpreted as statements about its ontology. The theme of scientific realism is the core of the problem of substantiating sociological knowledge and philosophical reflection on sociology. In our case, the problem is as follows: can the concept of social space be called knowledge, i.e. is it referential to social reality? Or is this concept referential only to sociological practices? The problem of the ontological status of the concept of social space leads us directly to questions about the nature of sociological knowledge and the essence of sociological practices. What should sociology be — just an empirically relevant methodology of interviews, mass surveys and database operations, or something more? Realism insists that science has access to the essential, and not just the phenomenal, level of social reality⁴. Do we have sufficient grounds to believe that the entities [*enses*] postulated by sociology actually exist? How should researchers solve ontological problems right now, when before our eyes the fundamental cognitive agenda is

4. See arguments in favor of unknowability in e.g., (Hanson-Park, 2023; Morganti, 2004).

being replaced by managerial and socio-technological tasks, and there is an active search for new methods of sociological research and explanation?

The purpose of this paper is to analyze Bourdieu's sociological "project", summarizing his ideas and identifying the ontological structure that underlies it. Bourdieu used the concept of "social space" to rely on "hard science" and avoid irrationalism and relativism. The concept of social space emphasized the scientific character of Bourdieu's sociology by giving it a theoretical organization, as opposed to a haphazard set of results, rules and practices. Considering the "social space" as an object of research, we go beyond it and reveal that its own elements are part of a broader concept of structural realism.

Social Space as a Theoretical Concept

The idea of social space is a theoretical concept. Speaking of an idea, we draw a distinction between the empirical and the structural research of the social space. That is, the structural content is significant and systematically provides not only a method, but also an inner theoretical form for Bourdieu's sociology — a form that asserts its own universality.

Bourdieu follows E. Cassirer in perceiving space as a "possibility of togetherness" ("Möglichkeit des Beisammen") (Cassirer, 2010: 487), as a "space of idea" (Cassirer, 2010: 488) that can be studied through the order of relationships rather than as an abstract description borrowed from mathematics. To comprehend social space means to develop a relational conceptual framework through a system of assumptions, hypotheses, and postulates. To achieve that, Bourdieu equates social space to topological space, creating a scientifically founded and respectable insight that asserts: the properties and dynamics of social phenomena are conditioned by the underlying topological relationships (Bourdieu, 1985: 723–726).

At the same time, Bourdieu does not propose a mathematical model, but states that social space is a positional attribute of the social reality and that there is a mathematical form that captures the inherent spatiality of social reality — a form that allows for the empirical diversity of elementary differences (Bourdieu, 1997: 162). By focusing on social space, Bourdieu avoids offering a straightforward model of social reality but introduces a mathematical structure that serves as the basis for its description and explanation. N. Bourbaki gave the first comprehensive definition of "structure": "It can now be made clear what is to be understood, in general, by a... structure. The common character of the different concepts designated by this generic name, is that they can be applied to sets of elements whose nature has not been specified; to define a structure, one takes as given one or several relations, into which these elements enter... then one postulates that the given relation, or relations, satisfy certain conditions (which are explicitly stated and which are the axioms of the structure under consideration). To set up the axiomatic theory of a given structure, amounts to the deduction of the logical consequences of the axioms of the structure, excluding every other hypothesis on the elements under consideration..." (Bourbaki, 1950: 225–226). If the notion of structure for social sciences

is to hold any water, it should be based on this definition that captures the fundamental intuition underlying it.

In that way social space is an ensemble of sociological *enses* that possesses a relational structure. social space does not provide a direct representation of social phenomena, but rather characterizes them through positions and distances (Bourdieu, 1979). Seemingly obvious, the conceptual simplicity masks the philosophical ideas that underlie the concept of “social space”. An apparently intuitive methodology hides a non-trivial ontology: behind the method there is a topological structure that “encodes” social structure.

From the philosophical viewpoint, Bourdieu’s approach to social space may be labelled as “rationalistic realism” (Vandenbergh, 1999), “epistemological realism” (Lahire, 2023), or “structural realism”⁵, with E. Cassirer among the forerunners of the latter (in the form of conceptual structuralism: see (Ferreirós, 2023)). Bourdieu drew the following conclusions about the nature of theoretical knowledge from the views of Cassirer (French, 2014: 99):

- relations with known logical and mathematical properties conceptually precede *relata* (objects related to each other);
- scientific objectivity shifts from objects to regularities.

Bourbaki’s mathematical structuralism was not the sole source of the idea of social space. Bourdieu was also deeply influenced by the French school of structuralism and semiotics, which started with the object as an organic whole, and “emphasized the irreducible relations linking elements together” (Aubin, 1997: 311). The role of structure in Bourdieu’s sociology is seen as “unity of diverse aspects” (see (Bourdieu, Wacquant, 1992: 17–19)):

- structure in social science is not a primitive element; it is defined through an ensemble of relations but it is qualitatively different from any one of them and it forms their totality;
- the content of each relation depends on the content of the structure in which it is incorporated;
- structure does not stand in opposition to its elements, since not only are the elements determined by their structure, but the structure is also determined by its elements;
- the relations that make up the structure do not form a chaotic conglomerate, but have a specific order (or orders).

5. Scientific realism is defined by its core assumption that theoretical knowledge is possible and offers an accurate description of reality (Chakravartty, 2007; Rowbottom, 2019). At the same time, no logical contradiction arises between adherence to scientific realism and the deviation of metaphysical realism (Alai, 2023; Corti, 2023), i.e., the thesis about structured reality that exists independently of reason. Simply put, structural realism is a minimalistic version of scientific realism: it solely argues for the existence of a mathematical or structural content of scientific theories. For an excellent and in-depth overview of structural realism see (Ladyman, 2023). While heavily focused on physics, structural realism can in principle be used *mutatis mutandis* to explore the problems of social science (Kincaid, 2008; Porpora, 2022), although opposing views have been voiced (Lyre, 2013; Tulodziecki, 2016).

Bourdieu insisted that sociology, in its objectivist mode, is a social topology and that thinking in the terms of social space is thinking in terms of topology⁶ (Bourdieu, 1989: 16). Based on *a priori* considerations and verified by sociological experience, “social space” is introduced as a topological structure defined on some carrier. The “topological” definition ensures intelligibility. “Social space” is a theoretical concept, and a theoretical concept generates sociological knowledge by means of deductive reasoning without directly referring to empirical data. This constitutes its *differentia specifica*. Why is this possible? Classical German philosophy states that the basis of the hypothetical-deductive development of theoretical knowledge is its definitive attributes: apodicticity, unconditional universality and apriority. What necessary and universal knowledge is contained *a priori* in the definition of social space? What kind of *a priori* knowledge can sociology use in principle? The answer is obvious: mathematical knowledge. Similarly, the concept of topological structure makes Bourdieu’s “social space” a theoretical concept. Topological structure forms a non-empirical (*a priori*) aspect of the concept of social space. The correct use of the concept of social space (and not metaphorical, as, e.g. in (Liu, 2021)), implies that the *essentia* of social reality is adequately described by mathematical structures. These structures are built in accordance with logical rules (independent of science) in such a way that their features are discovered rather than invented.

Bourdieu assumes without proof that social reality can be mapped into a mathematical construct such as (metric) space. It is not about mathematically formulated sociological theory. It means that sociological research projects an object constructed by sociologists onto a certain metric space, which, in turn, requires a meaningful sociological interpretation.

At the same time, the mathematical content of social space is not just a representation of nominalist (sociological) content — they cannot be separated (cf. (Leng, 2020)). Bourdieu compares social reality with mathematical space based on their common attribute of “structurality”. In other words, the connection of social reality with the mathematical concept of space is motivated by the fact that reality is considered from the viewpoint of structure. Social phenomena become part of spatial order insofar as they are structured, and structured by sociological research.

Bourdieu seeks a replacement for the theories of a “social structure” that contains all the specific sociological structures. Therefore, the concept of social space, while retaining important structural information, is used not to construct a theory, but to highlight a theoretical object. Topological structure does not become the main tool of sociological research, but it is used in fundamental reasoning. This means that constructive postulates and statements about social space correlate with the existential propositions of topological structure only at the level of mathematical ontology, while the construction of specific sociological entities (social positions, capital, etc.) takes place at the empirical level. The Ontological commitments of the concept of social space do not conflict with its epistemic commitments.

6. See a detailed analysis of Bourdieu’s topological “dimension” in (Wacquant, 2023: 37–40).

Bourdieu's notion of social space is based on a constructive scheme of structure, but it requires resources that are not directly linked to mathematically defined structure. In our case, the structure is one or more sets that are in external relations, which are characterized by axioms⁷ defined in the terms of set theory (Bourbaki, 2006: E IV.4–5). However, not all of Bourdieu's statements are conditioned by structural representation or can be explained in structural terms: structure is not enough to identify nonstructural properties, for example, monadic relations (attributes) or internal states (Bourdieu, 1979).

Topological Structure

The construction of a social space, the implementation and development of sociological research within the framework of this program are impossible without mathematics encoding sociological entities. But mathematics, which has become a factor and a means of studying social space, is not always directly related to topology. More often it is about probability theory and statistics. Nevertheless, the topological structure is fundamentally important for the idea of social space. It is not a combination of propositions like set theory, which, being a consistent syntactic construction, allows to make plausible statements about social reality without referring to data. No, the topological structure does not guarantee the logical form of possible empirical propositions. It acts as a prerequisite and a condition — one of the conceptual forms of sociological experience. This is possible because the concept of topological structure is directly included in the construction of the social space. In an idealized description, topological structure is identified with the structure of social reality, whereas social space is considered isomorphic to the mathematical one in its construction.

To clarify our subsequent argument, we refer to the set-theoretic definition of structure⁸. So, structure S comprises:

- the definition area — a nonempty set of objects U ,
- a nonempty ordered set of R relations on U .

Structure is commonly treated as an ordered pair: $S = [U, R]$ (Krause, Arenhart, 2016). In these notations, there are two structures $S_1 = [U_1, R_1]$ and $S_2 = [U_2, R_2]$ if there is a one-to-one mapping $\varphi: U_1 \rightarrow U_2$ that φ preserves the system of relations of structures S_1, S_2 in the following sense: for all relations $r_1 \in R_1$ and $r_j \in R_2$ indexed set (a_1, \dots, a_n) from U_1 satisfies the relation r_1 , if indexed set $(b_1 = \varphi(a_1), \dots, b_n = \varphi(a_n))$ in U_2 satisfies r_j , where $r_1 \in R_1$ is a relation corresponding to $r_j \in R_2$ (relations r_1 and r_j have the same index in ordered sets of relationships R_1 and R_2). In that case, φ is called isomorphism (da Costa, Rodrigues, 2007). Isomorphism and homology are often used to analyze both

7. Axioms limit the notion of social space. From the perspective of empirical science, they can be considered hypotheses.

8. N. Bourbaki's "structures" can facilitate effective articulation and formalization of scientific theories (Bolinger, 2015: 59–68 u. ff.), although other approaches to the representation of structure are also possible (see, e.g., (Bueno, 2021; Frigg, Nguyen, 2020)).

scientific knowledge (Krause, Arenhart, 2016: 15–17), and social space (see, e.g., (Atkinson, 2021; Atkinson, Schmitz, 2024)).

According to structuralism, “concepts constitute the core of mathematics and concepts are captured by the axiomatic method” (Marquis, 2020: 44). A topological structure on a set X is a family Ω of subsets of X that satisfy the axioms of topological structures (Singh, 2019: 7). Namely, a family Ω of subsets of a set X forms a topological structure if it contains an empty set \emptyset , X itself, each sum of any number, and each intersection of the total number of its subsets. Sets of Ω are typically called open sets. The pair (X, Ω) are referred to as topological space. The elements (X, Ω) are called points, and the set X — the carrier of the topological space. Topological space is a set with a defined family of all its open subsets. Whereas metric space can be viewed as an axiomatization of the concept of the proximity of points, topological space seems to axiomatize a broader concept of the proximity of a point to a set. Any metric or ordinal structure on X produces a topological structure. Therefore, we shall only deal with topological structure from this point onward.

If we deem the structure of social space to be topological, we accept that, at the level of mathematical ontology, all sociological entities can be modeled on a carrier set in terms of the primitive relation of belonging⁹. This provides a useful theoretical framework. The carrier set of social space must satisfy two conditions:

- the carrier of a social space is a connected set (within the limits of certain relations);
- the social differences between elements of the carrier are subject to certain statistical regularities.

When those conditions are met, the construction of social space is rewarded with a sociologically meaningful result.

Across various social spaces (different countries and/or regions of social phenomena), empirical referents of the points do not coincide. However, topological structure as an ontological invariant may endure regardless of the specific elements in those spaces. This became possible because an abstract structure is not implicitly reliant on objects. Elements that form the domain are devoid of any primary (inherent) properties, and relations form tuples (ordered sets) of elements that do not lend themselves to intensional interpretation. A relation is defined extensionally, through the set of tuples to which it can apply, since the mathematical characteristics of a relation are determined only by its extensional. This narrows dramatically the set of intensions that such a relation can imply. The extensional interpretation of structure, however, does not deprive it of its meaning: elements comprising X are interdependent and can be exhaustively described in terms of structure.

Further, it is impossible to establish a one-to-one correspondence between the extensional and the intensional of a structural relationship. So that it is allowed, there are the relations whose extensionals coincide while their intensionals differ. The extension-

9. The language of set theory consists of first-order logic and the only non-logical symbol ϵ .

al quality of abstract structure and its unwillingness to explicitly consider intensions is sometimes deemed as its disadvantage (Arenhart, Bueno, 2015; French, 2023). This, however, underscores the generality of abstract structure, which remains *de facto* independent from realizations.

Social space explains the subject of research, written as points, by placing them in an encompassing topological structure. Topological (metric) relations of points express the combination of differences between positions (Bourdieu, 1998: 32) and reveal their external inherent properties. Social space allows for an empirical method of establishing the equivalence of social differences between (individual and collective) agents and the distances between them. Such a principle is largely consistent with the popular spatial metaphor of sociological experience (Bourdieu, 1979). In other words, the differences between sociological entities, for example, (xDy) , (xDz) , (yDz) , are transformed into the distances between them $q(x, y)$, $q(x, z)$, $q(y, z)$, (for example, see (Le Roux, Rouanet, 2010: 35, 37)). Here we face a contradiction: distance is non-negative, symmetric, transitive and self-similar. By contrast, difference is devoid of any such useful mathematical properties: it lacks the important property of transitivity $(xDy) \wedge (yDz) \not\Rightarrow (xDz)$, being merely anti-reflexive $\neg(xDx)$ and symmetric $(xDy) \Rightarrow (yDz)$. To translate differences to distances correctly, the researcher is forced to introduce certain additional conditions, which may lead to conceptual aberrations. Moreover, not every empirical study allows for determining the distances between objects based on the available data, leaving the researcher to make do with differences¹⁰. Thus, it is often impossible to plot a metric space on a graph (extracted, e.g., from a social network). Therefore, the more general concept of topological space comes into play.

Speaking of social space, Bourdieu assumes by default that for each pair of different points there is a neighborhood comprising exactly one of the points. This means that, in principle, we can separate any two subjects of sociological research or parts of a single subject, and the whole is the sum of its parts. In topology, this property is referred to as separability (Singh, 2019: 89–90). Separability of social space may signify a persistence of social differences.

As a result of an axiomatic choice that does not require an external justification, topological structure acts as a constructive definition for the theoretical subject — the idea of social space. It also functions as a mathematical condition for such an idea. The connection between Bourdieu's sociology and topological structure reveals itself as a mathematical level of ontology.

Mathematical ontology and sociological ontology, however, are far from identical. It is obvious that social reality as such cannot consist of an ordered set of tuples devoid of primary properties. Sociology here acts as a meta-ontology of a topological structure. Bourdieu's sociological statements appear excessive from the viewpoint of topology. The fact that sociological ideas of social space extend beyond topological structure creates a premise and a condition for research. Social reality is not mathematical, but can be

10. See, e.g., (Katchanov et al., 2019).

described in mathematical terms. In sociology, it is possible to identify specific structures in which agents and relationships are empirically interpreted, i.e. sociologically adequate. Basic structural relations (for example, “to be more than”) in social science have intensionals, and this allows us to explain the sociological content of the spatial structure (Belardinelli, 2023). Speaking of structure that constitutes social space, Bourdieu undoubtedly believed that it is isomorphic to the structure of social reality (Bourdieu, 1989: 16–17).

The logical simplicity of Bourdieu’s concept presents the concept of social space as a self-evident general term that captures the available volume of empirical facts. As a result, statistical regularities appear as a logical necessity. Postulation of a topological structure underpinning social space may signify an invitation to research and not a mere doctrinal gesture. This structure is not closed. It can be modified and interpreted depending on the research subject and the abilities of the sociologist¹¹. Topological structure and spatial relations are fundamental and become *ens realissimum* (Bourdieu, 1998:31) in the interval of idealization assumed by Bourdieu for the plane of objectivist ontology. Outside this plane, points (positions) in social space can have constituents and primary (internal) properties. In general, social positions represent complex entities, while topological structure should be construed as external relations that are not fully dependent ontologically on the internal properties of positions (cf. (Paolini Paoletti, 2021)).

The Ontological Problem of Social Space

The ontological problem of the notion of social space can be formulated as follows:

- the term “social space” may correspond to referents in (an independent from the sociological research) reality or constitutes a description of data of sociological experience data¹²;
- the concept of social space is either true (in the sense of the correspondence theory of truth — the core of realism (Leeds, 2007; Psillos, 1999)), or it is just a tool for describing sociological experience.

When study is oriented towards social reality rather than its own products, it is bound to encounter controversy. Therefore, sociologists who do not limit themselves with hypothetical constructs hardly ever engage in protracted chains of deductive reasoning¹³ in an attempt to avoid controversy.

11. Topological structure, with its minimal sociological content, makes the theoretical concept of social space invariant to any social-historical context. See, e.g., (Barth et al., 2023; Guy, 2018; Lu, Fan, Fu, 2021).

12. Broadly speaking, the realism of “social space” reveals itself as a thesis that this notion offers a way for the objective study of reality. The thesis that the postulated general concept actually exists is a special case of the previous thesis (see (Musgrave, 2017)).

13. “Social space tends to be translated, with more or less distortion, into physical space, in the form of a certain arrangement of agents and properties. It follows that all the divisions and distinctions of social space... are really and symbolically expressed in physical space appropriated as reified social space...” (Bourdieu, 2000: 134).

It is always possible to propose several alternative ontologies of social space, and there is no fundamental way to make the single correct choice. From the semantical viewpoint (Suppe, 1989), the resulting empirical underdeterminedness denotes the fact that Bourdieu's concept lacks a comprehensive theoretical definition of the ontology of social space:

- theoretical fragments of Bourdieu's writings do not provide a nomenclature of social position;
- it is argued that social positions are objectified by "classes on paper", i.e. statistically constructed research subjects;
- empirical studies produced by adherents of the research program established around social space tend to use different and variously constructed social positions.

The definition of the concept of social space is formulated in such a way that its operationalization in empirical data constitutes a separate complex problem. The concept alone cannot determine which objective social positions exist — this is a task for empirical research. Social space demonstrates ontological commitment to sociological entities only if they exist within all of its possible ontologies. Such entities, however, do not exist. Social space, on the one hand, offers a conceptual framework and explanatory principle. On the other hand, it is impossible to unequivocally derive ontological consequences from such a scheme.

Nonetheless, we deem the empirical underdeterminedness of the ontology of social space in Bourdieu's sociology an asset rather than a flaw. To be able to use this asset efficiently in future scientific practice, we shall have to shift our focus from spatial intuition and comprehension to a formal definition. The confirmation of the social space ontology does not solely depend on empirical consequences. Instead, a choice between empirically equivalent ontologies can be based on theoretical virtues such as explanatory power, unifying power, the ability to generate novel and testable predictions, plausibility, consistency with other accepted theories and background beliefs, simplicity, etc. (Alai, 2019).

Formalization becomes necessary since the loose interpretation of social space as a correspondence established between empirical statements and their generalizations, on the one hand, and abstract structure, on the other, prevents researchers from obtaining systematic results. Thus, sociology is forced to operate with discrete if brilliant insights. Intuition is all good, but it cannot be controlled. While formalization ensures the reproducibility of sociological knowledge. Sociologists need logical purposes in order to develop a conceptual framework for understanding social reality. Bourdieu succeeded in attaching scientific aura to sociological thought by giving it topological structure

The underdeterminedness of the ontological status of social space prompts us to make a choice:

- To consider this concept as a grounded model for empirical research and an outline for a possible future theory that will clarify Bourdieu's ontology.
- To reject the idea that the ontology of social space has an epistemic value. This position will be supported by scientists who prefer sociological discourse *per se*

and replace consistent and binding theories with collections of witty aphorisms or scandalous observations, prone to ambiguous if not conflicting interpretations.

The problem of the ontology of social space is split into two:

- What is the ontological status of the topological structure? Does it exist on its own?
- What is the ontological status of individual sociological entities, positions of the social space?

Bourdieu argues that social space is the first and the last reality because it determines all the ideas that agents may have about it (Bourdieu, 1998: 13). Social space is as real as physical space: upward movement in the former requires effort, work, and time and is inevitably accompanied by the acquisition of marks, or stigmata, of this effort (Bourdieu, 1985: 725–726). According to Bourdieu, social space is the very “social reality” that Durkheim wrote about, i.e. a set of objective relations between positions that cannot be reduced to interactions (Bourdieu, 1989: 16–17). Social space tends to be more or less directly objectified in physical space. Its topological structure generally corresponds to the order of agents’ coexistence in inhabited (or appropriated) space (Bourdieu, 2018: 107).

Social space, therefore, is not an empty stage where processes unfold and social agents should only play certain roles. Social space is not a mere absence of something. It constitutes a certain sociological entity *per se*. Agents cannot “teleport” but must brave the journey through social space.

Social space is not a reality hiding behind the phenomena of the social world. Instead, it is an ontologically binding structure and form, where reality reveals itself to sociological research. The conception of social space is the conception that the research subject contains not only individual empirical entities and their properties but also something else. The notion of social space assumes that, alongside agents, social differences and the transactional relations between them, there exists an objective topological structure¹⁴. This structure cannot be ignored, despite being a product of contingent social-historical processes (Atkinson, 2021).

Here, we are confronted with an obvious discrepancy:

- on the one hand, objective social positions are epistemic entities, i.e. they are provided irrespective of sociological research (Bourdieu, 1984: 34-45);
- on the other hand, social space with sociological constructs as its points determines the perceptions, thinking, and practices of indisputably existent individual agents. This space is just as real as its physical counterpart.

14. The adherence of topological structure to ontology is determined by methodological schematization and interpretational perspective, which are recognized and methodologically implied by the notion of social space (Lenk, 2017). “Working sociologists necessarily operate with a realist ontology. It therefore follows that the success of the critique of reism [Reism is a philosophical doctrine that argues the category of material things to be the only ontological category — Authors’ note] is effectively guaranteed in advance, but what is still more troubling is that the critique of reism has the potential to put into question the very possibility of sociology” (Vandenbergh, 2008: 11).

To ease the tension, we shall identify the nature of social space, whose reality we maintain. Since objective social positions are referential only with respect to sociological experience, the best solution is to assert topological structure as something that sociologists regard realistically. Within the framework of the semantic approach, “social space” is a family of models representing the structure of reality (cf. (Suppe, 1989)). We insist that of these models, at least the topological structure is empirically correct and isomorphic to the objective structure of social reality. Social positions in the topological structure constitute a carrier of social space. Thus, we consider statements about certain social positions as statements about a topological structure of a certain type. Adherence to the topological structure makes it possible to preserve referential semantics and assume the position of local realism (Psillos, 1999: Ch. 12) whenever sociology operates with “classes on paper” (statistical constructs devoid of internal order) or epistemic individuals.

The topological structure as a mathematical concept exists *ante rem*, i.e. before and independently of any subjects identified by sociological research. However, social space exemplifies the topological structure solely because the latter models social reality. By contrast, as an empirical exemplification, topological structure exists *in re*.

Does topological structure depend ontologically on its carrier? Topological structure can be defined as an abstract form of social space, such that a single structure is exemplified by several spaces, with social positions varying from one space to another. By refraining at the theoretical level from realistic treatment of sociological entities with an ambiguous ontological status, we cannot make assertions about topological structure as something abstracted from entities. Such a view of the ontology of social space does not help it to converge with the epistemology of social science. Yet neither does it shroud the topological structure in mystery, since topological structure is a system of open neighborhoods, whose nature is irrelevant.

The concept of topological structure is devoid of ontology in the sense that social reality has no concrete topological entities that would be unmetaphorically construed. In this regard, the reality of topological structure is not a definition that could supplement the concept of social space — to use Kantian terminology, it does not constitute a real predicate (“Critique of Pure Reason”. B 626). More precisely, the predicate of existence in this case can express the ontological independence of topological structure from the results of the sociological measurement.

The referent of the concept of “social space” is a predetermined objective framework within which social agents think, practice, perceive, etc. The reality of the topological structure is that it structures this framework. By the same token, non-transitive social relationships are immediately mirrored in the relations of proximity between social positions or between agents and positions. The structure of proximity relations is a part of the natural order, being a historical invariant. As a result, topological structure uncovers social reality in its objectivist aspect. Topology describes reality as a space, formulating the purpose and the means for implementation of social trajectory. In the context of social space the term “topological structure” not only characterizes the connections of

many social positions, but also conveys the agents' attitude to social reality. Topology is how reality is revealed to agents. It is an objective horizon where symbolic space is formed.

The concept of topological structure appears to be thematically neutral, and the fact that it is realized in the relations of a family of social positions (statistically constructed sociological entities) does nothing to invalidate its mathematical status. However, mathematics is not ontologically neutral: subjected to relevant empirical interpretation, it provides the means for accessing social space. The fact that statistical or epistemic social agents do not possess the same ontological status as topological structure is of no concern. According to Bourdieu, the study of agents obscures or replaces the study of complex multilevel sets of relations. Social positions can be empirically interpreted, but they remain ontological derivatives of topological structure. In the idealization interval stipulated by the concept of social space, topological structure, holds precedence, while all sociological entities should be interpreted in structural terms (a viewpoint argued by structural realism (French, Ladyman, 2011)).

Why does topological structure ontologically precede sociological entities? It is possible that each entity in the social space stands in a structural relationship with any other entity (Morganti, 2019). Therefore, relations and entities mutually support and condition each other. The common interconnectedness of entities in social space and their complete immersion in the network of structural relations, as argued by Bourdieu (Bourdieu, Wacquant, 1992: 16), supports the thesis of the ontological primacy of topological structure although the holistic thesis of the global interconnectedness can generate logical-philosophical problems of its own (Busse, 2023; Swiderski, 2022).

Layers of Ontology

The metatheory of social space calls for formalization that would differ from what is already in use by sociologists in a direct or implicit way. We shall take a close look at the following essential characteristics:

- mathematical ontology,
- the ontology of the theoretical concept of social space,
- empirical statements.

These three layers of ontology are typical of contemporary scientific theory (Krause, Arenhart, 2016). Bourdieusian sociology views topological structure as a mathematical "*materia prima*", from which social space is derived. In turn, the topological structure is not a primitive. It is constructed on the base of set theory, which proceeds from deeper principles forming the foundations of mathematics. In fact, we recognize the existence of extra-empirical principles that can only be expressed mathematically. Thus, we overcome the challenges of the irreducibility of social space to "datasets" and the presence of ineliminable super-empirical content.

Ontological commitment to social space implies realism regarding the type of mathematics required for the identification of topological structure. What can we know about

social space — or rather, topological structure — from the viewpoint of the set-theoretic interpretation of structure? Social space appears to us as an ordered family of sets. Set theory allows for social space (topological structure) to be viewed as comprised of separate scientific entities and determined by its internal structure of belonging (Barton, Friedman, 2019). Based on set theory, topology offers the possibility to study social positions in their various combinations. At the same time, a topological structure considered together with its carrier can be identified as a scientific entity with its own attributes. This renders topological structure or social space significant as an integral subject of sociological research. Reification, or hypostatization, constitutes a fundamental logical and semiotic phenomenon. To study topological structure means to identify it within the framework of first-order logic by asserting predicates and quantifying those assertions. Topological structure is an abstraction devoid of physical existence but possessing internal connections with well-defined subjects of sociological research. The manner of existence of topological structure differs from that of physical objects. It remains objective in the sense that it is intersubjective to the highest degree.

The subject of the study requires clearly defined identification conditions in the ensemble of vertical relations “theory — data” in order to consider it a family of social positions. Reliance on the theoretical concept of social space cannot yield such a clear identification criterion. By limiting ontological commitment to topological structure, we ensure that our arguments are supported by the theoretical concept of social space. Thus, we can maintain scientific realism in the face of methodologically controversial “standard” social positions, which can be construed as ontologically irrelevant scientific entities (Bourdieu, 1989: 19–20).

Our approach can be summarized as follows: the social space is empirically underdetermined, since there is no uniform and complete list of positions and socially effective dispositional properties for its construction. Moreover, its practical implementation allows for countless models with different properties.

The idea of social space constitutes an ontology. This idea can be perceived uncritically: although initially assumed as a hypothesis, social space has properties that are non-random and necessary. At the same time, the referentiality of the theoretical concept of social space is an implication of its truth or plausibility, since the selection of the referent is conditioned by the description.

However, as soon as we use statistical methods of dimension reduction and classification, we arrive at a less definite structure — a two-dimensional projection and clusters — we obtain hypothetical results that can be challenged. The properties of social space as a whole constitute topological invariants. These properties vanish, however, once we achieve the transition from the totality of distances between all positions to a visualization of topological structure by means of statistical algorithms. A two- or three-dimensional visualization, common in scholarly publications, is not social space as such, but a projective representation thereof.

At the mathematical level of the ontology of social space, topological structure can be treated as an empirically unrepresented concept. At the sociological level, however, it

becomes represented by a system of spatial relations of a set of social positions. While at the first level we are dealing with a topological structure postulated by means of formal axioms, at the second level sociology operates with informal concepts of social positions, which are constructively described using empirical data. Yet the mathematical level of the ontology of social space enables us to convert informal empirical results into formal statements. E.g., the two-dimensional mapping of social space, so popular among sociologists (Blasius et al., 2019), is a mere approximation of topological structure. Nonetheless, a visualization of social space using the Euclidean plane introduces mathematical structure with its points and real numbers (distances, angles, etc.).

We can speak of a certain pluralism: “social space” depicts reality using two diverse but overlapping ontological schemes — theoretical and empirical (cf. (Glick, 2021)). Although these schemes map social reality in slightly different ways, they are coherent. In general, the ontology of social space can be captured as an interference of theoretical and empirical ontologies.

In the process of sociological research, the theoretical concept of social space collapses — it turns into a set of factual statements. Although charged theoretically, they no longer represent *a priori* universal apodictic knowledge. Instead, they become empirical statements. At the empirical level, topological structure provides an epistemic resource and does not signify a sociologist’s ontological commitment. Topological structure evolves into a plane image constructed with the use of mathematical statistics and accompanied by its verbal description (Lebaron, 2021).

What is “social space,” then? Is it a substantiation of topological structure reflecting the essential characteristic of reality, or a geometric metaphor — a mathematical fiction — whose explanatory power should be questioned? Although mathematical tools sometimes help sociologists, a mathematical concept can never replace sociological knowledge. Mathematical formalism can facilitate the progress in sociological description and explanation only to the extent that it is strongly related to unformalized ideas of social reality. For Bourdieu, topological structure is not a mathematical construct that operates separately from sociological statements. On the contrary, he views it as a cornerstone of a sociological concept that ensures organic incorporation of diverse empirical elements into a complete whole.

Therefore, the idea of social space is introduced by means of the axioms of topological structure, whereas the idea of topological structure, in turn, is bestowed with sociological content by the concept of social space. Thus, we encounter *circulus in probando*: the concept of social space needs the concept of a topological structure, which cannot be sociologically defined without the concept of social space. Within the framework of sociology, “social space” is defined by a “topological structure”, and “topological structure” is defined by a “social space”. If the notion of social space could be defined independently of the notion of topological structure, this type of circular reasoning would not occur.

Let us clarify the point made above. The concept of a topological structure assumes that every element x , belonging to an open set (which in effect means that satisfies a set of conditions \mathcal{C}) has a property P . However, the sociologist defines the topological structure of

on the set empirically — by taking an arbitrary family of sets and declaring it a prebase of topology. To be more specific, this family is deemed random in mathematics, but sociology views it as justified. There is an obvious isolation: the topological structure of is uniquely determined by the researcher's sociological choice. It does not have an independent sociological content, since the topological structure in sociological research plays the role of a form organizing the results of empirical research external to it. Topological structure may be built on any data prepared for the construction of social space (so long as conformity to its axioms is ensured). The result of this construction will be interpreted as social space. In other words, neither of the two terms can boast an independent sociological definition. However, here we are dealing not with paralognism, but with the pragmatic specificity of the axiomatic method: "social space" and "topological structure" are introduced as theoretical concepts undefined in another — more general — sociological conception. This problem is removed by an explicit reference to the ineliminable gap between the mathematical and theoretical layers of the ontology of a sociological concept. At the same time, while studying a social space, the boundaries of mathematics and sociology intersect. In each specific case, it is possible to point out a more or less pronounced effect of preliminarily nominalized mathematics on the findings of sociological research: they share structural similarity.

A sociologist can learn a lot, for example, about small entrepreneurs without studying individuals in Forbes' billionaire rankings. However, the relative epistemic autonomy in no way rules out their ontological interconnectedness: small entrepreneurs are only called small because there are also middle-sized and big entrepreneurs. Sociologically meaningful research implies a study of the patterns (common forms abstracted from properties that do not affect the relations between *relata*) of social reality. Social reality asserted in its objective aspect constitutes a system of positions in spatial relations and in the relations of potential changes. Social positions are not singular terms like proper names: they are linked to the structure. Yet the differences between positions in topological structure and objects are relative. It is worth remembering that, from a Bourdieusian perspective, social position is viewed as a group of interconnected properties rather than an object. Social positions are characterized through their relations to each other, while each position is determined by topological structure. It follows that the preferred research strategy is to study small entrepreneurs as a position in social space.

The relativity of social position and existence in the concept of social space does not disprove the fact that each position has a meaning assigned to it by background (social) ontology. Namely, it correlates with families of properties and individual social agents selected on the basis of these families. Background ontology is not an implication of the theory of a certain structure. The difference between social position as a complex scientific entity and social position as a point in space cannot be eliminated. Social position is a relative concept that represents the carriers of spatial relations and co-represents the relations in question.

What are the special characteristics of spatial relations in Bourdieu sociology? He essentially posits intralayer ontological connectivity, which implies interdependence between social positions and their internal properties, on the one hand, and relations

between social positions, on the other (cf. (Ladyman, 2016: 182–183)). It follows that relations in social space (while irreducible to the inner properties of sociological entities) depend on the existence of *relata* (Mohr, 2013). In the empirical layer of ontology, social positions constitute scientific entities that are quantified, endowed with certain properties while being devoid of others, and can form structural relations.

Conclusion

The idea of social space cannot be immediately inferred from data, but it cannot be deduced from *a priori* reflection either. Social space adheres to the methodology of empirical research and is responsible for ontology in sociology. The topological structure is isomorphic to the structure of social reality and is a prerequisite and condition for sociological practices and statements. The concept of social space as it is presented in this paper meets two main requirements for scientific realism: ontological responsibility and scientific methodology (Chakravartty, 2007: Ch. 1).

The significance of topological structure in sociology is determined by its usage. As demonstrated in this paper, the usage can be twofold:

- at the theoretical level, topological structure constitutes the concept of social space as a model of reality;
- at the empirical level, topological structure is a mathematical image of the state of a particular fragment of social reality such that this state is determined not by the values of the quantities, but by the distribution of agents across positions (points or open sets) of social space.

By holding together the theoretical and empirical levels, which support each other, we cover the entire spectrum of meanings of the topological structure.

The perspective of social space proposed by Bourdieu can basically be summarized as follows:

- The topological structure involved as a non-phenomenological law of the ontology of social space corresponds to the structure of social reality.
- The topological structure makes it possible to study not the social phenomena themselves, but their models created by sociologists. Properties described by the axioms of topological structure may appear “thin” from the standpoint of positivist methodology, and as such incompatible with empirical intuition.
- The mathematical concept of a topological structure is projected onto empirical material. Therefore, it can be used to describe and explain facts registered by sociology.
- At the sociological level, the topological structure unites all empirical manifestations of social space, supporting their certain common features and disregarding all others.
- The fundamental use of mathematical space goes beyond the construction of quantitative models and indicates an ontological choice regarding the theoretical image of the studied domain.

- The concept of space used as ontology should be understood not as a mathematical concept *in stricto sensu*, but rather as a record of a set of scientific presentations that are interpreted within an empirical context.
- The concept of social space expresses the structural-relational facts about social reality uncovered by sociology.
- The object of sociological study is considered as a set of social relations together with their carriers. This approach overcomes substantialism.
- Social position is an ordered set of sets of agents. It is constructed on the basis of a combination of dispositional (distributed in social space) properties.
- A dispositional property is treated not as an intrinsic sign of a single agent but as a social relation shared by many agents. Thus, the hypostatization of properties is removed.

Neither philosophy nor mathematics can be used as algorithms that guarantee the production of new sociological knowledge. Sociological statements cannot be logically deduced from philosophical concepts or mathematical theories — their veracity can only be assumed.

The problem of realism may become unsurmountable if discussed at a round table of philosophers. But it loses its metaphysical charge and mathematical aura in the publications of sociologists, gaining its distinct realistic meaning¹⁵. However, sociologists are not concerned with solving philosophical problems. Instead, they strive to “comprehend” the framework of social reality. Their goal is to create and develop a conceptual framework for thinking about reality that is consistent and agrees with data.

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15. “...The question about the *general* legitimacy of realist interpretations of well-confirmed mature theories is more radical than the zero level question about the legitimacy of the realist interpretation of a given *individual* theory. The former question is a philosophical question, the latter a scientific one. Clearly, on level zero, i.e., in the scientific context, the general legitimacy of realist interpretations of theories (under appropriate conditions) is taken for granted. ...The general *philosophical* doubt about realist interpretation articulated on level one does not come into play in the scientific practice on level zero” (Hoyningen-Huene, 2018: 7).

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Идея социального пространства Пьера Бурдьё¹⁶

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«Социальное пространство» — ключевая идея социологии Пьера Бурдьё. Согласно этой идее, социальная действительность в её объективистском аспекте фундаментально характеризуется многомерным распределением агентов по социальным позициям. Метатеоретическим принципом социологии Бурдьё является тезис о том, что, постулируя существование пространственной структуры, можно разрешить эпистемические трудности, с которыми сталкиваются социологические концепции, поддерживающие плоскую онтологию в рамках объектно-ориентированного реализма. Пространственная структура используется для ответа на три важных вызова: первый связан с тенденцией субстантивации социального порядка и социальных явлений, второй — с атрибутивизмом, редуцирующим отношения к свойствам, а третий — с доминированием позитивистской методологии в социологии. Хотя Бурдьё декларирует, что пространственная структура может быть интерпретирована в терминах социологического исследования как социальное пространство, он выходит за рамки эмпирических обобщений. В статье изучается онтология идеи социального пространства. Авторы утверждают, что постулируемая пространственная структура, в отношении которой социологи должны быть реалистами, — это метафизическая сущность, которая не может быть полностью подтверждена наукой. Чтобы не уводить метафизический постулат слишком далеко от научной практики, фундаментальная структура социальной действительности отождествляется Бурдьё с топологической

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структурой, заимствованной из математики. Топологическая структура проявляет себя как нефеноменологический закон, описывающий отношения социальных позиций, понимаемых как точки социального пространства. Идея социального пространства утверждает примат топологической структуры над социальными позициями, которые не существуют до или отдельно от существования структуры. В статье рассматриваются три слоя онтологии «социального пространства»: математический, теоретический и эмпирический.

Ключевые слова: социальное пространство, Пьер Бурдьё, топологическая структура, философия науки, структурный реализм, теоретическая социология