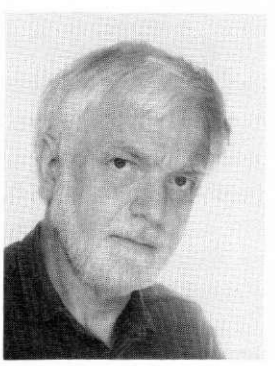
Search for a Design Strategy

by Björn Klarqvist



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This is a search for the hidden design strategy in the plan pattern of the Skintebo Neighbourhood. What design principles, besides the given standards, have architects and planners employed when they locate play spaces? I use the Space Syntax Analysis to read the imprints. Different hypothetical design strategies are tested.

TO DESIGN for instance a detail plan for a dwelling area you have to take many decisions, which means that you use a design strategy. First you have to take into consideration all the given things, e.g. the topography, the interfaces to the surroundings and the brief. You have also many planning guidelines given by the State and different authorities, which in a way are sets of design principles. To that the planner adds a whole bunch of examples of built up areas and plans learned from personal experience, through education or from magazines. During his or her practice the planner develops a design strategy to handle all this to assemble the plan pattern. The strategy is to some extent personal and is not easy to reveal, because it is tacit knowledge. The problem is that this knowledge is often tacit to the designer also.

In this paper I will explore a way to understand design strategies through analysing the result of a plan process, i. e. the plan pattern. My belief is that a plan layout is basically a result of spatial logic related to social intentions. To that end I exploit a method developed by Professor Bill Hillier and his colleagues in the Bartlett School of Architecture and Planning, London. It is called Space Syntax Analysis and is described in *The Social Logic of Space* (Hillier & Hanson, 1984). By applying the method to a case I will try to deduce how the planner might have reflected upon the design problems he or she faced. I concentrate in this article upon the distribution of play spaces.

Installation	Accessibility (walking distance, metres)	Net area, square metres	No. of children aged 0—15 within the area of influence	No. of children dimensioned for
Play space within the neighbourhood play area	—200	2,000—4,000[1]	—200	
Including:				
Small playground for infants	—50	150—200	—50	10
Larger playground for infants	—50	300—500	50—100	25
Play parks				
Small play park	—300	2,000—4,000[1]	—1,000	50—150
Large play park	—500	6,000—	—1,500	100—300
Football pitches[2]				
Gravel pitch	—300	1,000		10—20
Grass pitch	—300	3,000—5,000		10—20

[1] The higher figure may include a gravel football pitch situated within the play area or the play park.
[2] Separate or part of the play area, a play park or a sports ground.

Table 1. Recommended values for the dimensioning and location of play spaces. (*Barns utemiljö*, p. 166.)

Official guidelines for play spaces

The plan standard for play spaces was first set by the Swedish National Board of Housing in their publication *Good Housing 1960* and further developed in the 1964 version (*God bostad* 1960 & 1964). A few years later an official report launched a proposal for new guidelines, *Children's Outdoor Environment* (*Barns utemiljö*, 1970). The proposal sets the maximum walking distance between the playground and the doorway, the suitable number of children playing at the same time, maximum number of children on each playground and the net area for each type of playground.

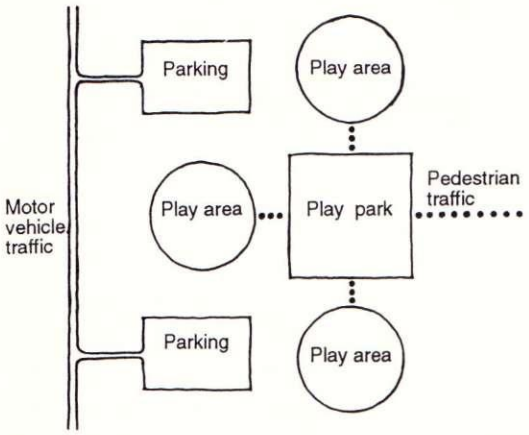

Fig. 1. Skeleton diagram of the play spaces and traffic system in the residential district. (*Barns utemiljö*, 1970, p. 17.)

The report suggests that play areas should be designed to be more attractive to children than unsuitable and dangerous places. Traffic separation is an important design principle here. Playgrounds should be separated from vehicle traffic and be connected to the pedestrian system. Play areas for young children should also be located in sight and within earshot of the dwellings.

The National Board of Planning and Building was the authority, beside National Board of Housing, that had to transform the proposals given by the official report. The most comprehensive and detailed statement about the design of dwelling areas so far is the report *Housing Environment.* A few years later it was condensed into guidelines (*Bostadens grannskap*, 1972 & 1975).

These guidelines are mainly concerned with dimensioning, walking distance and equipment. Standards tend always to favour the measurable qualities. Though if the planners read the texts in reports and guidelines carefully they will get an idea of why the Swedish authorities think play spaces are needed and how they should be located in relation to other functions.

The social intentions of the State

A quotation from the official committee reflects some of the social intentions behind the proposed guiding principles.

> It is one of the fundamental interests of society that residential areas should be planned so that the children may play under circumstances that are as free and safe as possible. - - - A child's natural radius of action is shortest in the pre-school years and is extended little by little. Observations of play habits of pre-school children have shown that these children generally keep within a radius of about 100 metres from the entrance to their own house. An increasing radius of action depends on increasing mobility, an increasing repertory of games and growing independence. (*Barns utemiljö*, 1970, p. 165.)

We can understand that some of the social intentions put down by the State have their basis in the theories developed by child psychologists (e. g. Piaget).

> Contact between people is an essential condition for human development. Contacts are not originated just because we see other persons nor by having many people around. We need common experiences to come into contact. The more common ground we have the better the requisites are for deeper contacts. The built environment can support or hinder contacts. Traffic planning and the distribution and design of the neighbourhood activities and services are of importance for how the social network is shaped. (*Bostadens grannskap*, 1972, p. 13.)

> Play varies according to age and stage of development. To pre-school children it is important to test their mobility – crawling, jumping, running, climbing and cycling – and to work with different materials – baking and moulding with sand and clay, digging in the ground, constructing huts, splashing and messing about, playing with snow. School children play in groups; playing football, cycling, swimming, experimenting, playing theatre, planting, etc. Older school children often join clubs, sport, discuss, ride mopeds etc. Their need for independence increases and they try to be a bit further away from home.
>
> Being together with other children is essential for the development of the child and should preferably take place in small and lasting play groups. It is also of great importance to meet other categories. To speak with and to see adults at work is stimulating. The caretaker of the houses, the refuse collector, the baker, the carpenter, i. e. all those occupied with something, have always attracted children. Spaces that house activities of this kind are mostly as important as the playgrounds of a dwelling area. (*Bostadens grannskap*, 1972, p. 160.)

Children need to play to develop into a substantial social beings. To this end they need enough accessible and safe space and materials. The children need supervision, help and inspiration from adults and they also need to play together with other children to develop their social skills. This is in short the "Will of the State".

Three types of play spaces

I will now present the guiding principles in more detail for each type of playground. The rules and intentions are mainly based on the report presented by the National Board of Planning and Building (*Bostadens grannskap*, 1972, pp. 160–171). I classify them here as A, B and C.

Playground, type C. This type is almost equivalent to what the State Committee called a "small playground for infants" (see Table 1). It is intended to be used mainly by the youngest pre-school children. These are not able to play together with other children; their play is mostly individual. To avoid disturbance each child should have enough space in the sandpit and on the adjacent paved areas. The area of the sandpit should be dimensioned to be 1 m^2 per dwelling and the paved area 4 m^2 per dwelling. Not more than 30 dwellings and 50 children per playground should be accepted. The net area (pedestrian area, planting, fencing and shrubbery not included) of each playground should be 150–200 m^2.

The C-type should be located less than 50 metres from the house entrance. The reason is that small children do not like to be alone far away from home and parents. The short distance makes it more easy for parents to supervise their children. It should be possible to survey the playgrounds from all dwellings, especially from kitchen and balcony.

The small playground for infants should be furnished with seats for adults and children. This area is meant to be a quiet place well demarcated from the surroundings with some sort of barrier e. g. fences or shrubbery. It is not intended to be used by school children because of possible conflicts. The playground should be sunlit at least 5 hours between 9 a. m. and 5 p. m., but there should also be some sort of sunshade.

The C-type playgrounds should be located more than 5 metres from windows in order not to disturb the adjacent dwellings. They should preferably be located near wash-houses or other community buildings where children can warm themselves, be in contact with adults and have easy access to a toilet.

Playground, type B. The next level corresponds to what the Committee called a "large playground for infants". It is intended for use by older pre-school and young school children. These ages have a wider natural radius of action and are more capable to play together. The playground should be located within 200 metres from the dwelling entrances. The distance is supposed to give an adequate separation to the youngest children.

The B-type playground should serve a maximum of 150 dwellings or 200 children. The net area should be about 1 500 m^2 or 12 m^2 per dwelling. This area can be split up, e. g. into specialised areas for ball games etc., but altogether it should offer a greater variety of play with sand, paved areas, grass, broken ground and equipment like swings, climbing frames and huts. The playground should give opportunity for both execise and creative play.

This type of playground should also provide for contact with adults. Play spaces, jogging tracks and other areas for recreation are likely to be located together so they can be used by different ages and the supporting service facilities used more densely. This type of playground should be located at least 10 metres away from any dwelling window.

Playgrounds, type A. What the Committee called play parks and football pitches are here

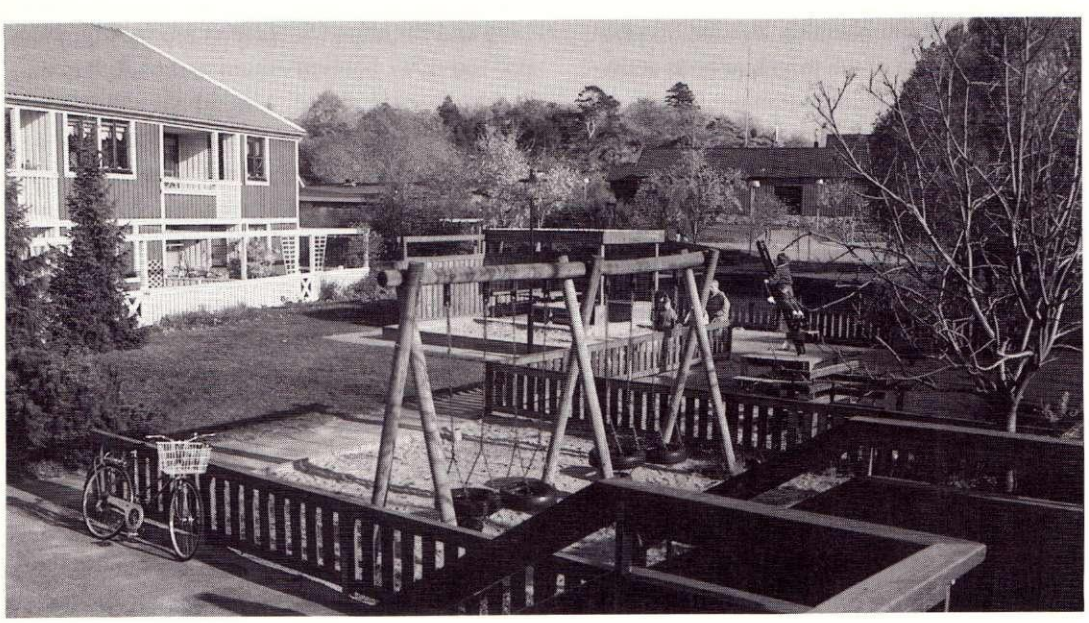

Fig. 2. Skintebo, B-type playground.

put into the same class. One reason is that most of these spaces should be located within 300 metres from the dwelling entrances. When a large play park is guided by a leisure-time staff 500 metres should be accepted.

This category of playgrounds is seen as a complement to the B and C playgrounds within the "play area". It is intended to be used mainly by school children. Play parks should preferably be located near a daycare centre since it will be easier to mix different ages if professional staff is provided.

The case area

When a planner designs a dwelling area on virgin land it is likely that he or she will have the greatest possibility to influence the distribution of plan elements. By definition neighbourhood units are designed as a whole. That is why such a unit is adequate for a study of design strategies. We have chosen the Skintebo Neighbourhood Unit in Gothenburg to be our case. It is located about 13 km south of the city centre. The area has all the features that constitute a neighbourhood unit. It is rather secluded, built in a short time span and has the necessary local services. There is an elementary school, a day nursery and a local shop. The motor vehicles have an central approach and is in a very nice way separated from the pedestrian system.

According to architects and planners in Sweden Skintebo is an example of good planning. The design was intended to be a counter-attack to the traditional high-rise block areas from the '60s and early '70s. Skintebo neighbourhood unit contains about 800 flats, of which 300 in two-storey gallery apartment houses and 500 in different types of one-family houses. It is fairly dense with a plot ratio of 0.46. (Figure 3.)

According to a research report, *Low and Dense Housing, 2* (Lidmar et al., 1978), the guidelines in *Good Housing* (*God bostad*, 1964) are fulfilled to great extent in Skintebo. The planners have been able to provide the neighbourhood unit with the prescribed number of playgrounds per floor area for infants (B+C). The playgrounds, however, ought to be located closer to the entrances or vice versa (or if not possible, more playgrounds must be added). There are no specific playgrounds for older children, except the school yard and the football pitches. This plan does not attain all the requirements of the authorities, but it seems that Skintebo is better equipped than the average of of low-rise housing areas. The separation between pedestrian and motor vehicle systems is rather distinct. With short walking distance between parking lots and the dwelling entrances there are very few cars using the pedestrian system. With a lot of paved areas near the entrances there are very few children playing on the vehicle roads.

My question, however, is not the fitness to the guidelines. I want to know how and why the playgrounds are located in this specific way. Are the play area per flat, number of simultaneous playing children and walking distance for instance the only rules determining the distribution of playgrounds? Are the planners using some other rules than those given by the State authorities?

Plan structure and the playground distribution

I will now describe the plan structure by applying Space Syntax Analysis developed by Hillier et al. The method makes it possible to calculate the syntactic properties of the axial lines of the pedestrian system. The integration values (1/RRA) indicate to what extent an axial line (a straight street line) integrates all other lines of the system. The control values indicate to what extent an axial line controls its nearest connected lines. The global choice values indicate the extent to which an axial line will be passed if you take the shortest syntactic route from each line to all other lines (for a more detailed explanation see the Glossary in this issue, p. 11).

To relate space to use we observe how many people there are on a sample of the axial lines in the pedestrian system. The correlation between the spatial properties of the axial lines and the

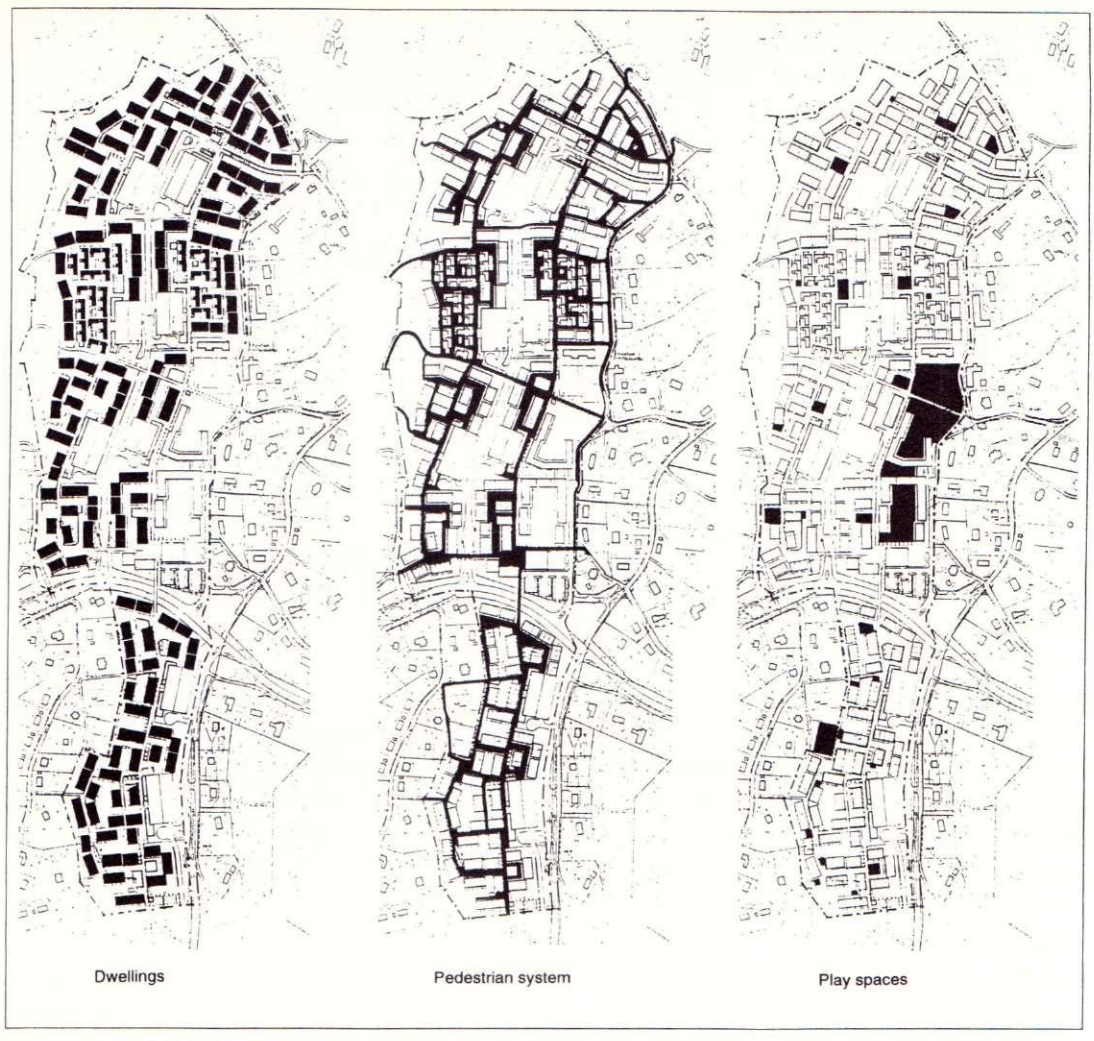

Fig. 3. Map of Skintebo Neighbourhood Unit, Göteborg, its pedestrian system and the classified play spaces.

encounter rate of the very same lines are in this case as follows:

Integration (1/RRA): ENC	.482
Control (CV): ENC	.405
Global choice (RGC): ENC	.707

Table 2. Correlation between spatial properties and the encounter rates (ENC) of the pedestrian system in the Skintebo Neighbourhood Unit, Göteborg.

The global choice property seems to be a rather good predictor of the use of the pedestrian system, and to some extent also the two other measures. The conclusion is that it is likely that higher values of the syntactical properties also mean that the same spaces have a generally greater pedestrian flow.

Let me now try to imagine how the planner would have reasoned when locating the play spaces in the neighbourhood structure. Let me also start from the belief that the ideas embedded in Space Syntax Analysis have something to do with architectural practice. Therefore, I suggest the following:

a) The playground of *category A*, which is directed towards all children in the neighbourhood unit, should be located adjacent to pedest-

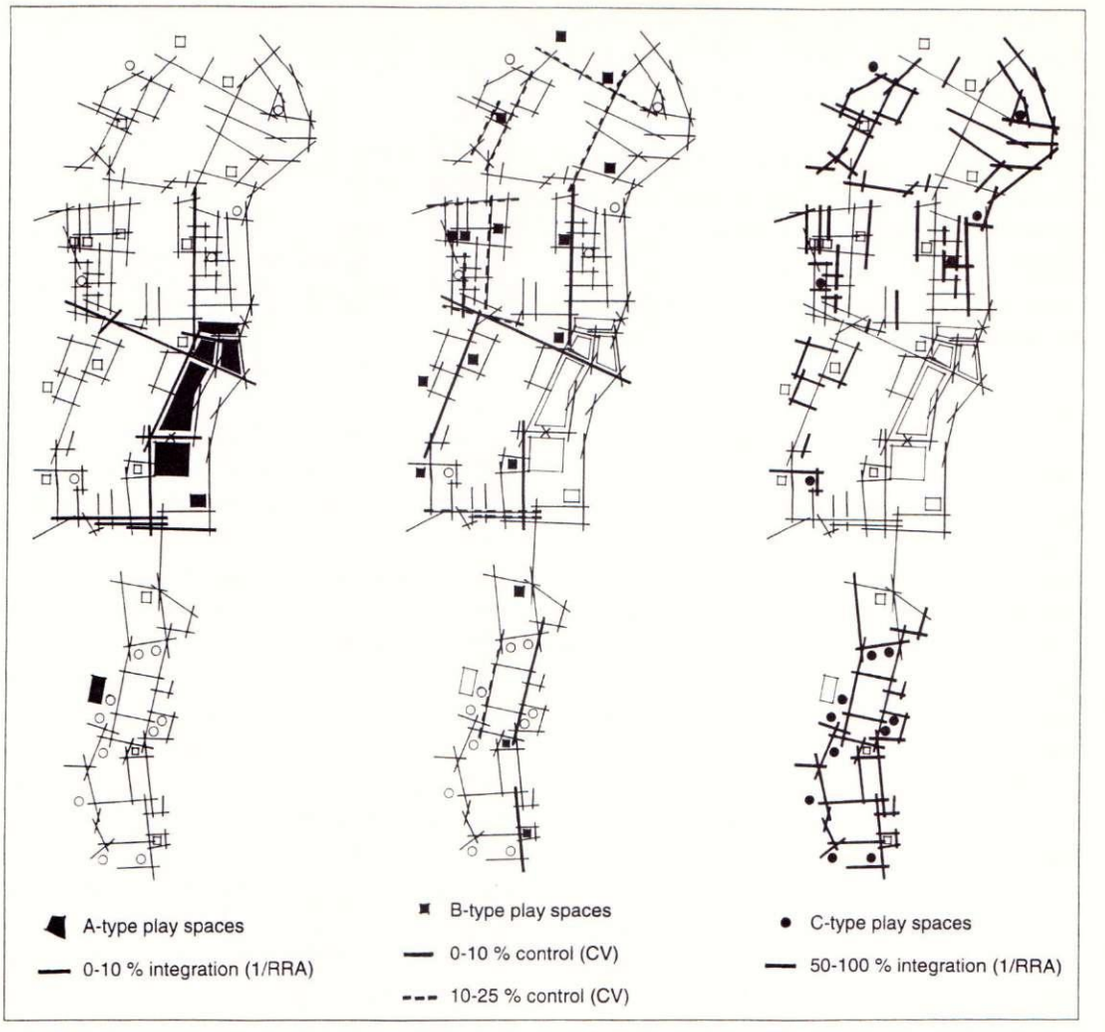

Fig. 4. The A-, B- and C-types of play spaces superimposing respectively the integration, control and segregation maps of Skintebo.

rian spaces passed by the greatest flow of people. According to the correlation analysis it should be near to the axial spaces with high integration values (1/RRA);

b) The playgrounds of *category B*, which are directed towards children in a local part of the neighbourhood unit, should be located adjacent to pedestrian spaces depending on the flow of people based on its local importance rather than the global, i. e. the spaces with the highest local control values (CV);

c) The playgrounds of *category C*, which are directed to the infants playing near their homes, should be located to the pedestrian spaces with the lowest flow of people in order to create an undisturbed environment for play. The most segregated spaces have low integration values (1/RRA) and thus low pedestrian density.

This can be the origin of a hypothesis about the strategy used by the planner:

> **Hypothesis No 1**. *Play spaces requiring different environments are located in a dwelling area depending on the global and local syntactic properties of their adjacent axial spaces of the pedestrian system.*

The weakness of this hypothesis is that the planner did not know anything about the syntactic

properties of the plan being designed. If the hypothesis reflects a design strategy, this must have been very intuitive. Which it of course might have been!

My first test is to correlate the syntactic properties of Skintebo to the location of the playgrounds of different kinds within the neighbourhood unit. I do it by superimposing the set of axial maps upon the site plan of Skintebo with those playgrounds marked out. (Fig. no 4.)

The largest playground in Skintebo (the school yard and adjacent play spaces) called category A, seems to be connected to strong integrating spaces or axial lines. The importance of these spaces to the whole neighbourhood is not only emphasised through their central location but also implied by their relation to the global syntactical structure of Skintebo. When superimposing the control map upon the playgrounds most of the B-type play spaces seem to be located near highly controlling lines. Finally, superimposing the segregation map (showing the 50% least integrating lines) of Skintebo upon the map of play spaces indicates that the smallest playgrounds, category C in Skintebo, in general will occupy such places which are in syntactic terms both "deep" from the integration core of the system, and with a lack of strong local control.

The visual impression seems to verify the hypothesis No 1 but it must be tested more carefully, "Never believe your eyes!" A test can be done by comparing the mean value of the properties of all axial lines to the mean values of lines connected to different categories of play spaces.

If we compare the mean integration values (1/RRA), which is a *static global measure*, of the three categories we find that the axial lines of C playgrounds show a mean integration value just below average, B playgrounds about average and the A play park considerably above average. A *global dynamic measure*, global choice (RGC), show similar differences, though, all categories are above average. Both measures correlate highly to the use of pedestrian system, 0.5 and 0.7 respectively which means that more people

	1/RRA	CV	RGC
All axial lines	0.947	1.000	19.812
"Play park" A	1.271	1.435	42.293
B playgrounds	0.962	1.330	31.944
C playgrounds	0.858	1.258	23.656

Table 3. Comparison of syntactic properties using mean value of all axial lines compared with mean value of all lines connected to playgrounds of category A, B & C respectively in Skintebo.

are passing by the play spaces of category A than category B and C. There is also a high correlation between the *dynamic local measure*, control values (CV), and the use of pedestrian system. The correlation value is here 0.5. As can be understood from the table there is a high probability of finding more people passing by playgrounds of category A followed by categories B and C in descending order.

The analysis of mean values support to some extent our visual examination described earlier. However, a significant conclusion of this test is that all categories of play spaces are generally located to axial lines that are, in all probability, more populated than average. This can be interpreted as the overall intention of the planner has (intuitively) been to locate the play spaces to sections of the pedestrian system where many people are likely to pass. The test does not fully confirm nor fail the hypothesis No 1. So, let me test some other design principles that may explain how the planner determined the distribution of play spaces in this case.

The gravity model hypotheses

One basic conception in planning, traffic prediction, location theory and several social sciences is the so called *gravity model*. This is an model of analogy to Newtonian physics. It is based on spatial relations, where relation is reduced to distance. Still it is a model for predicting use in relation to space. Formulated generally the model reads:

$$F_{ij} = k \frac{f(m_i, m_j)}{f(d_{ij})}$$

	Playgr. No	Total No of user	No of children	No of adults	On playground	On adjacent spaces
B playgrounds						
5 most used	5	57	43	14	25	32
	3	54	46	8	22	32
	4	48	39	9	28	20
	8	44	38	6	24	20
	10	40	37	3	22	18
	Subtotal	**243**	**203**	**40**	**121**	**122**
5 least used	1	28	20	8	25	3
	9	27	23	4	19	8
	2	22	19	3	14	8
	7	15	13	2	4	11
	6	12	11	1	2	10
	Subtotal	**104**	**86**	**18**	**64**	**40**
C playgrounds						
2 most used	d	18	18	0	6	12
	a	11	10	1	6	5
	Subtotal	**29**	**28**	**1**	**12**	**17**
2 least used	c	8	8	0	4	4
	b	7	7	0	5	2
	Subtotal	**15**	**15**	**0**	**9**	**6**
	Total obs	**391**	**332**	**59**	**206**	**185**

Table 4. The most and least used playgrounds in Skintebo of categories B (1–10) and C (a–d) respectively.

Let us assume that the number of children visiting a playground is proportional to the force or the gravity, F. One factor that many designers say have influence upon the use of a playground is the attraction of it. With this they mean the supply of play opportunities and/or its beauty, in short its quality. In this formula represented by m_i. The second factor is the demand for play by children. This can be represented by m_j. The function $f(d_{ij})$ represents distance between the children and the play spaces.

Basing on the gravity model I formulate two hypotheses:

Hypothesis No 2. *The higher quality of a playground, the more children will use it.*

Hypothesis No 3. *The more children there are within "a catchment area" of a playground, the more children will use it.*

To test these hypotheses we must observe the use of the play spaces. While including to few items we omitted the category A. The main observation set were made of the playgrounds of category B and C in the northern part of the Skintebo Neighbourhood Unit. The sample included 10 items of category B and 4 of category C, all located to an observation route passed 20 times.

One half of all observed persons, including both adults and children, was found on the playground and the other half on the open spaces adjacent to it. The adults were mostly sitting on benches or standing, talking and surveying the children at the same time. Of course the children were moving about very much; swinging, running, cycling or playing with balls etc. Some of them were also standing or sitting on their bikes or on the ground, talking with adults or other children. The older children were often on their

way to somewhere else on their bikes, skateboards etc. The adults were more numerous near the more used playgrounds. Does this mean that children stay where adults are or vice versa or does it just mean that both adults and children have the same preferences in relation to the structure of the built environment?

The supply and demand factors

When we observed the use of the playgrounds we found that there is a great difference in the use frequency within the two classes, B and C. If we sort the playgrounds of category B and divide them into two groups, we can see that five of the playgrounds are used twice as much as the remaining five. Making the same operation for the playgrounds of the category C we can show almost the same differences in use frequency.

All the playgrounds of the category B (Table 4) are approximately of the same size and have almost the same standard equipment. They are located in a way that fulfil the demand of being sunny during the day. The local micro climates of the playgrounds does not differ very much. They are designed in the standard way. What is said about the B playgrounds is valid within category C too.

The small variations of quality within each category does not explain the great differences in use. The attraction (considered as play equipment, size of the playground and local climate) seems not to be a good predictor of the use of playgrounds. There may still be some differences in other qualities which we have not been able to notice. Though, we have not been able to verify the hypothesis No 2 based on the quality factor.

In order to verify hypothesis No 3 we have studied the official registration lists regarding the dwellings surrounding the observed playgrounds. We made two types of delineation of the "catchment area". First, we included all dwelling entrances situated within 50 meters from the playgrounds, in real walking distance. Second, we included all entrances situated by the axial lines passing the playground.

The number of children living within a real walking distance of 50 metres from the playground cannot offer any explanation of the differences in use of category B. The conditions are the same for the playgrounds of category C. Here there seems to be even a reverse tendency contradicting the gravity model I based our hypothesis on. Neither did the number of children living adjacent to the passing axial lines did support my hypothesis No 3.

The gravity model is traditionally employed by traffic and commercial planners for predicting use of space. The supply and demand model does not seem to fit very well to predict (explain) playground use.

A dynamic hypothesis

Let me now modify the gravity model and base it on an analogy with locational theory for shops. The catchment area on the detailed level is a dynamic property based on the flow of people, not the static number of people living nearby. A locational theory may be formulated: the more people pass, the higher the probability of attracting latent purchasers and consequently the greater the business. Transformed by use of the correlation between syntactic properties and encounter rates I can formulate:

> **Hypothesis No 4.** *The syntactic properties of a plan pattern can predict the use of playgrounds.*

On an operational level we can say that there should be a positive correlation between, on the one hand, integration (1/RRA), control (CV) and global choice (RGC) values of the axial spaces touching the playgrounds, and on the other hand the observed use frequency of these playgrounds. When calculating the mean values of the axial lines I get the following figures for the subsets of most and least used playgrounds.

The conclusion might be that the playgrounds adjacent to axial lines with low syntactic values (a more segregated location etc.) will be more used. This means that my hypothesis is failed. The "dynamic gravity model" or the "shop location" hypothesis must be rejected. If the plan-

	1/RRA	CV	RGC
All axial lines:	0.947	1.000	19.812
"Play park" A	1.271	1.435	42.293
B playgrounds	0.962	1.330	31.944
Most used	0.907	1.203	21.399
Least used	1.146	1.490	41.411
C playgrounds	0.858	1.258	23.656
Most used	0.939	0.930	13.140
Least used	1.052	1.309	23.238

Table 5. Syntactic properties of playgrounds of category A, B & C in the Skintebo Neighbourhood Unit. Mean values of all axial lines and of lines

ner had the idea of locating the playgrounds adjacent to intensively used pedestrian (axial) lines in order to get more children to use the playgrounds he or she has failed. The design rule should rather be formulated like this: A playground will be more used if it is located to less used pedestrian spaces.

My conclusion here, though, must be related to a previous conclusion. I was able to say that almost all playgrounds were located to axial lines with spatial properties (integration etc.) above average. This means that the playgrounds are located near to spaces with more people passing by than average. My conclusion was that the plan designer had the intention of locating the playground near busy spaces, probably in order to get a higher use density. Now, I find that the less people that are passing by playgrounds the more children (and adults) will use them.

The interface hypothesis

The fact that my hypotheses so far more or less have failed leads me to investigate other spatial factors that may influence the use of playgrounds. Maybe the house type is of some significance? A visual examination shows that the terraced houses are more numerous around the more visited playgrounds. The less visited playgrounds are entirely or partly surrounded by two-storey houses with external galleries (loftgångshus), whose main entrances have a weaker relation with the playgrounds.

A specific difference between the terraced houses and the gallery houses is the design of the interface between the building and the street. All main entrance doors to the terraced houses lead directly from the street. While the entrance doors of the gallery houses of course lead to the gallery, but the gallery is mostly located away from the street. The inhabitants of these houses have to pass several spatial steps to enter the street from their flat entrances. I am now inclined to formulate:

Hypothesis No 5. *The more a playground is faced by entrances the more it will be used.*

Using the interface map we can describe the constitutedness of a space, i. e. in this case the number of main entrances facing a play space and also the number facing the convex spaces adjacent to the play space. If we transform the

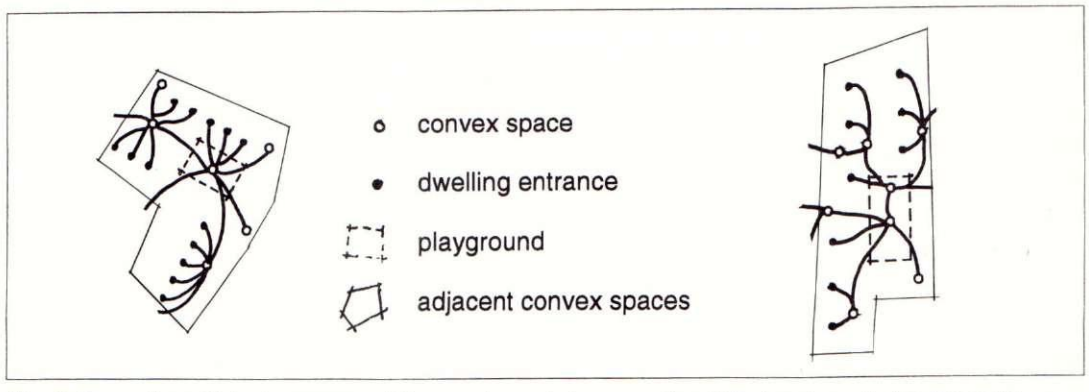

Fig. 5. Examples of interface maps of the most used playground and the least used of category B.

	Playgr No	Total No of user	No of interf Direct	No of interf Adjacent
B playgrounds				
most used	5	57	3	13
	3	54	4	18
	4	48	2	18
	8	44	2	11
	10	0	2	12
	subtot:	**243**	**13**	**72**
least used	1	28	0	3
	9	27	0	8
	2	22	0	4
	7	15	0	5
	6	12	2	9
	subtot:	**104**	**2**	**29**
C playgrounds				
most used	d	18	0	7
	a	11	2	5
	subtot	**29**	**2**	**12**
least used	c	8	0	0
	b	7	0	8
	subtot	**15**	**0**	**8**
	Total obs	**391**	**17**	**121**

Table 6. Playground use related to the constitutedness of the playgrounds in Skintebo North, Göteborg.

maps into a table we can see that there is a good evidence for the interface hypothesis. The greater the permeability between the convex spaces of the playgrounds (including their adjacent spaces) and the connected dwellings the more the playground will be used. The number of entrances facing the five most visited playgrounds of the category B exceeds distinctly those of the least used. (Figure 5.)

Concerning the playgrounds of the category C the image is not quite clear. For example, the most visited playground of the category C is has no main entrance directly facing the playground. (Table 6.)

As the sample is very small it is not appropriate to draw any final conclusions. To make a solid distinction between the effects of the interface and the effects of location a more sophisticated analysis is required than I have used here.

Discussion

Using Space Syntax Analysis I am now able to draw the conclusion that it seems to be a strong relation between the use of the playgrounds and the spatial properties of the plan pattern. In other words, the spatial organisation seems to have a great impact upon the use of the play spaces. I was not able to explain the differences in use by relating it to differences in quality, size, distance or number of children living around. I have found that the more people pass by the less the play space will be used and also that the greater the number of dwelling entrances facing the playgrounds the more these will be used.

What does it mean, the fact that the planner generally located the play spaces where adjacent spaces have greater pedestrian flows? It is not likely that he or she deliberately located all of them in order to avoid the playgrounds being

used. Let me now put down another hypothesis, which we have not tested yet. It may be true that a play space should not be disturbed by people crossing the adjacent convex spaces. It might, however, be that play spaces need to be rather near densely used lines, but not too near. You do not want to be disturbed, but you want to have some control over what happens around. If a play space should be used intensively it should for instance be located two syntactic steps (or perhaps some specific distance) away from the most integrated lines and visually exposed to it (cf. isovists).

I have found that the location of entrances to the dwellings is of great importance for the use of a playground in the neighbourhood. The more entrances that constitute the convex spaces adjacent to the playground the more it will be used. This is somewhat incompatible with the previous results. The conclusion may be that play should not be disturbed by moving people, but it is good if a lot of entrances face the playground, i. e. it is surveyed.

Our observations revealed that the more children stay at the playground and its surrounding convex spaces the more adults. Which is the hen and which is the egg? Or does it mean that both children and adults have the same preferences? Both categories seems to respond to the specific syntactic properties in the same way. We also observed that the C playgrounds had almost no adults staying there, which contradicts the main idea that these preschool children would be supervised by caretakers.

This study raises interesting socio-spatial questions which have to be tested. We will continue our studies with a deeper analysis of the design process. I do not believe that ideas about plan pattern derive from God or from a Genius Architect. On the other hand, I do not believe that plan design is just a rational or mechanical procedure. It is however, probably not a random process (even if the results sometimes make us believe that). I believe that it is possible to analyse the design strategies in a scientific way. What we have found seems to have relevance for playgrounds, but may be extended to studies of other plan functions. The conclusion from our study presented here is that Space Syntax Analysis may help to unlock the secrets of tacit knowledge and also help the architects and planners to develop their theory *and* practice. A new field of investigation is open to explore.

Rem: I translated the quotations from Swedish guidelines and official reports. Ye Min and Lotta Särnbratt made the basic field studies. Maria Kowalska contributed to the discussion. Anna Ornered made fair drawings.

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