‘To know is to know one’s geometry’ –
Reflections on the problem of inference in space syntax from
the viewpoint of a human geographer

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Pages: 1-18
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This paper reflects upon the theory and method of space syntax from the perspective of the discipline of human geography. It does so in order to address the question: what is problematic about space syntax from a social scientific point of view? In this context the paper seeks to answer a second question: what is new – indeed revolutionary – about space syntax? The discussion contrasts space syntax with mainstream architectural/planning practice, with examples taken from current urban planning projects in Sweden.

Introduction
In this paper I will reflect upon the theory and method of space syntax from the perspective of the discipline of human geography. Practitioners in the world of space syntax may be interested to understand the views of those in other disciplines, and I believe human geography is particularly interesting here, since our core interest is the relation between the physical environment and social processes – an interest which resembles that of architecture. What is problematic about space syntax from a social scientific point of view? In my attempt to answer this question I am primarily addressing that particular aspect of Hillier’s thought that informs urban design practice, and which has influenced work that focuses on urban modelling and rates of movement done after the publication of Space is the Machine in 1996. The text is an elaboration on my earlier contribution to JOSS (Westin, 2010), where I discussed why space syntax has been given relatively little attention from geographers. A second question that the text seeks to answer is: what is new – indeed revolutionary – about space syntax? When discussing this I contrast space syntax with mainstream architectural/planning practice, with examples taken from current urban planning projects in Sweden.

Space syntax as a remedy for ‘the impossible profession’?
The architect, as well as the urban planner in general, is the right arm of politics (Olsson, 1985). She or he is to implement politically formulated goals; to translate ideals into tangible reality. In fact, being fundamentally political, urban planning and architecture comprise one of the three professions that Freud (1976) characterised as impossible. That is, professions in which you can be sure to achieve unsatisfactory results (the other two being education and psycho-analysis). This view finds support in a quote from the Swedish architect Ivar Tengbom in 1911 (in Eriksson, 2001, p.172): ‘There are so many interrelated factors to take into account that the art of city planning stands out as the most demanding of all the arts; it is the sum of all architectural experience and knowledge.’

In everyday speech, a profession is synonymous with occupation, but if we look at its more precise definition we see that profession refers to an occupation based on ‘scientific knowledge and proven experience’ (Lundequist, 1991, p.64). Its purpose is to offer society specialised services and sound advice. Urban planning is a profession (whether you are trained as an architect, a sociologist or an engineer). There is, however, something rather

Notes:
1 Elements of this article were excerpted and substantially revised for the Journal of Space Syntax by permission of the Publishers from ‘The impossible profession’ (Chapter 4) and ‘The theory of space syntax’ (Chapter 6), in The Paradoxes of Planning: A Psycho-Analytical Perspective by Sara Westin (Farnham: Ashgate, 2014), p. 139–144, 161-194. Copyright © 2014. All quotes from Swedish titles are translated by the author.
arbitrary about planners’ ideas of how to implement their more or less immaterial and social goals. Take the aim of ‘creating urbanity’ virtually from scratch – a common goal in Swedish urban planning today and one that I have studied closely (Westin, 2014). Politicians, inspired by the discourse of sustainability since the 1990s but also by a general critique of modernistically planned suburbs, have decided that the functionally-separated modernist suburb is not the urban milieu of the future. The goal now is to create an attractive urban atmosphere which resembles that of the older, mostly nineteenth century, inner city of Stockholm, for example. First, this reveals a confusion as to what the term ‘urbanity’ really means. This frequently used word has, in fact, proved to be ‘one of the popular clichés of planning rhetoric’ (Svensson, 2004, p.77); it is used ‘routinely and without thought in almost every planning project’ (Lundström, 2002, p.4). Nevertheless, it is a beacon – not only for the majority of today’s urban planning projects in Sweden, but also for the education of planners. The fact that this term is both undefined and widespread is a frequent target of criticism, but it is hardly surprising; being a fundamentally political activity, the language of planning is made up of ‘empty signifiers’; that is, “comfort terms” … meaning everything and nothing; ideas that mean ‘all things to all people’ (Gunder and Hillier, 2009,p.2).

Secondly, it seems that planners do not really know how to build in order to create urbanity (if we, for the moment, agree to the meaning of urbanity as a kind of function or atmosphere most often found in city environments built roughly before the twentieth century; in the city centres of Paris, London and Stockholm for example). Just agreeing on the elements of urbanity is a challenge. ‘Urbanity means streets on four sides and closed blocks’, one planner may say. ‘We don’t want to do this’, says another. ‘Many people think that it is varied content that creates urbanity. But this is wrong’, says a third, arguing instead that ‘it is all about street axes and clear place formations.’ Common solutions to the problem of trying to create urbanity are to strive for density and to design buildings and public spaces so that they demonstrate a visual resemblance to the inner city. Materials and details of design are here seen as important tools in promoting an urban atmosphere. There are also attempts at renaming streets and places, to ensure that the project in question carries the word ‘city’. In sum, we see here how the planners put their trust in various symbols when trying to implement the goal of creating urbanity (see also Jacobs, 1992, p.13). This is hardly surprising given that most architects regard themselves as artists (Schorske, 1981, p.71, Zumthor, 2005, p.19).

Leone Battista Alberti, an artist who has had a great influence on architecture and urban planning (Choay, 1997), declared that the task of the Renaissance artist was to create some kind of illusion. More precisely, the artist should…Alpha

...draw with lines and paint in colors on a surface any given bodies, in such a way that at a fixed distance and with a certain determined position ... whatever you represent will seem to stand out in relief and exactly to resemble the bodies in question and in the same relief. (Alberti in Olsson, 2007, p.130f.)

Good art should thus strive to be effective by being affective, seem real rather than be real (Olsson, 2007, p.131; see also Cassirer, 2005, p.141f). And Alberti was an artist who was not content with interpreting the world – he wanted to change it, too. In light of this insight, the planners’ actions do not seem arbitrary. On the contrary, from the frame of reference of the Renaissance artist, it appears rational to trust the power of symbols when trying to invoke an atmosphere or a feeling – in this case, a vibrant urban atmosphere. But, wait! What about basing one’s actions on scientific knowledge and proven experience, which we saw is the require-
ment of a profession? If the artistic dimension is allowed to play such a large role in the architecture and planning profession, and if the artistic sphere is a sphere where it is impossible to maintain any ‘objectivity claims’ (Cassirer, 2005, p.141), can we still speak of it as a profession – like, for example, the medical profession?

The status of architecture in society is dual. It is a ‘social art’ meant for utility and social improvement as well as to promote beauty (Lundequist, 1989, p.91). It is both a profession and an art form. A profession, again, needs to be based on science, and the task of science – on the most general level – is to describe and depict reality (Molander, 1995, p.125). But the other side of architecture – which spells art – is about ‘showing personal expression and creating new realities’ (ibid). When we refine the double meaning of architecture like this, we see that the latter aspect is hard to reconcile with the former.

‘Social art’ is a rather curious concept. Hence it is not surprising to see that within the discipline of architecture there exists a kind of chasm between, on the one hand, artistically oriented practitioners, and on the other, theoretically oriented researchers. As Östnäs and Werne (1987) have noted, in Swedish architectural education, scientific thinking and systematic knowledge-building is de-prioritised in favour of professional training. And this, of course, has its downsides: ‘The lack of specialisation in any area of knowledge leads to an uncrirical and superficial approach to knowledge in general, and not infrequently to a contempt for knowledge among the students’ (ibid., p.27). The emphasis on artistic design encourages a release from external criteria and standards, stimulating instead the creation of one’s ‘own’ criteria (although all individuals are influenced by role models/teachers – especially, it seems, students of architecture). The knowledge imparted to students is largely tacit and intuitive: ‘Teaching is mixed with a development of taste, and in this process it is very difficult to separate one aspect from another – this applies to the discerning teacher as well’ (Sternudd, 2007, p.150). As Habraken (2005, p.1) puts it, ‘We know, deep down, when form is good.’ Silent, intuitive knowledge thus plays a critical role in professional practice, and this is why Lundequist (1991) calls the profession of architecture ‘incomplete’.

But, some may ask, isn’t modernism – the planning ideology that still characterises much of today’s planning – scientifically based? In the Swedish modernist manifesto accept! (1931), the authors speak warmly of the need to study cities scientifically, objectively, rationally (Asplund et al., 2008). Their faith in the ability of science to create a good life is well documented (Franzén and Sandstedt, 1993, p.145). ‘Go to the root of the problems; study the mathematics, statistics, logic of urban planning’, the Swedish modernist architect Uno Åhrén declared (1928, p.175). But as Choay (1997), Hillier (1996, p.65ff), Jacobs (1992) and Rådberg (1997) have argued, the claim that modernism is based on science is a myth. Moreover, attention was on how cities ought to function, not how they actually function. The kind of logical analysis made was a dissection of the problem of the city into four different categories: dwelling, work, recreation and transport, whereby these were used in the construction of new (versions of) cities. Science was primarily something the modernists alluded to in order to gain support for their ideas. Logic was used as an effective rhetorical tool – a smokescreen, if you will – to hide a (much more arbitrary) artistic vision and a moralising ideology.

That the artistic perspective – not the scientific-theoretical – is most prevalent in the education of architects is hardly surprising considering that it is the oldest. Architecture has been studied as an academic discipline since the Renaissance, and up to the end of the nineteenth century its nature has been more or less purely artistic. Thereafter, society’s view of architecture and the architects’ position
was affected by rapid technological development. In Stockholm, architectural education was moved in 1877 from the Academy of Fine Arts to the Royal Institute of Technology (KTH). It was believed that the architect’s social status would increase if she (or, rather, he) was trained at a scientific institution (Östnäs and Werne, 1987, p.23). However, the move was not without controversies; the discussion of whether architecture belongs to the sphere of art or science continues to this day, and both words – art and science – currently appear on the Institute’s logotype.

**Space syntax – A revolution?**

If architecture is an art, if it is a language that speaks to us humans, it is vague and polyphonic, to borrow a formulation from architectural theorist Björner Torsson (1995, p.39). It speaks not only to the eye but also to the body. By their very existence, buildings affect where we can and cannot go. And because people’s movements are crucial for how cities function – in this case how cities are used – this is of great interest if we want to learn more about the relation between urban form and urban life, between space and society. For if we study this relationship we can become better at using architecture as a means to achieve social goals.

This is how I read the message of space syntax. Here we see that space syntax means a revolution. Architecture and planning is still the right arm of politics – space syntax does not aim at changing this. What is new is the moving of focus from the eye to the body; from what the built environment signifies to what it does. Or, formulated in another way, the focus is put on architecture’s performative side rather than its representative side (Marcus and Koch, 2005). As several scholars have stated, architecture and planning are visual activities (de Certeau, 1984; Pallasmaa, 2005; Rasmussen, 1964; Söderström, 1996). From their ‘silent offices’ (Lefebvre, 1991, p.6), the modernist architects described their heavy concrete buildings as floating and likened their walls to membranes – as if the buildings did not have anything to do with physicality. As if they did not affect people in their daily lives. As if it was only through the eyes that architecture would evoke emotion.

Space syntax, by contrast, is a scientific paradigm. It is rooted in a feeling – one which can be described as a sense of contradiction between what the eyes observe and what the body experiences. Hillier describes his starting point (in Westin, 2011, p.232):

‘My starting point was in the 1960s when they were building visually very exciting housing estates. I thought it was the best architecture that had ever been, it was very exciting. And then when you went into the places, you got this terrible sense that life was not worth living. There is something completely wrong here. And space syntax originated in trying to understand that. That feeling of “Oh, my God! I can’t bear this – this is wrong!”’.

Lars Marcus too started out with a feeling. Although he himself does not dwell on the fact but frames it more neutrally, it was a feeling of disappointment and confusion that made him embark on a study of how the new ‘city-like’ areas (really) work. His suspicion was that ‘city-like building’, which had and has dominated Swedish urban planning since the 1980s, ‘was not what it was said to be, namely, a revival of traditional urban form and its qualities’ (Marcus 2000b, p.38). If modernists argued that the functional is the beautiful, it seems that today’s architects – Marcus writes (2000a) – think that the beautiful is the functional. ‘Both claims are nonsense and in equal measure threaten architects’ credibility’ (ibid.). Echoing the message of Jane Jacobs (1992, p.12), Marcus (2000a) continues: ‘I simply believe that time has come to discuss the knowledge content of the profession.’

So it is that space syntax theorists have spent the last four decades trying to clarify the relation
between the form of the city, on the one hand, and the life of the city on the other. Briefly put, the aim is to strengthen the knowledge of the performative phase in the architect’s work, that is, how the form might function. Architects usually have very good knowledge of the generative phase – the phase where the architect uses her or his artistic creativity to come up with new solutions (Hillier, 2007, p.46). Think about the gap between drawing and building; as John Dewey (2005, p.53) has argued, architects are handicapped relative to other artists due to this gap. The architect has no way to know how the building that she or he is drawing will be experienced in reality (see also Evans, 2003, p.7, p.156; Lawson, 1997, p.25; Rasmussen, 1964, p.14). Space syntax is the first architectural theory to seriously take on the challenge of bridging this gap, and thus – if you will – making the profession complete. It is logical then, that space syntax is labelled ‘evidence-based design’ (Hillier and Sahbaz, 2008; Stonor and Stutz, 2004).

**Some problematic aspects of space syntax**

**Measuring the Social**

If we now turn to the problematic sides of space syntax, one of the most obvious – from a social scientific point of view – is that it is a scientific theory seeking to answer questions related to the social world. In order to measure aspects of the social world scientifically, these must first be operationalised into quantitative processes before they are mathematically related to the quantity of things that make up urban form (see Marcus, 2000b, p.44f). As Olsson writes: ‘[C]ertainty is in spatial form. Ambiguity is in human action’ (Olsson, 1974, p.53). Briefly put, one can say that the social sciences study subjects and social relations, while the natural sciences (i.e. the original sciences out of which the social sciences grew) study objects (Skjervheim, 1996, p.5). In other words, the former study subsisting phenomena and the latter existing phenomena. ‘Subsist’ is here used as an opposite to ‘exist’, ideas and meanings subsist, i.e. they are not tangible, while things and signs exist – they are tangible (see Olsson, 1980). Moreover, social scientists are themselves a part of what they study (the constantly fluctuating phenomenon of society), while this is not true for natural scientists. Furthermore, natural scientific investigations involve procedures of extensionality, which means that the intentionality aspect of humans as social beings is excluded (MacInlyre, 2007, p.7; Israel, 1971, p.343; Laing, 1967, p.53).

Although this difference is roughly described, it can be illustrated by how human geographers and architectural theorists define space. In short, geographers tend to emphasise the social, political and mental aspects of space, while architects generally treat space as an absolute object, with a physical-geometrical extension (see Coquilhoun, 1989, p.224). ‘Space is not a scientific object’, states Lefebvre (in Soja, 1980, p.210) – one of the main sources of inspiration for the perspective on space that has dominated the discipline of geography for the past decades. The architectural view applies to space syntax; space, as we have seen, is given an autonomy that allows it to be analysed on its own terms; it is made into a scientific object. This view is at once abstract and concrete: concrete since space is seen as something material, as a thing with a certain shape and dimension, but abstract since space is taken out of context – onto the drawing board or the computer screen, disconnected from human experience (Kärrholm, 2004, p.17ff).

Hillier opposes a division between the natural and the social sciences: ‘For me, it is not even a question’ (in Westin, 2011, p.233). But I insist: this distinction is important, as it encourages us to reflect on what reasoning rules we use. ‘Know thyself!’, as Socrates exhorted the earliest philosophers (in Barrett, 1962, p.4). In short, a scientific approach to knowledge involves the belief that what is not pos-
sible to reify does not exist. Or at least we cannot say anything universal about it; it is only in regard to countable things that we can achieve the goal of science – that is, absolute and certain knowledge (MacMurray, 1957, p.36). However, this inevitably implies a view of man as a billiard ball, to use R.D. Laing's metaphor (1967, p.53). 'All modern science is ... founded on the postulate of the mindlessness of things. If this postulate appears rather well founded in physics ..., it is not so in biology (nor a fortiori in the social sciences)’ (Thom, 1979, p.19).

Space syntax's ambition to try to explain the relationship between the city's tangible and intangible dimensions is an ambition coloured by positivism; a school that has traditionally attempted to translate long-lived philosophical problems – such as the relationship between res extensa and res cogitans – into an empirical language that can be comprehended (Livingstone, 1992, p.319). A challenging task, to say the least. Hillier (2007, p.138) writes: '[T]he very idea of “architectural determinism” – that buildings can have systematic effects on human behaviour, individually or collectively – seems to lead directly into the quagmire of mind-body problems which have plagued philosophy for centuries.'

In philosophy and in the social sciences there is an established tradition which argues that the social sphere cannot be studied with the same methods as those used in the natural sciences (see for example Cassirer, 1972; Skjervheim, 1996; Flyvbjerg, 2001; Giddens, 1996; Ollman, 2003). This position involves a critique of the orthodox view of what social science is or should be: a copy of the natural sciences (see Giddens, 1996). To better understand why the positivist claim ‘if A, then B’ is not so suitable for understanding human processes, we can look at the fundamentally human phenomenon of improvisation. Anthropologist Michel de Certeau (1984, p.98) points to this when he likens the walker with Charlie Chaplin, '[who] multiplies the possibilities of his cane: he does other things with the same thing and he goes beyond the limits that the determinants of the object set on its utilization.' The improvisational aspect of humans is what makes us 'the most unpredictable of animals'. (Kalin, 1974, p.114), and this is disregarded when one considers man as res extensa. The path I choose to walk today is not the path I choose to walk tomorrow: 'If bodies are objects or things, they are like no others', writes Elizabeth Grosz (1994, p.xi) and continues: 'Bodies are not inert; they function interactively and productively. They act and react. They generate what is new, surprising, unpredictable.' Or in the words of Arthur Koestler (1967, p.202), 'By the very act of denying the existence of the ghost in the machine – of mind dependent on, but also responsible for, the actions of the body – we incur the risk of turning it into a very nasty, malevolent ghost.' 'Ghost in the machine' is an expression borrowed from Gilbert Ryle as a metaphor for the human mind.

One of the ideas behind space syntax is that if we generate enough knowledge about the configurational aspect of the constructed environment, it is possible to predict the social effects of architectural form (Hillier, 1996, p.378). '[O]ur objectives are clearly instrumental – we want to explain exactly what causes certain effects, so that we can develop tools possible to utilise in future practice' (Marcus, 2000b, p.44). Or, as Hillier explains, 'Any theory about how we should act to produce a certain outcome in the world must logically depend on some prior conception of how the world is and how it will respond to our manipulations' (Hillier, 2007, p.42). He also writes, 'By changing the design of a building or complex, we do change outcomes. There is, after all, some kind of mechanism between the built world and people' (Hillier 1996:390f). The choice of words in these quotes reveals a view of humans as a kind of stimulus-response mechanisms (Livingstone, 1992, p.338), which, in turn, reminds us of the tendency of behaviourism to emphasise the causal role that external stimuli have on human behaviour. The
words and expressions used by some space syntax researchers (‘response’, ‘manipulation’, ‘objectivity’ and ‘prediction’), are a direct legacy of behaviourism – the psychological tradition that is modelled after the natural sciences. Behaviourism is imbued with the idea that human behaviour is considered as an environmental product, and behaviourists tend to limit themselves to the study of phenomena that are quantitatively measurable. A distinction is made between man as an internal, subjective world and man as an outer, objective world, and the focus is on the latter. In behaviourist John Watson’s words (in Koeptler, 1967, p.5), ‘[T]he time has come when psychology must discard all reference to consciousness … Its sole task is the prediction and control of behaviour; and introspection can form no part of its method.’

Behaviourism is a loaded term: it has endured much criticism since its introduction in the early twentieth century; it has even been pronounced dead (Smith, 1986, p.333). But behaviourism is a form of understanding that permeates much of our technological civilization (Asplund, 1979, p.264). Its goal is ‘the measurement of behavior by quantitative methods, and the control of behavior by the manipulation of stimuli’ (Koestler, 1967, p.8). To refrain from criticising this tradition just because it has been criticised so many times before would be to refrain from questioning a chief aspect of the society we live in.

Although we humans at one level are stimulus-response mechanisms (for example, if we want to leave a room and there is only one exit, we use this exit), this is not our entire nature. What we miss when applying a behaviouristic approach is the fact that our behaviour is affected not only by external stimuli but by internal stimuli as well; the thought aspect affects the body aspect and vice versa (Merleau-Ponty, 2002). If we perceive a certain environment as frightening, we go a roundabout way; that is, that which we consciously or unconsciously perceive affects how and where we move our bodies (see for example Frers, 2007, p.26). The point I want to make can be summarised as follows: man’s intentional aspect very much affects the city’s functional aspect.

In its most general form, space syntax – when it is developed and/or used as a basis for urban design practice – is a science of prediction and control of social processes. In other words, it is a technology. Here, I adopt a definition of technology as instrumentality; it is about the applying of means to achieve ends (Heidegger, 1977, p.5). All technologies are control systems (but all control systems are not necessarily technologies) (Asplund, 1979, p.269). Proponents would perhaps oppose the description that space syntax is about designing more effective strategies for the prediction and control of human behaviour, as this task is often negatively associated with modernist social engineering. Social engineering today can be considered ‘softened’ because it takes into account human intentionality (see Montello, 2007), but its philosophical foundations remain the same. If the objective is explanation and/or prediction, which requires certainty, one must take note of what can be measured; of man as res extensa. That is, one must consider man as an object.

What I am drawing attention to here is the fact that there are aspects of a shared intellectual tradition between Hillier’s thought, on the one hand, and behaviourism, on the other. Again, behaviourism is a loaded term, but it merely expresses a principle of the Enlightenment that has become part of the social order (MacIntyre, 2007, p.84). This principle is so embedded in both science and politics that it is barely recognisable. Its hallmark – then as well as now – is its control interest. The word ‘control’ is often associated with negative connotations, when it is interpreted as ‘to hold down’ or ‘to dominate’. But it also means ‘to master’ something, and this is what the scientific development of a technology is about.
Using scientific or other organised knowledge for practical purposes – that is, instrumental rationality – is the very definition of technology but also of (urban) planning (Weber, 1994). One possible explanation for the viability of behaviourism is that it is nourished both within and outside academia. First, it embodies a positivist understanding that produces clear results, and second, it constitutes an effective instrument for the state. In the words of geographer R. J. Johnston (1989, p.62), ‘Empirical science is presented in the ideology of most modern societies as a powerful tool in the promotion of societal well-being. Against this, some argue that it can be used by powerful groups within a society to promote their particular interests; it gives them greater ability to control.’ From this discussion it should be clear that science – despite being different from the sphere of politics – is based on preconceptions of the world and of human beings, which challenges the idea of it being an anti-ideological perspective. For example, to assert that one is ‘only’ considering human behaviour in a ‘neutral’ and ‘objective’ manner – that one only regards man as res extensa – is to endorse the treating of man as an object. And this is an ethical decision, whether acknowledged or not. And the ultimate consequence of such an ethical stance is a manipulative social technology (Israel, 1980, p.20).

Space syntax and the problem of inference

In urban planning for a busy street life, for urbanity – a typical goal of contemporary Swedish urban planning – space syntax offers insights into prerequisites for ‘used space’ (Hillier, 1996, p.170). And ‘used space’, or ‘co-presence’ (Hillier in Westin, 2011, p.231), is an essential aspect of the phenomenon of urbanity (see also Hannerz, 1992, p.203; Jacobs 1992, p.150f; Whyte, 1990, p.9). More specifically, space syntax presents evidence that used space, i.e. a busy street or square, requires a certain type of spatial configuration. To claim that urbanity assumes used space and that used space, in turn, requires a certain spatial configuration is to physically-spatially define the urban. It means making inferences from process to form. But is it also possible, as Hillier seems to suggest, that a certain spatial configuration generates used space and that used space is more or less the same as urbanity? In other words, is it possible to make inferences in the opposite direction, from form to process?

This question points to an essential human geographical problem – with a corresponding epistemological history. In short, one can say that the optimism for solving the problem was strong in quantitative geography in the 1950s and 1960s – an optimism that came to an abrupt end in 1968 (Olsson, 2002, p.252; 1974, p.52; see also Johnston, 1997). At this time, new insights were made into the relation between theoretical-mathematical statements and social reality – insights distilled by Gunnar Olsson (2002, p.252): ‘Although it is sometimes possible to reason from process to form, moving in the opposite direction is never appropriate; even though two plus two normally equals four, four can equal anything, including two plus two.’ The point can be expressed differently, borrowing from Nassim Nicholas Taleb (2007, p.53): ‘All zoogles are boogles. You saw a boogle. Is it a zoogle? Not necessarily, since not all boogles are zoogles.’

That space syntax analyses can bring confusion rather than clarity is something Carlo Ratti (2004) has shown. For example, he points to the ‘unacceptable situation’ where one single urban configuration produces two conflicting outcomes when analysed with space syntax tools (Ratti, 2004, p.487). However, it is interesting that Ratti – despite his acknowledgement of anomalies and contradictions – does not seem to doubt quantitative techniques in explaining and predicting social outcomes of physical forms; on the contrary, the problem can indeed be solved – if only computer technology improves: ‘[N]ew algorithms might allow a deeper un-
derstanding of urban texture [that] would contribute to answering the fascinating question which space syntax has helped to frame: what is the influence of urban configuration on social life? (ibid.).

A similar optimism is shown by Daniel Montello (2007), an environmental psychologist. The following quotation conveys a trust in the strength of closed experiments and in their ability to eliminate the ambivalence that characterises all forms of ‘causal circularity’:

Problems of causal circularity or ambiguity when applying space syntax to extant places will be disentangled with research on created environments, real or virtual. Manipulating actual built environments is possible, but quite difficult and expensive (except for modest environments built inside large rooms), so the possibility of studying space syntax and other aspects of environmental psychology with virtual environments has great appeal and has attracted quite a bit of attention. Some research on space syntax with virtual environments has already been done …, but much more is called for. (Montello, 2007, p.8.)

As planning theorist Anders Gullberg (1986) has highlighted, when faced with the difficulties of evaluating the ‘effects’ of planning initiatives, many researchers try to close the system, that is, to make empirical studies in a limited area in space and time. In other words, they attempt to mould research to fit the scientific standards, with dubious results: ‘Conventional scientific wisdom raises the experiment as the method to gain knowledge of causal relations’ (ibid., p.93). ‘But’, he continues, ‘the quest for closure of a un-closable system steers the theoretical and methodological efforts in a futile direction’ (ibid., p.145). The very idea of the experiment is based on the assumption that the results produced in a particular here-now can be transferred to a not-here and a not-now, that inferences can be made from one event to multiple events and from multiple events to all events. Philosopher Ernst Cassirer (1956, p.41) calls this assumption ‘questionable and precarious’, for the making of such inferences results not so much in an extension of the time-spatial realm (from a here-now to a not-here and a not-now), but in a complete abolishment of this realm. The progress made in an experiment has not taken place in the here-and-now in which we live, but in another dimension – a theoretical one. It is this change of dimension that characterises the formulation of scientific laws (ibid., p.41f). The most problematic aspect of this process – and the criticism I present here concerns induction-generated knowledge in general – is that it is backward-learning. The problem is old, as summarised by Taleb (2007, p.40):

‘How can we know the future, given knowledge of the past; or, more generally, how can we figure out properties of the (infinite) unknown based on the (finite) known?’

The discovery of the inference problem shook the foundations of the geography discipline (see Barnes, 2004, p.589), as it beat against its main claims: that spatial analysis leads to knowledge of human behaviour. Olsson (1984, p.82) reflects on these ideas when looking back on what he and other quantitative geographers had been engaged in:

What I and some others were searching for was the truth of human spatial interaction. Our ambition was to catch that truth in the most precise net we knew, that is to translate statistical observations into the clear and non-ambiguous language of causal relations … We were after the kind of ‘truth’ that is necessary for the construction of an optimal world.

And he continues:

‘[R]eality was more evasive than our naïve minds had been taught to believe.’

As we have seen, proponents of space syntax in urban design practice are optimistic about the task of deriving a social process from a material form – provided that the road goes through spatial configuration. This idea, among others, emerged
during my (SW) interview with Hillier (BH) in spring 2008 (Westin, 2011, p.234f):

SW: [I]s it then possible to draw the conclusion that it is possible to predict the outcome of a certain form? If we want to, let us say, create an urban atmosphere, to create urbanity, is it possible to - through the form - create that?

BH: Yes. Yes, you can do that.

SW: If you have the knowledge.

BH: Yes, if you have the knowledge it is not even difficult.

Marcus (2000b, p.52), however, expresses some hesitation on the matter:

[S]peaking about the cause and effects regarding the relationship form-function earlier, we said that built form was the cause and functional outcome was the effect. On reflection, this is absurd, as it would entail that we, for example through building certain spatial forms, like an ‘urban grid’, would be able to generate certain social outcomes, like an ‘urban city life’, in the middle of a desert. What is active obviously are people and their actions; in the end it is people who give meanings and functions to built form, and the latter can only create opportunities in one or the other direction.

In some of Hillier’s statements, too, one can discern a hesitation when it comes to raising space syntax analyses to the rank of resolute theses. For example, he cautions, ‘Space syntax gives a partial and incomplete view of the relations between human beings and their created environments’ (Hillier, 2005, p.12). Still, reservations of this kind run the risk of being overshadowed by expressions like cause-effect (Marcus, 2000b, p.44), mechanisms (Hillier, 2007, p.139), spatial laws (Hillier, 2002, p.154), and evidence-based design (Hillier and Sahbaz, 2008; Stonor and Stutz, 2004). As philosopher of science Carl Hempel (1942, p.41; 1966, §5.3) teaches us, if you speak about laws, the problem can, strictly speaking, not be a matter of probabilism, but determinism. For what is a law if it can only be applied sometimes? And, correspondingly, if you speak about probabilism, as Hempel (ibid.) underscores, it can hardly be a question of a general law.

Let us look at an example:

[If] Tommy comes down with the measles two weeks after his brother, and if he has not been in the company of other persons having the measles, we accept the explanation that he caught the disease from his brother. Now, there is a general hypothesis underlying this explanation; but it can hardly be said to be a general law to the effect that any person who has not had the measles before will get them without fail if he stays in the company of somebody else who has the measles; that a contagion will occur can be asserted only with a high probability. (Hempel 1942, p.41.)

Although not all scientific explanations are based on laws of a strictly universal type (Hempel, 1966, §5.4), it seems somewhat confusing, as Hillier (for example 2007, p.7) does, to talk about spatial laws while rejecting, as he does, the idea that these laws would be deterministic (see the second block quote below); then the concept of law is deprived of its specific characteristics. This also applies to the reverse argument: accepting determinism while rejecting the idea of laws. As Hempel (1942, p.46, emphasis removed) concludes, ‘[T]he use of the notions of determination and of dependence in the empirical sciences, including history, involves reference to general laws … [T]o speak of empirical determination independently of any reference to general laws means to use a metaphor without cognitive content.’

If we look at what Hillier means by the term ‘spatial laws’, we realise that he refers to laws that apply sometimes: Alpha

The concept of spatial ‘laws’ is critical … so we must explain what this means. Spatial ‘laws’, in the sense the term is used here, does not refer to universal human behaviours … but to ‘if-then’ laws that say that if we place an object here or
there within a spatial system then certain predictable consequences follow for the ambient spatial configuration. Such effects are quite independent of human will or intention, but can be used by human beings to achieve spatial and indeed social effects. Human beings are bound by these laws in the sense that they form a system of possibilities and limits within which they evolve their spatial strategies. However, human agents decide independently what their strategies should be. Like language, the laws are then at once a constraining framework and a system of possibilities to be exploited by individuals. (Hillier, 2002, p.154, my emphasis.)

He also writes:

Architecture is law governed but it is not determinate. What is governed by the laws is not the form of individual buildings but the field of possibility within which the choice of form is made. This means that the impact of these laws on the passage from problem statement to solution is not direct but indirect. It lies deep in the spatial and physical forms of buildings … (Hillier, 2007, p.7, my emphasis.)

As we see, it seems as if Hillier wants to soften the law concept by saying that the kinds of laws he is talking about are not ‘of a deterministic kind’ (Hillier, 2007, p.22). At the same time, as we saw earlier, he says that space syntax aims at elucidating the city’s underlying regularities. And if you talk about regularities, you – again according to conventional theory of science – indirectly assume that they are governed under general laws. In the words of Hempel and Oppenheim (1948, p.136),

[T]he explanation of a general regularity consists in subsuming it under another, more comprehensive regularity, under a more general law … [T]he validity of Galileo’s law for the free fall of bodies near the earth’s surface can be explained by deducing it from a more comprehensive set of laws, namely Newton’s laws of motion and his law of gravitation …

That there, behind the regularities generated by the built environment, lies some kind of law, is shown in the following quotes by Hillier (2007, p.67, p.338): ‘Examining the space-time regularities of the phenomena generated by abstract artefacts, we cannot fail to note one overwhelming consistency; that they seem to be governed by pattern laws of some kind’, and, ‘The relation between spatial and social forms is not contingent, but follows patterns which are so consistent that we can hardly doubt that they have the nature of laws.’

The main finding of space syntax (in particular that aspect of space syntax which informs urban design practice) is that ‘the structure of the urban grid considered purely as a spatial configuration is itself the most powerful single determinant of urban movement, both pedestrian and vehicular’ (Hillier, 2007, p.113). ‘[T]his relation is fundamental and lawful …’, Hillier writes (ibid.) and continues: ‘Urbanity, we suggest, is not so mysterious. Good space is used space. … [H]ow the urban system is put together spatially is the source of everything else’ (Hillier, 1996, p.169f). Hillier can be likened to Socrates, who claims to know how to ‘correct the world by knowledge, guide life by science, and actually confine the individual within a limited sphere of solvable problems’ (Nietzsche in Megill, 1985, p.56). In this respect, the rhetoric that Hillier uses is not unlike that of the modernists, who called for ‘[e]xact problems, exact solutions’ (Åhrén, 1928, p.174), and who argued that it is ‘strange that an area of human activity, where the conditions are very much rationally comprehensible and measurable, to this day has escaped to become science’.

Space syntax techniques may help planners solve the problem of how to generate ‘used space’, but ‘used space’ is merely one prerequisite for urbanity; it does not guarantee it. When it comes to clarifying the relationship between built form and social diversity, for example, even the most advanced spatial analysis falls short. For example,
many of the spaces of today’s gentrified areas have a relatively low social and cultural diversity – despite their being well used.

Science is a negotiable entity (Livingstone, 1992, p.307). Knowledge, in general, is as self-referential as its own language (Olsson, 2008). This is especially evident when it comes to how space syntax advocates and social scientific theorists look at the question of ‘what comes first?’ Is it – crudely put – space or social processes? According to Hillier (2007, p.140), it is the urban structure that constitutes ‘the fundamental source of the multi-functionality that gives life to cities’, which is why he ‘[is] trying to detect society through space, in contrast with most commentaries on society and space which typically look at society and try to detect its output in space’ (Hillier and Netto, 2002, p.13.3). ‘Space precedes function’ is the summarised message of space syntax (Klarqvist, 1993, p.12). Although social scientists sometimes express the desire to study the outcomes of social, economic and political processes in space – which is a kind of reverse determinism – a recognition of the interaction that exists between the social and the spatial is more common; in other words, a recognition of a dialectical relationship between the material environment and the immaterial social structures (Tonboe, 1985). ‘The spatial structure partly reflects and partly determines the social structure’, sociologist R.E. Pahl (1975, p.147) writes. Others that express this idea include Harvey (1989), Castells (1977) and Soja (1980), but also Simonsen (1993) and Pløger (1997). All of these urban theorists reject the idea that space can be studied in its own right, that space has an explanatory value in itself when it comes to understanding social processes. For example, if we look at human geographer Per Gunnar Ree’s (2007) study of the emergence of so-called mini-cities in Oslo’s suburbs, we see that he explains this not by referring to space but to socio-cultural processes and practices. These ‘mini-cities’ often show greater diversity than the segregated western parts of Oslo’s city proper. As for the underlying forces behind this, he points to cultural factors, changes in cultural policy and the new practices and materialities linked to these practices. Overall, the study points to how a range of factors, especially the residents’ practices, can affect urbanity’s existence or non-existence. What you see depends on where you stand – the geographical inference problem in a nutshell.

‘To know is to know one’s geometry’ – concluding remarks

As shown above, my main objection to space syntax is that it overlooks the inference problem and that it overlooks the fact that the social sphere – urban life – is difficult to grasp using a (natural) scientific approach. The ceaseless auto-correlation that exists between the material and the social makes it impossible to explain cause and effect in the processes that mould and characterise (urban) space. There are simply too many variables that elude us (Bergman and Mannheimer, 1974, p.331). Some phenomena we can be more or less good at predicting, but the fact remains that ‘predictability does not entail explicable’ (MacIntyre, 2007, p.103). Referring to space syntax as ‘evidence-based design’ is debatable, since it implies a view of the future as being ‘obvious to the mind or eye’, using the etymological meaning of the Latin word evidens. The term ‘evidence-based design’ provides a semblance of certainty, of ‘deductive certainty’ rather than ‘near-certainty’ or ‘high probability’ (see Hempel, 1966, §5.4).

Having said this, it is also possible, even desirable, to use a different word and say that space syntax defies – not overlooks – the inference problem and that it defies the fact that we cannot grasp the essentially ungraspable. For without categories and definitions, both thought and action are confused (Nietzsche, 1968, §521; Lefebvre, 1995, p.121). In Olsson’s words (1980, p.11e, p.121b), ‘As in other
instances of the human condition, tragedy captures the pattern. We are damned if we do and damned if we don’t … [T]o argue that something cannot be achieved fully is not the same as to advocate fatalistic inactivity.’

What I want to say is that space syntax’s problem, paradoxically enough, is also its strength – a conclusion reminiscent of Aristotle’s point that what one cannot do perfectly, one must do as well as one can (Olsson, 2007, p.xii). As Shakespeare’s Hamlet teaches us, understanding kills action; action requires that you are wrapped in an illusion (Nietzsche, 1999, §7). It may also be that social scientists – like city planners – have to assume that the city in some respects is a cause-effect system, whose syntax can be clarified. Although we cannot fully explain the relationship between urban form and urban life, we can at least increase our ability to make good predictions.

Although space syntax is a mathematical approach, it would be misleading to claim that it is all about quantities. The parallel to geography’s quantitative revolution is inevitable (Soja, 2001, p.1.1). ‘[I]t was not the numbers that were important’, Peter Gould (1999, p.86) writes when describing this revolution, ‘but a whole new way of looking at things’. This new way of seeing was a scientific way, which, with the help of Alfred North Whitehead, can be defined as ‘to see what is general in what is particular and what is permanent in what is transitory’ (in ibid.).

Space syntax graphic axial and segment maps can be interpreted as rhetorical tools, which allow us to – figuratively speaking – go below the surface of the city and discover the underlying principles behind its organisation. For as Hillier has explained (in Marcus, 2008, p.135), ‘The extraordinary thing about cities is not that they are so different but that they are so alike.’

This is also where space syntax’s most crucial – indeed, revolutionary – contribution is to be found. To urban-planning discussions, space syntax contributes to a shift in focus from architectural style, aesthetics and symbolism, to what can be done between the buildings. ‘[T]he superficial appearance of the environment is nearly completely ignored by space syntax, including surface colors, textures, and patterns … Space syntax says little or nothing about properties of layout other than connectivity’ (Montello, 2007, p.8, p.7). Unlike many practising architects, who – in the spirit of Palladio – focus on individual houses and places (Habraken, 2005), space syntax aims at illuminating the bridge that connects stones and people. Instead of trusting more or less unfounded speculations about what kind of forms generate urban life, space syntax offers tools to investigate, at the very least, which forms that counteract it. And, it must be added, the realisation that urbanity is about co-presence, rather than ‘city-like’ roofing materials, is promising – at least if one considers the issue from the point of view of the flâneur, who cherishes the crowd and its promise of capricious moments of friction (see for example Baudelaire, 1995, p.5, p.9; Benjamin, 1999, p.10).

When contemplating Marcus’ (2010) cities. For as Asplund (1991, p.59) has noted, Jacobs’ quest was ‘to keep Gesellschaft intact’. Jacobs (1992) and Hillier (1996) advocate a form of ideology of urbanity, if you will. They do not want to steer people away from each other in different insulating compartments; rather, they want to encourage clashes, collisions and exchange of ideas, activities that in the broad sense can help to transcend boundaries.

To social-scientific urban studies, space syntax’s theoretical contribution includes a (re)focusing on the city’s material dimension. For even if the built environment by no means determines how people interact with each other, it unmistakably opens up as well as shuts down opportunities for social interaction. This fact has been neglected in humanistic inspired human geography.
In retrieving man from virtual oblivion in positivist science, humanists have tended to celebrate the restoration [of man] perhaps too much. As a result values, meanings, consciousness, creativity, and reflection may well have been overstated, while context, constraint, and social stratification have been underdeveloped … (Ley, 1981, p.252.)

In conclusion, the aim of my critique of space syntax has not been to ‘falsify for the sake of rejection’ but rather to ‘falsify for the sake of creative understanding’, to borrow a formulation from Olsson (1960, p.18b). Or in the words of Elisabeth Hermodsson (1968, p.14), ‘To critically review – instead of forever chanting – the principles of science, does not, of course, mean a disapproval of science in general.’

When it comes to understanding the city, the urban and the relations between them, it seems that space syntax-based design practitioners are looking to solve one puzzle, while dialectical social scientists are seeking to solve another. The former emphasises certainty, the latter ambivalence. However, most often the respective camps do not clarify the underlying rules that govern their thinking. So it is that some are talking about apples and some about oranges, while everyone believes that everyone else is talking about the same thing. As Soja (2001, p.1.6) has noted, ‘Sharing a common spatial language does not always lead to a common understanding.’

Here we could stop and conclude that it is precisely because of this that everyone might as well continue on the track that each discipline has created; we live in incommensurable realms of thought and cannot learn from each other. In fact, the opposite is true. For it is only in light of another’s reasoning rules that we can get a clearer picture of our own. As Plato knew: ‘[T]o know is to know one’s geometry’ (Olsson, 2007, p.103).

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