2 Conceptual elucidations
The epistemic frames and causality in relational spatial theories in the European context

2.1 Introduction

It is pointed out by Sayer that "while it is common to argue that social phenomena are historically-specific, and that method should take account of this, little interest has been shown outside geography in their geographically variable character; indeed most social scientists ignore space" (2010 [1984], 99). There is no doubt that the particular intellectual tendency of *thinking space relationally* or the *relational theory of space*, admits space to be all about relations, reflects the intellectuals' efforts in the post-modern social science domain to rectify such methodological negligence. More than ever, social scientists endorse the concept of space (in terms of place, location, territory, etc.) to describe and explain the local and global social formations and transformations. The meaning of 'relational space' is yet to be directly addressed nor given enough analytical rigor in most of the applications. Malpas lamented that "one may develop frameworks to organize forms of spatial description and analysis, those frameworks will be, at best heuristic, whereas what is needed is a more careful analysis of the ontological underpinnings of the very concepts at issue" (2012, 230).

As I have indicated in the introduction, in line with the sociology of knowledge (SK) and critical realism (CR) approaches, I deem conceptual knowledge of space socially produced. The underlying epistemic frame of a conceptualization or theory might, to a great extent, shape scientists' accounts and explanations of the social-spatial phenomenon of interest. It imposes significant challenges for scientists who want to embrace analytical rigor yet remain sensitive to the context in which the empirical phenomenon is situated. In this chapter, in order to elucidate the epistemic underpinnings of the relational thinking(s) of space, I will first excavate the 'epistemic frames' and 'causal agents' embedded in the 'absolute,' 'relative,' and 'relational' notion of space within the physics and philosophical domain. These conceptualizations represent some of the most prototypical epistemic as-

sumptions, which are later appropriated. Then, I pay particular attention to three relational conceptualizations of space within social science. It is necessary to clarify from the roots that *relational* bridges a multitude of theoretical traditions and research approaches (see Powell and Dépelteau 2013), far from forming a unifying paradigm.

Aligning with the stratified ontology from CR and the understanding of knowledge production in SK, I will do the following. Firstly, in sections 2.2 and 2.3, I delve into the ideas of space in modern physics and philosophy to explore the prototypical epistemic foundations. I will revisit the ontological 'substantial-relational controversy' between Newton and Leibniz to elucidate the epistemic frames (forms and rules) underpinning the absolute, relative, and relational concepts of space. Secondly, in 2.4, I examine how the constellations of epistemic forms and rules in the conceptualization of space (A) are transferred from the modern physics and philosophy domain and get recontextualized in the social science domain (A'). The underlying 'connect-ability assumptions' will be excavated and outlined. I search for the empirical content of the epistemic forms and causal agents presupposed in the physically and philosophically defined space (A), which are explicitly or implicitly employed by social science scholars in shaping their ideas of social space (A'). By connecting or bridging, I do not mean a one-to-one transference from A to A' regarding epistemic forms and their properties. The epistemic forms in A' are likely to be modified in light of social events without displaying formal contradictions.

For me, to differentiate the plural forms of the relational conceptualizations of space in social science on a fundamental level, it is necessary to trace the epistemic origin of space in the physics and philosophical domain and to discern the interdisciplinary epistemic connectivity and disparity. More specifically, the discussions in this chapter help to clarify the ambiguity in 'thinking of space relationally,' as listed by Anderson and Harrison:

> There are many emerging questions and unresolved tensions in geography's treatment of 'relations' and 'relationality,' including, how to bear witness to the plurality of relations? How to understand the 'reality' (felt or otherwise) of relations?; are relations internal or external to their terms?; can relations change without the terms also changing?; are actual entities exhausted by their relations?; and how to think what could be termed the 'non-relational'? (Anderson and Harrison 2010, 15)

At the end of this chapter, I will clarify the methodological implications when three selected relational space conceptualizations get deductively employed.

2.2 The absolute-relational divergence and epistemic frames

Space, as Max Jammer notes, is "the subject, especially in modern philosophy, of an extensive metaphysical and epistemological literature. From Descartes to Alexander and Whitehead, almost every philosopher has made his theory of space one of the cornerstones of his system" (1993 [1954], 1). In the modern philosophical and natural scientific domain, the 'absolute,' 'relative,' and 'relational' conceptualizations of space are disputably associated with the theory of space of Isaac Newton, René Descartes and Gottfried Leibniz. For scholars from social-spatial domains, the difference between these notions is often reduced to a matter of semantics, leaving their distinct yet tightly bound epistemic forms and rules overlooked.

Geographer David Harvey asserts that, from his understanding, "absolute space refers both to the kind of *Newtonian space* that 'in its own nature, without relation to anything external, always remains similar and immovable' and to Descartes' *res extensa*, the discrete and bounded physical space." For Harvey, the relative notion of space is mainly associated with "*Einstein and the non-Euclidean geometries*." Relational space, is ultimately associated with the name of Leibniz, which "can embrace the relative and the absolute." The relative space "can embrace the absolute, but absolute space is just absolute, and that is that" (2006b, 272–76). From these discussions, I infer, Harvey deems the three concepts of space as differed merely in representing space of different properties and scope. The depth of conceptual incommensurability, underlined by incompatible ontological and epistemological stances, is clearly underestimated.

Following Lawrence Sklar, on 'ground zero,' the divergence between the Newtonian and Leibnizian theories of space can be captured by the 'substantivalist-relationist controversy' (1977, 225). This term is a bit misleading, as Leibniz's conceptual scheme of space is not free from the substance. However, the properties of substance conceived by Leibniz are entirely different from those by Newton. To further clarify, I first recontextualize these concepts back under 17th century philosophical and scientific realms, examining what and how meaning is given to the constellation of epistemic forms (substance, body, force, time, place) and how legitimacy is given to certain causal inference logically jointing the epistemic forms. The constitutive entities would be thought *about* along the multi-staged conceptualizing process, rather than just thought *with*.

To begin with, the most straightforward statements comparing 'absolute space' and 'relative space' can be found in Newton's writing at the beginning of the *Principa*:

> Absolute space is in its own nature, without relation to anything external, remains always similar and immovable. Relative space is some movable dimension or measure of the absolute spaces; which our senses determine by its position to bodies;

> and which is commonly taken for immovable space; such is the dimension of a subterraneous, an aerial, or celestial space, determined by its position in respect to the earth. Absolute and relative space are the same in figure and magnitude, but they do not remain always numerically the same… Absolute motion is the translation of a body from one absolute place into another: and relative motion, the translation from one relative place into another … (cite in Jammer 1993 [1954], 99)

When reading this paragraph, we cannot yet tell the meta-epistemic ground taken by Newton nor the source of his mode of reasoning. Recalling how Newton's law of motion is taught and demonstrated in the physics classroom might help uncover that. In high school, I was taught that Newton wanted to give a systematic account of motion patterns, which he deemed real. However, in the well-designed experiments, I would never *observe* or *document* an absolute motion nor an absolute acceleration from the object used for demonstration (e.g., a running cart)). What can be observed and measured includes a running cart *represented* and *measured* by its body mass. It *tend*s to maintain its speed on smoother surfaces. When it subjects to an external force, the cart's speed *tends* to decrease when its mass increases. The acceleration is *represented* and *measured* by the increased or decreased running distance per unit of time (e.g., m/s^2).

Now it because more vivid that Newton's arguments, i.e., laws of motion and acceleration, can be taken as true only when we accept a set of assumptions. It includes his 'realistic' assumptions about substance realized and represented in terms of the quantity of matter, force, absolute durations of time; quantified distance between real, discrete locational points as measures of absolute time-space. One shall also warrant an 'inductive leap' – bridging observable tendencies to hypothetical laws as a legitimate way of making generalizations. Thus, what makes Newton's theorization of motion *true* is the correspondence between 1) recurring and consistently observable patterns of movements; 2) predictions of movements derived from hypothetical laws; and 3) the moving bodies' properties attributed by philosophical presuppositions. Regarding bodies, he has postulated on a 'substantial nature,' which presupposes mass, time, distance, and velocity as the *real* aspects to be seen and measured through empirical examination. The substantial assumption of bodies is also drawn to justify a reduction in the scientific formulation. In this context, we have revealed hypothetical and deductive logic aspects, which subject to purely philosophical debates and immune to empirical verification.

Sklar reminds us that "to go from one's account of absolute motion to the adoption or rejection of either a substantial or relational account of spacetime again requires the invocation of methodological or metaphysical principles whose defense and criticism seem more a matter for philosophical resolution than for scientific decision" (1977, 225). Following this thread, I have noticed that Newton's spatial schema has invoked the epistemic divide between 'movable' and 'unmovable bodies'

as a necessary clause to deduce the difference between relative and absolute motion. The postulation that the body's relative motion is induced solely by external forces hints also at such an epistemic commitment. Consequently, the motion-related properties of things: their position, velocity, and acceleration are all ascribed as relative. Therefore, logically, absolute space must exist to serve as a reference for absolute motion. Alternatively, as Sklar has noted, if Newton claimed motion and acceleration as absolute rather than a relative property of things, the claim of absolute substantial space free of things would no longer be necessary (for more discussion on this point, see Sklar 1977,185-188). Newton's ontological concern in defining absolute space, according to Jammer, is not only logical but also theological. The postulated ontology acknowledges something besides God – as an absolute, immutable, eternal, and real being – to exist independently of how it is measured (Jammer 1993 [1954], 110).

Newton's notion of absolute and relative space, as shown in the analysis above, is constructed based on his sensible observations and philosophical-epistemic postulations. What can be sensed and known rests on the properties of bodies assumed real, measurable, and enduring in relation to absolute space. In Newton's scheme, absolute space has a Euclidean (three-dimensional, homogeneous) structure, whose features can be accessed and measured by following the Euclidean geometric principles. Newton has differentiated two ways that absolute space can be grasped: its real and holistic structure exists only in the divine perception, whereas its parts – the relative dimensions – are comprehensible and perceptible to human senses (see Casey 1997, 142–43; Sklar 1977, 161–62; Jammer 1993 [1954], 96–97). The relative positions and distances are revealed when observers apply the measurements using their bodies as reference points. These epistemic rules constitute the condition in which spatial knowledge is generated and validated as true.

To sum up, Newton's notion of absolute space is, in the first instance, built upon a realist ontological stance. In each subsequent stage, Newton invokes various additional premises and principles to formulate his arguments. These postulations include the dichotomy between movable and unmovable entities and the existence of God. The conceptualization of absolute space emerges both as the necessary medium and the outcome in his deductions. It loses all meaning if we leave the propositions above out. Newton's conception of the relative space rests on the realist epistemology of geometry. It emerges both as the holistic structure of absolute space in the divine perspective and as the *means*[1] for measuring the movable and perceivable dimensions of space by non-divine observers.

1 Newton assumes the Euclidean geometry to be known by the perceiver via internal cognitive structures. He does not explain why, nor how perceivers acquire it as the means for understanding relative space.

As I have cited in the introduction, Leibniz's notion of space is defined by relations – among the coexistent bodies, including not only those which are concurrent and observable but also those that are possible. My focus here is not to repeat all Leibniz's arguments against Newton but only to explicate the core premises and principles embedded in his conceptualization. According to Russell, Leibniz's has followed such a logical order in conceptualizing: "first comes the notion of substance, secondly the existence of many substances, thirdly extension, resulting from their repetition, and fourthly space, depending on extension, but adding the further notion of order, and taking away the dependence upon actual substances" (2005 [1900], 118–19). In this order, 'relational space' is coined as the sum of the substances and relations, whose mobilization or stabilization is explained by the interacting mechanisms (extension and order).

To paraphrase Russel, we can also recount the logical order deployed by Newton in his conceptualization practice. As opposed to an order of discovery, it begins firstly with absolute space, secondly with the movable and discrete substance, thirdly with the relative motion resulting from the external force, and fourthly with relative space, depending on the position of the situated non-divine perceiver. To further reveal the core difference between Newtonian and Leibnizian spatial conceptualizations, it is necessary to situate it back to its historical context. Judging by the Leibniz-Clarke correspondence, Leibniz accepted Newton's claims of absolute and relative motion and acceleration but rejected the claim that viewed absolute space as neither a necessary medium nor an outcome for absolute motion and acceleration. To make his own theorization logically coherent, Leibniz introduced complex definitions for the 'organic' and 'intelligent' substance, as well as the 'law of identity' and 'order of the possible world' as two generative mechanisms to explain the primary and secondary motions of the substances and their interactions. In his own words, the constituents of space include:

> (1) the primitive entelechy, i.e., the soul; (2) matter, namely primary matter, i.e., primitive passive power; (3) the monad completed by these two things; (4) the mass, i.e., the secondary matter, i.e., the organic machine, for which innumerable subordinate monads come together; and (5) the animal, i.e., the corporeal substance, which the monad dominating in the machine makes one. (20 June 1703, PL: 264–265, cite in Antognazza 2018, 351)

There are different readings of the Leibnizian ontological stance[2]. Here, I agree with many interpreters who read Leibniz as an idealist. Thus I summarize his inferences from 'monad' and 'substance' to 'relational space' as follows. As the first step, the monad is conceived as the smallest unit of substance, consisting of soul and primary matter. It subjects to two types of force: one is passive, induced by its soul, the inherent and extensive attribute – *materia prima*; the other is active and external, as the result of the indistinctness of representation – *materia secunda*. The secondary 'organic machine' consists of monads and their dynamic confluences. Leibniz defined a substance's passive attributes by drawing on the presupposed 'subject-predicate principle' and 'law of identity.' The former presupposes that one part of the monad (the soul) is real and unchanging, which relates to the primitive powers that predicates and impels its extensive bodily-material change. Such change might not be observable to sensible perceivers. The latter principle of 'identity of indiscernibles,' along with the existence of God, are also invoked to justify the heterogeneity and irreducibility of the monads among one another. This law premises that "monads must differ, but since they have no parts, they can only differ in their internal states; and internal states, as far as experience goes, are either perceptions or appetitions" (D. 210; L. 409; G. vi. 599, cite in Russell 2005 [1900], 154). In this context, absolute motion is defined as appeared passive extension, explained by the indiscernible identities of the monads.

Drawing on the definition of substances (monads), Leibniz made secondary arguments to explain the formation of mass, or the 'organic machine' – the whole constituted by the dynamic interrelations of interacting monads. According to Leibniz, the mass or the organic machine as the cluster of secondary matter forms a body. It is conceived as an aggregate of monads, whose material body existing only as a phenomenon in the monads' perception, as an accidental unity (G. ii., 252; N.E., 722 and G. vii., 501, cite in ibid., 90). For 'the animal' (as the tertiary matter), monads are conceived to sympathize with one another and cohere into an extended compound with one dominant monad, which in this relationship acquires a certain unity. This unity is made up of heterogeneous compounds.

2 Due to the lack of a magnum opus, some arguments appear inconsistent in Leibniz's earlier and later texts (charges made by e.g., H.G. Alexander 1956, 105; Russell 2005 [1900], 91). The commentators disagree on the ontological stance Leibniz took in conceptualizing the substance, and its relation to change and time. The commentators have also developed different theories justifying their interpretations and explaining the inconsistencies that have occurred. In this section, I opt for an idealist reading of Leibniz on the matter of defining the substance, as in addition to the soul, the material bodies existing and constituting the logical unity in monads are to a great extent predicated by the soul. It is different from the Platonian (idealist) conception of substance which constituted only by immaterial minds. I would not attend to the inconsistencies in the Leibnizian conceptualizations, but purely aim to adumbrate the

The derivative active forces associated with relative bodily motion, and derivative passive forces associated with substantial resistance and impenetrability, occur at the highest-level aggregates. The interrelations between the two forces are interpreted by Pasini as, "the animal force is entirely in the whole, and entirely in any of its parts" (1996, 223).

In one crucial passage in *Monadology*, Leibniz described the indispensable mediating function of the situated body (position), drawing on a second postulated principle: "since every monad is a mirror of the universe in its way, and since the universe is regulated in a perfect order, there must also be an order in the representing being, that is, in the perceptions of the soul, and consequently, in the body in accordance with which the universe is represented therein" (cite in Casey 1997, 177). This quote demonstrates that Leibniz postulated on the existence of an *external and constant temporal and spatial ordering force* (a third one, in addition to substance and mass) on the real level, which partly coordinates with the monads' relative bodily change and movements through the mediation of secondary force. It is also attributed to maintaining the infinite diversity of substances in the universe.

Thus, for each (perceivable) possible world that monads aggregate in, there exists an order that determines the causal relations between monads and how the relative changes occur. For Leibniz, the possible worlds have general laws analogous to the laws of motion; what these laws are is contingent, but the existence of such laws is logically and theologically necessary. This assumption is followed by the inference that each monad has a different 'point of view' with respect to its bodily position. It is particular and biased, as every monad mirrors the world from a particular location and spatial point. We could infer, the boundary of a perceivable possible world for a particular monad is conceived, on the one hand, in relation to the bodily position and soul induced 'intelligibility' of the perceiving subject (the monad). On the other hand, it corresponds with the efficacy of the law of a possible world. Both constraints are postulated to affect the perceptions of coexistent and constitutive monads *in bilateral and symmetrical manners*. For each monad, the sensible ideal order and the bodily position conditioned particular point of view co-shape the 'confused partial' perception of the monads and their relative movements. Finally, the sum states and their connections constitute the aggregate (animal) order and its relative motion as a whole.

In conceiving the epistemic rules, Leibniz has introduced a God's perspective, which sees the order of the possible worlds as being embodied by the monads' bodily relations in the course of passive and active bodily changes. Moreover, resultant spatial relations and the relative motions on the collective level are deemed *external* to the monads' perceptions. Their forms are conceived as constant in the *current-actual* and *forthcoming-potential* terms. In his book, *History of Western Philosophy,* Russell accredits the milestone contribution to the Leibnizian conceptualization of the two worlds: "what I, for my part, think best in his theory of monads is his two kinds

of space, one subjective, in the perceptions of each monad, and one objective, consisting of the assemblage of points of view of the various monads. This, I believe, is still useful in relating perception to physics" (2005 [1900], xi). These assumptions have also enabled him to justify the plurality and diversity of individual substances and their perceptions of space. Leibniz has come up with alternative causal agents to explain the perceived relative motion without referring to absolute motion nor space through conceiving these epistemic entities and rules.

To sum up, Newton's and Leibniz's theorizations of space, have although attended to the same empirical phenomenon (motion), are conceived with vastly different epistemic forms and built upon very different epistemic rules. These presumed principles are not immediately reducible to empirical patterns accessible to impartial observers. I summarize the epistemic frames in three spatial notions as follows:

Table 2 The Epistemic Frames of Absolute, Relative and Relational Space

Concept of Space	Absolute Space (Real)	Relative space (Ideal)	Relational Space (Ideal)	
Empirical phenomenon	None	Event: perceived movement of physical objects	Event: conceived primary and perceived body-agglomeration and secondary motion agglomeration	
Ontological Principles	The dichotomy of movable and immovable beings		Law of subject-predicates The identity of Indiscernibles	
Epistemic Object	Material bodies with the substantial attribute: quantity of matter force; points of space-place; pieces of time		Intelligible substance Substantial attribute: soul, material prima Phenomenal attribute: embedded body, point of view; material secunda	
Epistemic Subject	God perspective-holistic and consistent	Sensible observer- logical but partial	God perspective-holistic and consistent	Embedded monads as the sensible perceivers
Knowledge Situation (the hinge propositions that guide the process of knowing)	Whole-a priori knowledge -Euclidean geometry as ordering principle	Partial-a priori knowledge -Euclidean geometry as an ordering principle, applied to perceptible movable dimensions of space-Reflection and Correspondence	Objective–perfect order: maintain and maximize the variety of Substances	Subjective – possible and symmetrically perceivable relations: the result of intelligence and point of view
Explanatory Mechanism for Motion (derived)	Law of motion		Perfect universal order, Contingent general law of the possible world	

After retrieving the three underlying epistemic frames, the flaw of engaging mixed conceptual frames 'pragmatically' in one analysis becomes clear. For instance, in the following narrative, Harvey dismisses the thick difference underlying the constituents of two theories of space:

> The view of relative space proposes that it be understood as a relationship *between* objects which exists only because objects exist and relate to each other. There is another sense in which space can be viewed as relative, and I choose to call this relational space – space regarded in the manner of Leibniz, as being contained *in*

> objects in the sense that an object can be said to exist only insofar as it contains and represents within itself relationships to other objects. (Harvey 2009, 13, italics original)

Based on my extensive discussions earlier, we can see that the 'object' embedded in the two conceptual frameworks are conceived with very different properties, thereby far from equivalent. Moreover, in the Leibnizian framework, the *relation* is conceived on two different levels (real and phenomenal) relating to two different causal mechanisms.

Furthermore, Newton and Leibniz's conceptualizations of space encompass four sets of epistemic rules, rather than of two. They both admit the epistemic divide between a God-like figure and a sensible perceiver. Thus, the first epistemology takes God as the epistemic subject, generating and justifying the real existence of the a priori order of space (the absolute Euclidean order in Newton's case and the order of possible worlds in Leibniz's case). The true knowledge of space is then only comprehensible to God. The second epistemology in the Newtonian theory of space takes a view of knowledge characterized by reflection and correspondence. The epistemic subjects (mundane social beings) are conceived to have acquired *a partial reflection* of such true knowledge in reference to their relative bodily positions. On the other hand, the Leibnizian second epistemology deems the (plural and diverse) monads to be epistemic subjects, whose intelligibility and bodily positionality are admitted in shaping their *distorted knowledge* formed in perceptions.

2.3 Newtonian space and its implications for modern social theory

> The sociologist, then, is someone concerned with understanding society in a *disciplined* way. The nature of this discipline is scientific. This means that what the sociologist finds and says about the social phenomena he studies occurs within a certain rather strictly defined *frame of reference*. One of the main characteristics of this scientific frame of reference is that operations are bound by certain *rules of evidence*. (Berger 2004, 16, italics added)

My examinations of the prototypical absolute, relative and relational conceptualizations of space have revealed the distinct ontological premises, epistemological principles endorsed by Newton and Leibniz. They are indispensable for justifying the analytical purchase of these conceptualizations. Now, I will move on to examine the theoretical knowledge of space of a more particular kind – in the European social science discipline. In this section, I present the frames of reference that prevailed in the European sociological domain and the rules of evidence for justifying spatial knowledge.

The Newtonian epistemic rules, especially his ontological postulation on realistic substance (eternal, consist of matter) and epistemological commitment to the existence of true knowledge, has a wider impact on many later conceptualizations of space. According to Schemmel, Newton's concept of space, in its concern with the movable things in space, has enabled Kant to put forward an epistemic separation between space and matter (2016, 84). Kant has famously conceived space and time as an *a priori cognitive conditions* – the pure form of intuition – under which social subjects' sense perceptions operate. In contrast, *matter* is conceived to be an 'empirical concept,' i.e., it needs perceptual instances in order to attain objective reality. The social subjects in the Kantian scheme, in Crowell's words, "live in the truth," wherein their positive cognition "experiences" categorial clarity without "knowing" it (2001, 62). Kant did not assume a God figure nor a dual epistemology but simply regarded it logically unnecessary to assume space to be real. Therefore, his 'hinge proposition' assumes that the social actors know the structure of absolute space prior to, and independent of, his or her experiences in any particular temporal or spatial context. Actors are conceived to be capable of acquiring knowledge deductively through pure reasoning based on their pure intuition. The Euclidean geometric ordering principle and the primacy of space are simply given for the existence of synthetic a priori judgments (Kant 2009 [1781], 69–71). Along this line of theoretical derivations, the premised epistemic principle of 'dichotomy between movable and immovable' remains intact.

In a similar vein, one can find Newtonian premises mobilized in Husserl's idealistic conceptualization of space. The statement that the "spatial shape, motion, sense-quality and notions of 'spatio-temporality, body and causality' as examples of universal, general structure" – that is "a priori" in being unconditionally valid for all subjects – corresponds to such an epistemic divide (Husserl 1989, 139). Similarly, space is conceived as an ideal a priori cognitive category, independent of empirical content and experiences of the perceiving subjects. Husserl contended thereby that, regarding the above-mentioned spatial-temporal attributes, "normal Europeans, normal Hindus, Chinese, etc., agree in spite of all relativity" (ibid, 139).

More concretely for the sociologists, the social-scientific paradigms entail corresponding sets of epistemic rules. It is pointed out by many that in comparison to philosophy, theoretical developments in social science concern primarily with *the way of knowing* in the social setting, or the*"primacy of epistemology"* (Connolly 1987, 116–26). As a well-known element in philosophy, epistemology concerns the condition of knowledge and justification rules for truth. Somers and Gibson argue that the sociological field exhibits "ellipsing of discovery an ontology by the context of justification" (1993, 3). It means, the postulations about the "way of knowing" determine where the best place is to search for the social-spatial mechanisms: in the material/symbolic structure of social reality itself, in the rational/reflective/reflexive structure of the mind, or the pre-reflective behavioral structure of the social

actors? Somers and Gibson have also highlighted consequences of sociologists' limited effort in constructing epistemic rules: 1) "issues of social being, identity, and ontology are excluded from the legitimate mainstream of sociological investigation; and 2) the social sciences focus their research on action and agency by studying primarily observable social behavior – measured variously by social interests, rational preferences, or social norms and values – rather than by exploring expressions of social being and identity" (ibid., 4). In other words, they evade admitting the role of ontological postulations that attribute varying answers to the same question. In adopting a realist social ontology, social structures are revealed as quasi-materialized driving forces, external to the individual's perceiption and practice. When opting for an idealist reading of reality, social structures are symbolic or affective dimensions placed inside the social actors' perception.

The relational debates have, to a great extent, responded to the missing ontological debates in sociology. According to Emirbayer's manifesto, written in 1997, sociologists possess an ontological dilemma between substantivalism and relationalism. It means "whether to conceive of the social world as consisting primarily in substances or processes, in static 'things' or in dynamic, unfolding relations" (1997, 281). Emirbayer differentiates the 'interaction' and 'transaction' modes of relational thinking. He regards the latter to be the genuine relational thinking, as "the very terms or units involved in a transaction derive their meaning, significance, and identity from the (changing) functional roles they play within that transaction" (ibid., 287). Both ontological substantialism and relationalism, according to Emirbayer, are ideal types that locate on two ends of the ontological spectrum. Social scientists often alternate their stand between the two when developing analytical categories in a complex conceptual matrix. Emirbayer has also clarified how several fundamental sociological concepts subject to reformulation under transactional-relationalism, including 'power,' 'equality,' 'agency,' 'individual.' However, he lists issues like boundary specification, network dynamics, and causality as unsolved. Noticeably, to reformulate these terms call for reevaluating epistemological principles, too.

As we have just discussed, the absolute, relative and relational conceptions of space in the modern physical and philosophical domains are generated to explain the phenomenon of motion that appeared in one's perception. When these conceptual claims are made, distinct epistemic postulations about the nature of things and identity are drawn, function as the first order yet unverifiable causal agents. These postulations might be necessary for achieving logical coherence and completion in a premise-conclusion structure. The resulting conceptual claims may also correspond with empirical observables, yet the theoretical adequacy will not justify if the postulations stand true in themselves. When the concept of space is reinserted into social theories, the epistemic frames accommodate not only natural beings but also social beings. Inevitably, we can witness systematic conceptual reconstruc-

tion. Sommers has indicated how Newton's first-order epistemic postulation of the agency is widely redescribed in classic sociology, which shaped the conceptualization of social subject:

> Social science's modern actor was thus conceived through a blending of philosophy with Newton. At a stroke, a philosophy of moral autonomy was refashioned to accommodate the progressive naturalism of modernization theory. This new revolutionary idiom of agency raised to a priori status an abstracted fiction of the social subject. Agency and social action became theoretically embedded in the historical fiction of the individuating social actor whose natural state was moving toward freedom from the past and separation from the symbolic association, "tradition," and above all, the constraint of "others." (ibid., 15)

I have noticed another epistemic continuity from the Newtonian 'absolute and relative space' to the modern social theory of space. In particular, Newtown's postulation about 'God and sensible being's dichotomic perspectives' is transposed on to two classic sociological strands. When the researcher admits a God-like external epistemology, along with a prescribed *a priori* knowledge condition, 'structure' is thus conceived to signify an ontologically and empirically real and holistic causal agent that maneuvers social actors' practices. It is deemed external to the observable objects and observing subject – the researcher, imposing causal powers that are independent of the individuals' actions and state of mind. Such an understanding of structure is exemplified by Durkheim's (1982) objective, external, and constraining social rules, coupled with the methodological demand to study social facts *sui generis*. Social structure, therefore, is obtained through accounting for fact-like relations between social beings. In this context, social beings are inferred as passive entities, as parts of an objective whole.

Following a God-like perspective, space in modern sociology is deemed primarily as an inert backdrop that resonates with the concept of absolute space. In this context, 'boundary' is not conceived as a necessary epistemic form, but often addressed as an empirical notion in reference to the nation-state's territorial borders. As pointed out by Elias, "many twentieth-century sociologists, when speaking of 'society,' no longer have in mind (as their predecessors) a 'bourgeois society' or a 'human society' beyond the state, but increasingly the somewhat diluted ideal image of a nation-state" (2001 [1987], 241). Here, we can also detect a strong influence from Newtonian spatial views, where 'external forces' and 'Euclidean geometrical structures' are embedded into the 'social' and 'spatial structure,' referencing empirical contents in the nation-state system.

One can also easily detect the close affinity between the Newtonian 'relative space' epistemic frame and that from the semantic school of spatial analysis. According to Gottdiener et al., "material structure of the built environment, the image of its inhabitants, the codes of meaning found articulating with space, and

the discourse of urban planners, analysts, and academicians" characterize objects of urban semiotic inquiry (1986, 101). Early urban semiotics studies regarded the 'grammars of design' conceived and deployed by planners and other experts – externalized through semiotic expressions – the structuring principle of space. The material dimension of the architecture and urban landscape was then conflated with codes and text-like representations conceived and deployed by architects and planners. Accordingly, the modalities of such language – the 'syntax' – are deemed surrogate of Euclidean geometry as a structuring principle and causal agent. At this point, the designer's denotive meaning is taken as a social fact, while the connotative meaning – the varying subjective articulations in public discourses – are dismissed. The later urban semioticians, following the inspiration of Barthes (1967 [1964]), have picked up the connotation within a society's value system. They have further distinguished between first-order signifying systems (which are termed denotative) and second-order systems (which are connotative). Yet, their conceptual inferences depend essentially on the god-like epistemic perspective and postulations of discrete, passive and indifferentiable individuals. Just like what Rapoport has once pointed out, the semioticians have focused overwhelmingly upon syntactic and semantics, devoting little attention to "pragmatics – the relation of the system of signs to the behavioral context" (1990, 38–39).

The above-discussed theoretical approaches allude to and can be seen as, a derivative of the Newtonian relative notion of space. Diverse entities in the social domain (social actors, social activities, social structure, semantic or visual representations) are embedded into the form of 'things' and 'law of motion' in Newtonian frames, keeping their ontological premises intact. The Newtonian epistemological principle under God's perspective (objective, holistic, static and external) is also bridged with some empirically observable principles, such as syntax, institutional rules of the nation-state. The redescription of the Newtonian epistemic frame into the social domain results in many logically coherent ways of describing and explaining the spatial form. They are deemed as a result of certain dominant social structures. However, space is left unremittingly inert and passive.

These analyzed approaches are inadequate to explicate the development of social-spatial reality of our time for two reasons. Firstly, the epistemic forms and the sense-relations are derived from a closed, physical model common in physics-natural sciences. They are a-historical and a-spatial. The social-spatial reality, especially in compressed modernity, is open and entails learning processes that produce continual innovations, epistemic uncertainties and qualitative changes. Secondly, the Newtonian epistemic frame reduces space as a passive variable irrelevant to the change's explanation, giving no justice to the spatial particularities. It leads to the *cul-de-sac* argument that there is nothing new about space that can be discovered. This is precisely why I need to conduct 'epistemic reading' on these spatial notions, uncovering their thick epistemic postulations. I aim to show how they might

be valid logically but not necessarily useful and relevant for us to understand the world changes of our time.

2.4 When relational space is re-inserted into the post-modern social science

In *for Space*, Doreen Massey makes explicit three affirmative and universal propositions to approach space through a post-modernist lens. For the first proposition – space is the product of interrelations – one must recognize space "as constituted through interactions, from the immensity of the global to the intimately tiny" (2005, 9). The second – space is the sphere of the possibility of the existence of multiplicity – perceives space "as the sphere in which distinct trajectories coexist, as the sphere therefore of coexisting heterogeneity" (ibid., 9). For the third – space is always under construction – "it is always in the process of being made. It is never finished, never closed" (ibid., 9). For Massey and many post-modern scholars, the reassertion of space within the post-modern social theory is entangled with the intellectual movement against meta-modern discourses, the strong collective and objective ordering principle. Instead, they aim to embrace the heterogeneous and fragmented cultural, political, and material landscape (see works from Foucault, Soja). In Massey's words, the goal is to pursue "a relational politics of relational space," attending to the heterogeneous make-up of spatial formations (ibid., 147).

The ethical ground of such a conceptual redirection is comprehensible and convincing. However, the lack of elucidations on its epistemic frames makes most conceptualizations chaotic or short in the analytical purchase. For example, in the lines cited from Massey above, it is impossible to detect the distinctions between relations that are conceptually *substantial* and those that are *formal*, *necessary* and *accidental*, *durable* and *transient*, *symmetrical* and *asymmetrical*. It allows all or none of these relations a valid place. Moreover, in Massey's book, the term 'place' is conceived to represent consolidated self-identifiable and historically coherent spatial formations, which are "articulate[d] in the physical form both the social spatiality of knowledge production and an imagined spatiality of the knowledge relation" (2005,145). Nevertheless, without elucidating the definitions of epistemic forms (subjects, things [physical entities], knowledge, etc.) that are conceived in sense relation with the notion of place, it is impossible to differentiate the analytical purchases between 'space' and 'place.'

Since no philosophical school holds exclusive rights to *the* relational thinking in general and thinking of space relationally in particular, there is no single nor coherent theoretical turn in conceptualizing relational space. In the following section, I will expound on three post-modern social theories of space that register *relationality* to the core of their conceptualizations. They have all set themselves apart from the

static, container-like notion of space while embrace conceptualizing social-spatial formations in process, interconnectedness, and change. The three theories come from David Harvey, Martina Löw, and Nigel Thrift. In the following, I attempt to 1) identify the explicit or implicit epistemic premises that underlie and characterize each relational thinking; 2) elucidate the empirical references assumed by each concept of relational space; and 3) clarify the corresponding methodological implications, i.e., the difference such conceptions make on thinking of space.

2.4.1 The (Neo-)Marxism and relational space

The first strand of the relational theory of space focuses primarily on the political-economic dimension of social-spatial change in the capitalist societies, as discussed in the works of Henri Lefebvre and David Harvey. Both scholars have explicitly referred to the Marxist historical materialism tradition as a basis to develop a relational concept of space. Harvey, Lefebvre and many sociologists (e.g., Emirbayer) have considered Karl Marx to be a relational thinker, for he has taken 'social relation' as the central object of analysis. As just mentioned, the term relational thinking is not bound to any philosophical perspective, hence, they may mean very different things according to the referential epistemic frame. I would elucidate how *relations* and *their terms* are explicitly conceived and how Marxist epistemic postulations are bridged into Lefebvre and Harvey's spatial concepts.

Regarding the nature of social entities (social actors and material entities), their relations, and the causal agent generating these relations, the Marxist doctrine has prescribed a set of straightforward theses:

> In the social production of their existence, men inevitably enter into *definite relations*, which are independent of their will, namely [the] relations of production appropriate to a given stage in the development of their material forces of production. The *totality* of these relations of production constitutes the economic structure of society, the *real* foundation, on which arises a legal and political superstructure, and to which correspond definite forms of social consciousness. (cite in Giddens and Held 1982, 37, italics added)

To put this into formal terms, the core propositions in the Marxist doctrine have placed social actors and material entities dialectically in an epistemic divide whose distinctive agency subject to different conditions of justification. It is to say, materials are conceived to be the fundamental substance. Their objective attributes condition the mode of production. The social actors possess although mental and conscious capacity, are structured by the material conditions they get with. This dialectic material-social relation is conceived to apply to society as a whole and afford explanations to all social phenomena.

In his epistemic frame, material condition' is defined by the way in which things are socially distributed or possessed by actors from certain social classes within historical contexts. Tools, land, and technology are characterized as distinct in their innate productive forces, thus enable different forms of production and ways of life. 'Mode of production' is thereby understood as the way in which social actors are organized to own and engage with productive forces created by tools, technology, machines, and land. Consequently, the social relation between actors is subsumed under the class relation characterized by their corresponding mode of production. Thus, the class relationships in society are defined in the first instance as an enduring structuring principle, which characterizes the form of praxis (social action) in the second instance. The agency of social actors may only be understood as a necessary relational attribute, i.e., the agency of capitalist class actors is defined by their possession of certain material entities and the dispossession of the working class. Furthermore, the class-specific social attributes are conceived to be fully internalized by these actors embodied by the labor they engage in. In other words, there is a postulated symmetry between the objective material structure and social actors' agency. The parts (social actors, their class attributes, and material goods) are conceived to add to an organic whole known as society.

In *The Production of Space* (1991 [1974]), Lefebvre takes the 'forms of space' produced in the capitalist social system as the core object of inquiry. He forges his conceptualizing practice in a frank dialogue with Marx, accepting Marx's theoretical propositions underlined by the historical materialist social ontology and dialectic epistemology. In his conceptualization, the social relation in capitalist societies is meticulously bridged with the dialectic relationship between the social-cognitive and the spatial-material in the Marxist epistemic frame. To contend with the dynamics of a dialectic constitution between the *material* and the *social* on the level of social agency, Lefebvre sketches out a spatial triad of architectonics as his analytical framework, comprised of "representations of space (conceived space – ideal)," "spatial practices (perceived space – ideal)," and "representational space (lived space – material, bodily experienced)" (ibid., 38–39). As for epistemic subjects or social actors situated in various class positionalities, Lefebvre has postulated three respective ways of knowing, i.e., the cognitive, the imaginative, and the bodily, as well as four types of knowledge produced from their primary form of spatial practices, i.e., the savior, the scientific, the practical, and the informal knowledge. Through associating distinct forms of agency (cognitive, perceptual, and practical faculty) to actors occupying varying social positions, the linkages between the three forms of produced space are forged in a logical manner. Thus, the production of the three forms of space and their interrelations are also explained following such formal dialectics.

According to Lefebvre, the perceptual, conceptual, and practical aspects of the agency are ideally unified in social actors' daily practices within social space, so that

"the 'subject,' the individual member of a given social group, may move from one to another without confusion – so much is a logical necessity." (ibid., 41). Lefebvre criticizes the semiology approach, for it tackles only the incomplete body of knowledge, "bound to transfer onto the level of discourse, of the language per se, i.e., the level of mental space" (ibid., 7). Instead, Lefebvre acknowledges a wide range of knowledge into his spatial analysis, from the coded to the embodied, the formally institutionalized to the informally tacit and unknown. To explain how the specific form of space in a capitalist society comes into being, Lefebvre introduces a core idea from Marx – alienation. According to Marx, 'alienation' is both the medium and the result of the enduring social(labor) relations in a capitalist society. Lefebvre then asserts that actors' spatial perception is socially legitimated in relation to the type of labor they engage in. Lefebvre has also argued that no single form of spatial knowledge would hold true on its own. Yet knowledge conceived by the dominant social class becomes collectively understood, as their production is legitimized, and they circulate in the frames of social class division and control. More specifically, Lefebvre has deemed represented knowledge of space in 'savoir' and 'science' as an immediate productive force in the capitalist mode of production. They are legitimized by the dominant social class and objectified in forms of regulative social norms, which further allow corresponding spatial practices to reproduce. As a result, working-class actors in a capitalist society experience a rupture between the imaginary perception of space, the imposed conceptualized spatial knowledge, and the everyday operation of 'spacing.'

Take the social-spatial reality in capitalist society as a whole, Lefebvre has also explicated how architects and urban planners – in alliance with administrators and capitalists, with the aid of technical codes and drawings – produce 'material space' based on their conceptual plans. Conversely, the working class produces space through their practice and senses, subjugated by plans of the mass production of space. Thus, their embodied intelligence manifests merely as 'lived space.' Whereas although artists possess the agency to produce 'space of representation' through imagination, they are unable to materialize or subvert the dominant conception of space due to their disenfranchised social position. The holistically defined social space concept is as follows:

> (Social) space is not a thing among other things, nor a product among other products: rather, it subsumes things produced and encompasses their interrelationships in their coexistence and simultaneity – their (relative) order and/or (relative) disorder. (ibid., 73)

In line with Marxist postulations, Lefebvre has conceived social structure, the social positions and their interrelations, as a holistic causal agent. New forms of space can only be produced when holistic change occurs in society. Thus, Lefebvre has attributed the production of 'absolute space' to the social structure in imperial so-

cieties where religious authority dominates farmers. He has also attributed the production of 'abstract space' – the homogeneous, fragmented, and hierarchical space – to the capitalist mode of production. Both forms of space are conceived to encompass materiality, social actors, and their relations. As a result, though Lefebvre postulated no *a priori* attributes to social-spatial boundaries, the nation-state is still taken as the *de facto* empirical content to the boundary, taking as the demarcation of the unit of analysis on the empirical level. We can notice a methodological consequence here: to follow the Lefebvre approach, an empirical social-spatial boundary must be identified as a quasi-holistic social structure.

In a similar vein, David Harvey follows the ontological postulations from historical materialism. Harvey attributes the causal agent of material distribution to political-economic structures (modes of production and their interrelations). These political-economic structures are deemed objective, determining the social ideology and culture that further shapes social actors' perceptions and productive practices. Harvey has also taken the class-specific attributes of spatial practices as an analytical dimension, but he differs from Lefebvre in his predominant heed on economic activities (monetization, commodification, exchange production etc.). The latter attends to the full spectrum of social activities and their causal relation to 'spatial structure.' Harvey has proposed a two-level conception of social-spatial structure (of economic systems vs. experience) to amend the limitation of his analytical framework. Yet, the inferences made on these two levels lack conceptual coherence.

Harvey builds his conceptualization of 'spatial structure' by reconstructing Marx's 'law of accumulation.' He claims that the different spatial structures that inhabit social reality are "glued together by flows of such items as money, commodities, information, cultural artifacts, and symbolic systems" (Harvey and Braun 1996, 286). For Harvey, spatial structure in the capitalist society manifest, on the one hand, in the interaction between the production of *fixed and immobile* territorial organizations including urban built environments, industrial agglomerations, regional production complexes, large-scale transportation infrastructures, and long-distance communication networks, regulated by state institutions; and on the other, in the production of relative space-time of *accelerated and expanded* capital circulations (2001, 237–66). He distinguishes the processes of "monetization, commodification, the exchange" and the process of "valorization and devalorization," emphasizing the speed of different modes of circulation (ibid., 23). Both are deemed to be steered by the law of accumulation. Here, an epistemological postulation is deployed at work: the dichotomy between movable and immovable beings. It means firstly that the material infrastructure and capital are deemed distinct in their circulative-mobile attributes. Then, the modes of circulation (motion) are conceived as caused by distinct forms of mobile forces.

I would argue that Harvey's inquiry lies in identifying the empirical content of the 'spatial structure,' the structuring principle that organizes the distribution and circulation of various forms of materiality than that of space. His concept of space is derived directly from Marx's realist concept of materiality. Thus, in Harvey's analysis, social-spatial structure corresponds with the sum of rules regulating two forms of capital circulation and accumulation in a capitalist society. Under Fordism, he argues, the social-spatial structures are realized primarily in fixed and immovable material forms, such as transport facilities.

While recognizing that the organization of accumulation under the post-Fordist economy (late capitalism) to be different from that of the Fordist-economy (capitalism), in *the Condition of Postmodernity* (1989), Harvey re-embeds his notion of space and social-spatial structure into a new social, historical context. It is called the late capitalist or postmodern society. In this context, flexible accumulation, according to Harvey, "rests on flexibility with respect to labor processes, labor markets, products, and patterns of consumption." This mode of production is also deemed deeply affective to class structures and political-economic possibilities to modify the processes of community production (ibid., 147). As other means of production and consumption cannot be moved without being destroyed, these structures themselves act as a barrier to further accumulation. Harvey has famously characterized such structural change as the 'time-space compression':

> It has also entailed a new round of what I shall call 'time-space compression' (see Part III) in the capitalist world – the time horizons of both private and public decision-making have shrunk, while satellite communication and declining transport costs have made it increasingly possible to spread those decisions immediately over an ever wider and variegated space. (ibid., 147)

Furthermore, in the book *A Brief History of Neoliberalism* (2005), Harvey seeks to identify the empirical content of organizational structures of accumulation and capital circulation and the manifestation of the temporal-spatial structure resulting from the interactions of the two in neo-liberalism societies. In Harvey's eyes, neoliberalism is gradually becoming the central guiding principle of economic practices on a global scale. In the non-western context, i.e., the Chinese context, Harvey perceives the economic system as a whole falls under this category. However, empirical data from China has often contradicted what the grand material-ideal dialectic premise predict, assuming a state (political-cultural) reconfiguration subsequent changes in the economic production system. Facing the incoherence between his theoretical prediction and phenomenon, Harvey proposes a 'creative destruction' argument:

> The process of neo-liberalization has, however, entailed much 'creative destruction,' not only of prior institutional frameworks and powers (even challenging tra-

> ditional forms of state sovereignty) but also of divisions of labour, social relations, welfare provisions, technological mixes, ways of life and thought, reproductive activities, attachments to the land and habits of the heart. (Harvey 2006a, 147)

So far, we can affirm, in Harvey's model, *space* is deployed heuristically to refer to the observable, material and symbolic, movable and immovable entities subject to accumulation. Spatial structure is conceived to represent the dominant political-economic rules organizing spatial constituents, which may or may not correlate with other social structures in a given society as a whole. In Harvey's epistemic frame, he separates the space of the economic system from that of experience. The concrete agencies of social actors are thereby deemed determined by the economic structure. At this point, Harvey's conceptualization of space correspond closely with the Newtonian relative space conceptualization, as 1) the social-economic entities are conceived as passive, discrete and material, characterized by their attributed movable or immovable bodies; 2) the ordering principle of space is deemed objective and encompassing, irrespective of the local context; 3) the 'law of accumulation' is deployed to *replace* the Euclidean geometry as the overarching measuring and ordering principle.

This affinity between the Newtonian relative epistemic frame and Harvey's spatial notion can be further affirmed by his own conceptual clarification in later writing (2006b):

> Space is relative in the double sense: that there are multiple geometries from which to choose and that the spatial frame depends crucially upon what it is that is being relativized and by whom. … The relational notion of space-time implies the idea of internal relations; external influences get internalized in specific processes or things through time (much as my mind absorbs all manner of external information and stimuli to yield strange patterns of thought including dreams and fantasies as well as attempts at rational calculation) (ibid., 272-274).

It is evident, Harvey fails to clarify whether or which of the relations (internal or external) are (conceived as) real or phenomenal. He has conflated the observable formal and substantial relations and has dismissed an epistemic distinction between relationalism and relativism. Harvey also holds that researchers could employ the absolute, relative, and relational conceptualizations of space at different intersections, integrate "different modalities of understanding the meanings of space and space-time" (ibid., 281). Harvey has thus characterized various entries according to their (assigned) relative attributes of mobility and associate them with the three spatial concepts. For instance, mountains, water, and energy flows are categorized under the row of material space in a native realism manner, overlapping with the lines of the absolute, relative, and relational categories. As indicated earlier, as the epistemic rule at Harvey's work is Newtonian, such 'mixed concepts' renders

each spatial term's analytical dimensions ontologically flat and epistemologically chaotic.

2.4.2 The structuration and (relational) space of everyday experience

The second conceptualization of relational space addresses the space of everyday experience, represented by Martina Löw's theory of space. Löw has developed a systematic conceptualization of space in the book *Sociology of Space: Materiality, Social Structure, and Actions (2016 [2001])*. As a theoretical project, her theorization aims at bringing space as a fundamental concept into sociological theory, enabling its analytical purchase to explore the 'phenomena of space' on all theoretical levels. Diverging from Harvey and Lefebvre, who aim to embed the concept of space into dialectic materialism tradition in a logically coherent manner (through following epistemic rules prescribed by Marx), Löw has clarified from the outset that she would depart from the Leibnizian relativist stance. In other words, Löw rejects a deflated realist ontology and the postulated epistemic divide between the movable and immovable entities. As I have discussed in 2.2 in detail, Leibniz conceptualizes space, on the collective level, as an order to things exists at the same time, emerging from the accumulation of the biased perspectives of 'situated monads.' Monads are understood as substantial agents. Their absolute manner of change and movement is caused by their substantial internal attributes. Their relative motion occurs in the process of negotiating their contingent 'point of view' with other compossible monads in realizing the particular law of their 'possible world.' Löw argues that the Leibnizian epistemic prepositions about the nature of entities and thereby the causal agents of their absolute and relative change allow her to attend to the process of change and the co-existence of plural subjective spaces. This integration is possible as Leibniz conceives "the 'bodies' (actions) to be always in motion" in both absolute and relative senses. The 'bodies' are conceived situated, which allows them to possess and actualize a different 'point of view' (ibid.,10). As a result, in her conceptualization of social space, Löw put "the coming-to-be of space" on the perceptual level, and "the arranging of the bodies in action" on the material level in causal relations to "the constructions and perceptions of the 'observers'" (ibid., 51).

In reference to the Leibnizian relational space conceptualization, we notice that the conceptual building blocks in Löw's conceptualization of space are syntactically parallel and analogous with that from the Leibnizian epistemic frame. The aforediscussed Leibnizian epistemic forms get systematically embedded and extended into a pool of concepts in sociology. Its epistemic rule – the premises and sense relations prescribed by Leibniz – get retained. Most prominently, the conceptualization of 'unit of intelligent substance,' or the 'monad,' has been embedded into both the notion of 'social being' predicated by pre-reflective perceptual and practical attributes, and the 'social good' predicated by perceivable (symbolic) and sen-

sible (material) attributes. On a secondary (*materia seconda*) level, Löw includes and connects the 'patterned perceptions,' 'actions,' and 'bodily positions' of the monads with the social actor' pre-reflective, internalized perceptions and social practices, and their positions in the social world. Furthermore, the ways in which these predicated attributes are related to social structure resembles how 'perception,' 'relative motion,' and 'point of view' are causally connected to 'the order of the possible world' in the Leibnizian schemata.

In line with the principle of epistemic coherency, Löw recourses to Giddens and Bourdieu's general social theories to further shape the epistemic building constituents of social space. In the Leibnizian epistemic framework, the orders of 'the possible world' is deemed contingent in substance, but absolute in form, as they are pre-established by God. Thus, Löw has also admitted an idea of collective social structure to account for the spatial constitution and transformation on the collective level. In contrast, she does not have a pre-established spatial order nor an absolute law attributor in mind but locates the source of collective order in the context of everyday social structures. On this point, Löw has drawn on Giddens' structuration theory. Social structure is conceived to have both the potential for enabling action and constraining repetitive social actions, resolving the dichotomy between social structure and action. Giddens presumes that a social actor reproduces one's core sense of meaning through 'repetitive actions and routines' in a social context. In his words, "routine is integral both to the continuity of the personality of the agent, as he or she moves along the paths of daily activities, and to the institutions of society, which are such only through their continued reproduction" (1984, 60). This mutual constitutive relation between agency and structure is compatible with that in the Leibnizian epistemic frame. The monads, in relation to the clearness of their perceptions, act in response to the intelligible law perceived from their point of view. Löw is thus inspired by Giddens, who takes 'routinization' as a key causal category to mitigate action and social structure. Following Giddens, she defines human beings' substantial attribute in terms of 'repetitive human action, which is deemed as social actors' inherent ability to affect change.' The social actor's 'absolute motion' is thereby caused by their routine actions.

Aligned with the Leibnizian differentiation between a 'general law' and a 'point of view' relevant to point in time and space, and with Giddens, Löw differentiates between 'structure' and 'structures': "structures are isolable sets of rules and resources, while structure means the totality of different structures" (2008, 31). More specifically, regarding 'structure,' Löw diverges from Leibniz and Giddens' conception in that she does not regard it as a 'general law' nor 'universal ordering force.' For Giddens, social reality is structured by mechanisms *out of* time and space. More specifically, structure(s) entail recursive rules of a normative nature (legal, economic, political structures) and resources (material or social) embedded in institutions. This implies that the validity of the term 'structure(s)' is deemed

irrelevant to the concrete and particular social contexts one investigates. Löw refuses the concept of structure to be "independent of space and time and beyond materiality" (2016 [2001], 142). Instead, she perceives that structure – like the division of public and private, and gender and class – "materializes itself in all social entities of whatever dimensions, including human bodies" (2008, 31). Then, there is still a risk that 'routinization' is re-embedded into Leibniz's both notions of repetitive passive (absolute) activity and active (relative) activity, conceived as the primary and secondary attributes of the monads. In other words, the two-fold causal agents Leibniz has postulated to explain the relation between substantive and relative motions, might be conflated in 'routinization.' To clarify the difference, and understand how Löw resolves the problem of conflation, let's have a look at the source of such a divergence. In the Leibnizian frame, the basic intelligent subject (the monad) is firstly defined on the primary level *(material prima)*, as a situated subject with substantial attributes. For Giddens, the modern social subject is primarily and explicitly defined as a 'reflexive' and 'knowledgeable' agent. Thus, his concept of structure(s) is constructed only on the ideal level, offering universal analytical purchase (1984, 3). Löw diverts from this line of thought, considers the social beings as having not only the 'social minds' but also as 'social bodies.' She conceives the social subject to have pre-cognitive faculties (often embodied) and pre-reflective perceptions (often cultivated from concrete social contexts, situated position). Therefore, she finds it necessary to extend the analytical dimension of structure to the materiality of things and social bodies, including the spatial and temporal structure.

Like Leibniz, Löw conceives each social subject to have its own capacity of 'perception,' but unlike *materia prima*, which is merely an innate quality. Löw regards the structured cognitions of social actors, their pre-structured perceptual patterns and bodily sensations to be formed in a 'temporal continuum.' On this primary level, Löw draws on the concept of 'habitus' in Pierre Bourdieu's sociology of culture to ground the causal relations between the concepts of substance, perception, bodily motion (practices) in the social field. The *habitus* is defined by Bourdieu as social actors' set of bodily and cognitive dispositions, generating their social practices and perceptions. It is conceived to be the result of a long inculcation process, beginning in early childhood, which becomes a 'second sense' or a second nature. According to Bourdieu, dispositions represented by habitus are durable, in that they last throughout an agent's lifetime, and transposable, in that they may generate practices in multiple and diverse fields of activity. They are "structuring structures" as social actors would inevitably incorporate the objective social conditions into their inculcation (1977, 72). Following these assumptions embedded in habitus, Löw conceives perception to be pre-structured by an actor's education and socialization, imprinting itself as orientations and pre-reflective repetitive social practices.

In addition to introducing Bourdieu's habitus concept into her analytical framework, Löw has embedded the subjects' social positionality into the notion of 'point of view,' introducing the perceived social structure(s) as a secondary causal agent. The notion of structures(s), in its plural form, is similar to the 'general law of the possible world' in the Leibnizian epistemic frame. For Bourdieu, social actors in a particular social world "mutually relativize each other," so that the way the world appears to and is understood by individuals is correlated to the sense of place they have developed in relation to the *whole* compossible field (2006 [1995], 193). For an actor situated in a particular social world, a sense of one's place refers to "a sense of what one can or cannot 'permit oneself,' implies a tacit acceptance of one's place, a sense of limits (sense like, that's not for the person likes of us etc.), or, which amounts to the same thing, a sense of distances, to be marked and kept, respected or expected" (Bourdieu 1993, 19). In other words, an actor orients themself in relation to their sense of position in a lived social world. The sense of place of all social actors (*doxa*) in a particular social world amounts to the "law of the field," which corresponds with the 'order of the possible world' in the Leibnizian frame (Bourdieu 1993, 39).

In line with Bourdieu, in Löw's conception, an actor's perception is pre-structured by education and socialization. It imprints itself as pre-reflective orientations in social actions. Löw follows the principle of 'subject-predicate-substance,' seeing reflexivity as a 'transcendental attribute,' and setting the condition of truth in socially cultivated and embodied subjectivity. As such, she connects the internalized, pre-structured perceptual schema to an actor's routine actions, which further contribute to the reproduction of social structures and space of everyday life. This causal connection also enables her to include distinct biographical perspectives explaining social actors' perceptions of space in co-existence. When 'structure' is embedded in the 'universal ordering force,' it is deemed "unrelated to place and point in time" (2008, 38). In her book, Löw illustrates the nominated reference of 'structure' interwoven with 'space,' using the structural notions of 'class' and 'gender.' The epistemic divide between 'structure' and 'structures' correlates perfectly with that between the twofold, substantial and phenomenal laws in the Leibnizian epistemic scheme.

Different from the Leibnizian notion of relational space, Löw has taken the bodies and materiality seriously. Materiality enters the social-spatial phenomenon's constitution when perceived or sensed by the social actors and placed by their actions. The former process is termed as 'synthesis,' and the latter as 'placing.' By *synthesis*, she refers to the process in which "goods and people are amalgamated to spaces by way of processes of perception, imagination, and memory." By *placing* (*Anordnung*), Löw refers to the process in which "space is constituted through the placing of social goods and people or by the positioning of markings that are primarily symbolic of identifying ensembles of goods and people as such (e.g., street

signs on entering or leaving communities)" (ibid., 134). For Löw, operations of synthesis and spacing can occur simultaneously and coherently in social actors' everyday practices. However, unlike the Leibnizian epistemic frame, she addresses the possibility in which "the operation of synthesis as an operation of abstracting without associated spacings" (Löw 2016 [2001], 135). Such detachment is illustrated by designers' software-based design and drawing. Correspondingly, she differentiates two types of knowledge needed for the constitution of space: the 'knowledge of the symbolic attributions' for the meaning constitution and the 'knowledge about how to deal with the material components of spaces' for the material arrangement. The knowledge about materiality is thus intricately linked with an actor's habits and internal characteristics. It demystifies what Leibniz has coined as the contingent association between monad' intelligence, the clearness of perception and the extent of activity. In this way, Löw has offered a systematic analytical framework to examine and explain how space is routinely constituted in repetitive social actions and interactions. Space pre-structures social actors' perceptions and practices also presuppose the existence of social structures. Her thesis of space goes as follows:

> Space is a relational arrangement of living beings and social goods. Space is constituted by two processes that must be analytically distinguished: spacing and the operation of synthesis. The latter makes it possible to unite the ensembles of goods and people to one element. (ibid., 135)

As a result, Löw's relational notion of social space enables one to acknowledge the two empirically concurrent processes as analytically distinguished. By delinking the causal necessity of these two processes, the methodological implications are, researchers are encouraged to attend to a plurality of space constituting processes on the symbolic and material levels, attend to their interactions and resultant material manifestations. One can also analyze the forms of detachment between the two levels of spatial constitution.

To clarify the meaning of relational in Löw's conceptualization of space, two crucial propositions and their inferential order need to be addressed. Firstly, two processes of constituting space (the operation of spacing and synthesis) are conceived to be permeated in the perceptual aspect of individual actions. Secondly, in the process of placing, the perceptual-symbolic and meaningful dimensions of social bodies are taken as the primary ordering principle. Furthermore, Löw has introduced 'atmosphere' to describe social goods and human beings' external effect, being realized perceptually in their spatial ordering. Atmospheres arise as the *perception of relationality* between people and/or the external effects of social goods in their arrangement (ibid. 172). This mode of inference implies that the *relationality* formed in the pre-cognitive *perceptual process* (synthesis) has the causal primacy in explaining the deployment and arrangements of material bodies.

As this chapter aims to elucidate and compare the methodological implications among distinct forms of relational conceptualizations of space, I cite Löw's own reflection and conclusion on this point first:

> Based on Sturm, four levels of procedure for scientific study can be derived from this classification: (i) the study of social goods and people in their arrangements, (ii) the analysis of operations of synthesis, (iii) the treatment of processes of spacing, and (iv) the exploration of spatial structures. (ibid.,187)

I have identified a few additional methodological implications after closely examining the relevance and difference between the epistemic frames underlying Löw's and the Leibnizian notion of relational space. As previously indicated, Löw constructs the concept of relational space on the level of the phenomenon, i.e., space emerges in subjective perception, constituting one's meaningful experience. It enables the analysis of movement and changes as the imminent factors in sensorial perceptions (as indicated in [i], [ii] in the above quotation). She also presumes social actors to be endowed with differing pre-cognitive knowledge required for spatial practice, which is not necessarily in line with, or legitimated by, the normative social structures in a social context. As a result, Löw's relational notion of space enables analyzing the co-existing 'multiple possible spaces' synthesized by different social individuals or groups, in relation to their spacing practices and materialization. In doing so, we can avoid the simple judgments of the 'true' or 'real' causes but incorporate those that come laden with a plurality of social actors and their situated perspectival limitations. Furthermore, 'boundary,' in the principle of making an empirical halt (as described by Löw that "movement has to be artificially halted in empirical analysis in order to be able to determine a configuration" [ibid.,188]) is not admitted as a formal concept in Löw's relational space.

2.4.3 Relational materialism and assemblage

The third approach for thinking of (social) space relationally can be broadly described as the assemblage approach. Most directly, the assemblage approach draws on epistemic premises from the 'actor-network theory' (Latour 2005), attends to the event of 'agencement' developed by Deleuze, Guattari, and their followers (see Thrift 2008; Anderson and Harrison 2010). As a general currency, the assemblage approach is developed to address the indeterminacy, emergence, becoming, processuality, and turbulence of social-spatial events. Such events are deemed to be composed of human and non-human, organic and inorganic, and technical and natural elements. According to Delanda (2006), the assemblage is part of a more general conceptualization of the social that seeks to blur divisions of social and material, near and far, structure and agency. Thus, we can also deem it a re-conceptualization of space.

As there is no all-encompassing systematic conceptual formulation of space under this approach, nor are its epistemic forms and rules defined in an agreed-upon manner. I examine here primarily the spatial notion conceptualized in non-representational theory (NP) by Nigel Thrift. I consider it to be the most elaborated work following this tradition. The non-representational theory was firstly developed in the volume *Spatial Formations* (1996), in which Thrift pieces together several concepts that came central to his thinking: 'time-space,' 'practice,' 'subject' and 'agency'. Later, the logical relations between these key concepts were formulated in a more detailed manner in *Non-Representational Theory: Space/Politics/Affect* (2008). For Thrift, he deemed the subject matter of his theory to be the 'onflow of everyday life': the superfluous, hybrid consciousness which is constantly destabilizing and changing content, present in 'experience' (2008, 2). In NP, Thrift does not offer a clear definition or conceptualization of space, nor is the meaning of the term deployed in a unitary way. Judging by the interchange of discourse, I infer that a notion of space as such is used by Thrift to refer to the represented arrangement of things and their interrelation in social actors' senses and consciousness, as a subjective cognitive and pre-cognitive condition under which experience and practice arise (see ibid., 97-98). However, as Thrift has integrated notions of social reality and subjects underlined by epistemic premises different from that in Marxist and Leibnizian traditions. Thus, we shall attend to another important relational spatial notion, the *assemblage*, distinct to the relational materialism tradition.

Firstly, regarding the postulations of social subjects' agency, the non-representational theory is aligned with the social constructivism tradition, primarily in its rejection of deeming human subject as autonomous, rational, and reflective. However, Thrift regards the human subject's pre-cognitive capacity to be more than an addendum to the cognitive capacity, so much so that he values the 'emergent' component more than the cognitive and entrenched pre-cognitive components of subjectivity in constructing social reality. To be more exact, Thrift has traced his postulation of *relational subjectivity* to that from Deleuze: "I take Deleuze's work on topics like the gap between sensation and perception, the difference between possibility and virtuality, the heterogenies of both material density and subjective action from a pre-individual field, and the different time images of repetition and recurrence, to be important" (ibid., 18). In Deleuze's differential ontology, the subjectivity of any given being is formed on the basis of the ever-changing nexus of relations in which it is found. In other words, the source of such relational subjectivity is attributed more to the responses to the external – the emerging sensation and perception occurring in nowness.

The NP theory contends to be "resolutely anti-biographical and pre-individual" (ibid., 7). By anti-biography, Thrift holds that the autobiography "provides a spurious sense of oneness," while biography offers a "suspect intimacy with the dead." Regarding the issue of pre-individuality, Thrift explains that "the flow of

dialogical action is a fundamental determinant of the intelligibility of social life: understanding comes from the betweenness of the 'we,' not the solitary 'I.'" Instead, he emphasizes the "flow of practice in everyday life" and the "on-going creation of effects through encounters," rather than "consciously planned coding and symbols" (Thrift and Dewsbury 2000, 415). From my reading, Thrift's conception of a relational social agency addresses less the relational representation formed via willpower or cognitive deliberation but more the sensible social-material relationality in the embodied and situated practices, dispositions, and habits, cultivated amidst environmental affordances. Having practiced in the center of the theory, 'agency' in NP is not conceived as being "localized in individuals but is understood as a relational structure" (2004, 87). It is then defined to entail ontologically heterogeneous modes of subjectivity (internal and external), embodied by "joint actions – action as always a reaction to other action –in a concrete context" (ibid., 14). Following Deleuze, Thrift has ruled out the 'subject-predicate-substance' as a principle, defining the social beings' agency as a complex relational structure.

We can move on to discussing the underlying epistemic rules regarding the definition of the 'thing' in non-representational theory. In NP theory, it is clearly expressed that the premises on which the nature of objects and thereby the necessary subject-object relation are primarily borrowed from actor-network theory's relational materialism tradition. It presumes 'things' to possess 'technological anteconscious,' and conceives thereby the world to be made up of actors or actants (Latour 2005, 54). In other words, it abandons the differentiation between subjects and objects at both ontological and epistemological levels. Following Latour's flat ontological principle, Thrift grants the social being's body and the thing with the same ontological footing, both as real and inseparable entities. Things are deemed to have the capacity to act, to the extent that they are endorsed with a practical and processual role in accounting space formation. The result is that the material context against which space emerges is no longer conceived as a dormant or an ordering background but an active and productive entity. Things appear and assume significance in the "manifold of actions and interactions" – a mobile but more or less stable ensemble of practices, involvements, relations, capacities, tendencies, and affordances.

Nevertheless, Thrift contends that the agency of things and social actors are not the same, in that the human body "is what it is because of its unparalleled ability to co-evolve with things" (Thrift 2008, 10). Thrift also diverts from ANT in that Thrift perceives human's 'expressive powers' to be of especial importance in understanding "what is possible to associate," which is neglected in the ANT framework. Thrift sees "the power of imagination, the capacity to posit that which is not, to see in something that which is not there" to be the cohering force, structure the transformation of the assemblage (ibid.,111). The notion of space is coined on the individual level to capture what social subjects have sensed in the course of interacting with

heterogeneous actants of different natures. It is formulated in a non-conceptual style, as Thrift strives for "deflating methodology and replac[ing] it with style, self-exemplification rather than self-referencing" (1996, xii). It is described as follows:

> …. space is not a metaphoric, nor is it a transcendental principle of space in general (the phenomenological idea of consciousness as the fount of all space, produced by a finite being who constitutes 'his' world), nor is it simply a series of local determinations of a repeating theme. In each of these cases, we can see that the very style of thought is 'oriented by spatial relations, the way in which we imagine what to think' (Colebrook 2005a:190). Rather, it is three different qualities in one. First, it is a *practical set of configurations* that mix in a variety of assemblages thereby producing new senses of space and… Second, it also forms, therefore, *a poetics of the unthought*, of what Vesely (2004) calls the latent world, a well-structured pre-reflective world which, just because it lacks explicit articulation, is not therefore without grip. Third, it is *indicative of the substance* of the new era of the inhabitable map in which space has more active qualities designed into its becoming – a tracery of cognitive and pre-cognitive assists threading their way through each and every moment of the being-at-work of presentation – which makes it into a very different ground from the one that Heidegger imagined as presence. (Thrift 2008, 16, italics added)

As previously indicated, two notions are core to capture and explain social-spatial formations in NP: one is 'space,' the other is 'assemblage.' My reading of this is that 'space' is conceived to encompass both social beings' mental and sensual structures – how they see and feel about the world around them, as well as the representation of such engagements in the world. Space arises from, and gives rise to, practices, embodied exteriorities, and joint-actions – associative processes through sympathy. Subsequently, under the backdrop of space, 'assemblage' emerges, which is considered real, yet cannot be accessed fully by the researcher or observer directly. The term assemblage refers to a compositional unity of the social and material entities, relations of the historical and the potential, and materially mediated arrays of human activity and performance, centrally organized around shared practical understandings of its emergent properties. To my understanding, the concept of assemblage is built on the ontological 'empirical' and 'actual' domain, consisting of manifested entities whose come-into-being could be captured in various ways, according to the temporal, spatial position and the perspectives held by the experiencing subject and the observer. As Olds and Thrift assert when examining global schoolhouses in Singapore, "assemblages will function quite differently across different contexts, not because they are an overarching structure adapting its rules for the particular situation, but because these manifestations are what the assemblage consists of" (2005, 202). In particular, the term assemblage also suggests that NP is built on a weak (situated) epistemology – it sets little pre-defined limits on

what and how would be known by the observer as constituents of assemblage (1996, 32–33). Vannini, a follower of NP, clarifies that:

> But what truly distinguishes the non-representational research from others is a different orientation to the temporality of knowledge, for non-representationalists are much less interested in representing an empirical reality that has taken place *before* the act of representation than they are in enacting multiple and diverse potentials of what knowledge can become *afterwards*. (Vannini 2015, 12)

With regard to the *structuring forces* of assemblage, building on a flat ontology as in Latourian sociology (2005), the descriptions of 'social mechanisms' in the NP are 'associative,' whereby the concept of society and social structure are dropped altogether from his conceptualization practice. The social does not refer to any type of collective representation that exists in itself, but a certain sort of circulation in which movement is constant; it is not characterized as a special or specific realm but "a very peculiar movement of re-association and reassembling" (ibid., 7). We can draw a reference to the 'contingent general law of the possible world' in the Leibnizian epistemic frame, where its form is deemed given, and the substance is actualized by the monads in their constant negotiation and conflicts. Thrift has admitted its form but addressed the construction and actualization of the empirical content of 'the contingent law' on the level of the assemblage. Without a mechanism proposed on the collective level, how can one describe and explain the stabilizing or destabilizing processes of these co-existent heterogeneous components in assemblages?

One causal agent proposed by NP theory is also 'routinized practices.' In Thrift's earlier writing, he has quoted directly from Vendler (1995)'s definition: "practices, understood as material bodies of work or styles that have gained enough stability over time, though, for example, the establishment of corporeal routines and specialized devices, to reproduce themselves" (ibid., 5). This quote has foregrounded the trans-actional, relational nature of the practice again and deems repetition to achieve stability measured by *temporal endurance and materialization*. Secondly, Thrift makes it explicit that stabilization and destabilization are both a *consensual and contested* process: "consensual because relations are usually made out of agreements or alignments between two or more entities, contested because the construction of one set of relations may involve both the exclusion of some entities (and their relations) as well as the forcible enrolment of others" (Thrift 2004, 91). The stabilizing process is also conceived as 'power-filled,' in which relations run through meeting places over different spatial scales, and "some alignments come to dominate, at least for a period of time, while others come to be dominated" (ibid., 91). The second causal agent is thus referred to the active derivative forces associated with social and natural entities' resistance, interpenetration, and movement of association and re-association at the level of assemblage. This implies that although a

contingent law or structuring force is conceived as a concrete analytical category and a causal agent within the NP epistemic framework, its form is not derived from the Leibnizian but Deleuzian epistemic premises, which get substantiated in the empirical realm, upon effectuality.

As I have previously indicated, instead of proceeding from subjects and objects predicated with *a priori* substantial attributes or prescribing singular forms of structuring force to the assemblage on the collective level, NP theory accentuates a third element: the emergent-external relational structure between subjects and between subject and object. The NP epistemic frame is aligned with that from a set of diverse but cognate anti-substantial philosophies of becoming, vitalist intuition perspectives, and Latour's relational materialism. The emergent capacity is conceived to exist in the real domain, not solely as a representation of the formal relations (institutional norms, frames, etc.) on the empirical domain. Furthermore, it's empirical manifestation is conceptually refers to an 'embodiment' representing elements such as affects, virtual memories, and hauntings. It resonates with what Löw defines as the atmosphere. Just, instead of addressing the more stabilized relation between embodiment and the resultant patterned perception of social actors, Thrift focuses more on those "which are ephemeral and possible" (Radley 1996, 560, cite in Thrift 2005, 115).

The methodological implications of NP include: one can trace the existence of absent entities from the way present entities are assembled, through looking for the unexpected qualities of events and ways of knowing in the movement of the practices in context (see Thrift 2008, 114–24). The focal point, as argued by Dewsbury et al., "is to redirect attention from the posited meaning towards the material compositions and conduct of representations" (2002, 438). If this clarification still appears obscure, my understanding is that the presented interpretations in the empirical domain can be considered plausible when they correspond with your observation of the way in which material components are configured and moved, and/or with the knowledge learned by experiencing subjects. The temporality of the events halted artificially by the researcher is crucial for identifying generative mechanisms. The associative mechanism between the social actors, materials, and other entities can only be derived *after* the completion of the processes, not *before*. And, by no means is one mechanism to be deemed as the only plausible one.

Let me summarize the necessary epistemic forms and causal agents that constitute these two forms of spatiality in NP theory. Firstly, in NP, both *social actors* and *social goods* are conceived to have contingent properties (e.g., affect) emerging from their interactions. In other words, the *non-cognitive properties* of social actors are (also) employed in explaining their social practices. The practices are conceived as embodied actions, ranging from perceptual, pre-reflexive, and conscious discursive, to controlled and coerced actions. These actions are more or less enduring and more or less mediated, but all conceived as relational. In contrast to Lefebvre and

Harvey, the assemblage approach deliberately avoids *a priori* reduction of social-spatial relations and processes to one or a set of fixed, necessary forms. Therefore, the routinary social practices (as conceived by Löw) is attributed to both social and natural entities in NP as causal agents to explain the spatial formation. They are conceived either immediately regulated or mediately generated and organized by rules bundled with the positionality of the individual. Thrift has attended more to the *responsive* effect of practice to the *ever-changing* context. The concept of *space* is thus conceived as the sensible backdrop against which actual practical manifestations unfold. It shapes and is shaped by the relational senses and practices of experiencing and expressing subjects. The *relational space* in perceptions here are not merely pre-structured by the law of inner identity, nor external norms (codes, rules, and laws), but also shaped by the constant, contingent mode of exchange with others in the context.

How do the weak epistemological principles (rules) characterize the logical relations between different epistemic forms in the assemblage theory is much discussed by Delanda. He states that, "unlike wholes in which parts are linked by relations of interiority, assemblages are made up of parts which are self-subsistent and articulated by relations of exteriority, characterized along two dimensions: along the first dimension are specified roles which parts may play, from a purely material role to a purely expressive one; along the second dimension, components come together in the process of stabilizing or destabilizing" (DeLanda 2006, 9). In comparison to the relational conceptualization of space coined by Löw, the assemblage has given both the sense of space, and the emergent relations between entities as parts and as a whole, a realistic epistemic status of their own.

Overall, the assemblage approach offers no unifying analytical framework due to its take on weak epistemology and the multiplicity of impulses, issues, and oppositions it tries to tackle. Methodologically, the two analytical dimensions in NP are in line with Löw's epistemic divide between synthesis and spacing. Both have stressed the distinction between the process of cohering the parts and their interrelations as a whole in one's subjective perception and senses; the process of spacing the parts in practices across scales. The difference lies in that, in the assemblage approach, time is not conceived as linear nor homogenous. Researchers are required to detect the *angle* or *moment* to capture the formation of synthesis and associative practices.

2.5 Summary

In this chapter, I have made the first step towards understanding the ways in which divergent relational conceptualizations of space come into being and the grounds on which one can tell their analytical purchase apart. These aspects are of crucial

importance to preselect relevant traveling conceptualizations for conducting context-sensitive spatial research. In 2.2 and 2.3, I have *deconstructed* the prototypical notions of the absolute, relative, and relational space embedded in the modern philosophical and scientific contexts, as elaborated by Newton and Leibniz. My deconstruction focuses on 1) addressing the epistemic premises which make certain events a target problem for scientific investigation and explanation; 2) explicating the fundamental epistemic forms and their attributes introduced in spatial conceptualization; 3) explicating the causal or inferential relations conceived between them, and 4) clarifying the criteria conceived for validating such inferences. Although both Newton and Leibniz's spatial conceptualizations aim to explain the event of motion, they diverge firstly on how the attributes of things are conceived on the individual and collective levels. They also differ greatly on the sensible subject's capacity to capture motion, and the rule they follow to justify their knowledge. In short, due to the depth of epistemic frames, the distinction between the absolute, relative and relational conceptualizations of space cannot be reduced to a mere matter of semantics.

Subsequently, in section 2.4, I have analyzed how the epistemic frame entailed in Newton's absolute and relative concept of space, in Leibniz's relational space is re-contextualized into the domain of social science, shaping the conceptualizations of social space and our reading of the empirical phenomenon. Particularly, I have focused on elucidating three distinctive approaches of thinking of space relationally in the social domain (represented by David Harvey, Martina Löw, and Nigel Thrift's theories of space), in relation to the prototypical Newtonian and Leibnizian notions. At stake here is to identify the explicit and implicit epistemic presuppositions deployed in the conceptualizations, which conferred distinct causal agents, mode of inference, and level of analysis, affecting the way in which a social-spatial phenomenon can be read 'relationally.' In extremely broad terms, the philosophical strands the three theorists take – Newtonian (mechanics) and historical materialism, Leibnizian idealist-relationalism, and phenomenology and relational materialist traditions – rest on vastly different epistemic rules. The three theorists have systematically resorted to – the (post-)structuralism, the structuration-ism, and the relational materialism – distinct and non-convergent epistemic grounds for conceptualizing their notion of relational space. Equipped with a cross-cultural sensibilities, a philosophical-epistemic vigilance enables me to trace the source of their controversies over nature and mechanisms of space constitution back to its underlying philosophical controversies that cannot be settled on empirical grounds.

As I have indicated in my analysis, I perceive Harvey's concept of space (the space of the economic system) to be derived mainly from a Newtonian epistemic framework. Harvey has bridged the Marxist social-material dialectic to rebuild a dialectic inferential relationship between movable and immovable bodies rather

than a dualistic one. The 'material entities' are bridged to the capital of different forms, endorsed with varying capacity to move or produce the built environment from the perception of 'impartial observers,' with their driving forces linked to the law of accumulation, internal to these social actors.

Lefebvre, Löw, and Thrift share the same insights to conceptualize the *process* of producing, constituting and assembling space, including its symbolic, material, and imaginative or atmospheric dimensions. Lefebvre's forms of space – the material, representational, and the perceived – are immediately derived from, and in correspondence to, the Marxist material-social dialect and the principle of alienation. Löw's theorization links the structuration approach to the Leibnizian framework. She bridges the epistemic form of the 'social actor' to the 'monad,' the social actors' *habitus* to *materia prima* and *materia secunda*. Following a structuration epistemology, Löw presumes that social actors learn about and reproduce social structures through processes of internalization and objectification. Löw introduces the epistemic form of social objects, conceived to entail symbolic and material dimensions. The agency of the social object is defined through its interlinking with social actors' two dimensions of the habitualized practices. The primary analytical dimension is perception (the operation of synthesizing) of the symbolisms, and the secondary one is practice (operation of building and placing out the material bodies). Furthermore, Löw connects the 'spatial structure' to the 'order of the possible world,' while acknowledging potential dislocations between one actor's synthesis and material placements. Both orders are conceived relative to the situated bodies.'

In Thrift's conceptualization of space, social bodies and objects are forged within multitudinous actions and interactions, conceived as more contextual than structural. Despite their similar commitments to constructionism principles, Thrift's and Löw conceptualizations are not convergent. They address distinct subject matters. Thrift addresses the 'space of flow,' or the interactive and transient spatial constitution in contingent practical contexts (e.g., dance). Moreover, Thrift addresses the spontaneous, responsive, and emergent aspects of social actors' relational agency, *more* than ritualized or repetitive. The primary level of analysis is put on the affective, pre-cognitive level. He has also advocated a flat ontology between the social and material and a weak epistemology. Therefore, movements and change are assumed to be caused by factors that are both immanent and external to the subjects who experience them. It requires the researcher to be both interpretive and objective in identifying the mechanisms behind social-spatial phenomenon. One also has to take both an artificial temporal and spatial halt in determining the range and processes of stabilization or destabilization.