Importance of Trees with Low-growing Branches and Shrubs in Perception of Urban Spaces

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Abstract. The purpose of this paper is to analyse the influence of trees with low-growing branches and shrubs on human perception and their preference in large urban spaces. Such a narrow choice of the landscape elements is done in order to prove the hypothesis that trees with low-growing branches and shrubs are perceived as legibility, a type of a refuge that is an essential element of survival in the setting according to environmental psychology. Semi-structured interviews in walk-along mode were used to talk to residents about the ways they saw and enjoyed yards and streets in four residential areas: ‘Agenskalna priedes’, ‘Kengarags’, ‘Zolitude’, ‘Lenina iela’ in Riga. A discursive as well as nonverbal (gestures) analysis of interviews was conducted. The extracted information was compared between two groups of spaces: an open-undefined category of space and an enclosed category of space. The results show that trees with low-growing branches and shrubs have a positive impact on the preference and perception of the size in open-undefined spaces. Whereas the impact on preference of such trees in enclosed spaces is negative or neutral. It can be concluded that trees with low-growing branches and shrubs play a positive role as a legibility element in the space that appears to open and undefined for a human eye since these elements propose safety via better readability of the space. Trees with low-growing branches in the space that is narrow and enclosed also have the role of a legibility element. However, their importance is not the same in such a setting: an enclosed space has well-defined borders, and elements helping to oversee it are redundant.

1. Introduction

Our previous work was focused on the influence of such landscape elements as trees, small elevations of the earth surface, benches, roads etc. on the perception and likability of an urban setting [1]. It was demonstrated that trees in general play a very important role on how people see and like a scene. The goal of our present article is to analyse specifically if the trees with low-growing branches and shrubs have a specific, measurable significance in the context of liking and perception.

Similarly, to our previous research, the collected information on trees is interpreted within the model of measurements of spatial aesthetics [2]. This model is based on the belief that spatial aesthetics is defined by the form and size (length, width to height ratio, angles of facades, gaps between facades etc.) of outdoor spaces as shaped by the walls of the buildings or bordering streets. This assumption in its turn stems from our interpretation of findings on ideal parameters of yards and streets done by environmental psychologists [3; 4; 5; 6; 7]. In their research, which used computer generated imagery, urban spaces are presented as concrete structures without greenery. Furthermore, the model borrows a four category principle from the environmental psychology [8]. This principle suggests that four spatial categories cover all the possible spatial shapes and proportions of any landscape. The open-undefined
spaces are the least preferred ones. Spaces belonging to this category are too large and a human being loses a possibility of the judgment as to where the space ends. Enclosed scenes are also disliked, since they facilitate the sense of entrapment. Humans also do not like blocked views as they obstruct the possibility to see in one direction. The only truly loved spaces are the ones that are categorized as spacious, well-structured. In such environment, there is enough of a refuge or an opportunity to hide and a prospect or a possibility to see into the scene. Originally the categories have been developed for the natural settings, but they have been proved to be suitable also in urban ones [9].

It has been also discovered that mystery and legibility can potentiate likability in urban settings [10]. Mystery is a distinct sort of a prospect that promises new information not available from the current standpoint. Legibility is a specific type of a refuge that offers a place to hide and observe the part of a scene that is not well visible from the current stand point. The model suggests that a sufficient amount of these elements grant a scene that has disliked a status of a tolerated one. This article focuses on disliked scenes of open-undefined as well as enclosed categories. For the purpose of this article it means that tree-formed spaces described by respondents must belong to at least one of the two categories to be analyzed. In this article we explore only the trees with low-growing branches and shrubs as potential legibility elements that can improve the likability.

Trees in general have proved to be of high importance to the respondents, but trees with low-growing branches and shrubs specifically have been pointed out for multiple times by our interviewees. We assume that low-growing branches and shrubs provide legibility – the former gives the possibility to climb a tree and observe the surroundings, the latter, if dense enough, provides the opportunity to observe the space from a safe “chamber”. There are two questions to be answered in this research paper: do trees with low-growing branches and shrubs have a specific influence on perception, and is it possible to measure this influence in terms of metres?

The aim of this research is to extract enough evidence on the role of trees with low-growing branches and shrubs in the process of perception and likability in order to provide the beginning for the more detailed research into this topic. Our hypothesis states that trees with low-growing branches and shrubs can play a role in the setting of a certain category.

2. Materials and Methods
The Model of Measurements of Spatial Aesthetics (hereinafter referred to as the model), the genesis of which is more precisely described by other authors, is used as the primary tool to evaluate any scene in question visually by the researcher. [11]. An updated version of the model can be seen in Table 1. The sizes given in the table are quite small. If length, width or height is as twice as large as the maximum given in the table, the double amount of mystery and legibility is required, but if these parameters are three times larger, the amount of mystery and legibility should increase at least three times and so on in order for the scene to acquire a tolerated status. This principle is called “Size Versus Element Progression”. The visual analysis is carried out with the help of the model; the table with the relevant information for each scene is constructed.

The interviews with residents are used as a subsequent tool to see if the scenes analyzed by the help of the model are visually perceived by the inhabitants in a similar matter. A large number of walk-along interviews of open-ended type were conducted to find out if landscape elements played a role in the process of perception and likability. Semi-structured interviews are chosen since it has been proven in the studies of space that this particular kind of conversation encourages to reflect on meaningful spatial experiences [12]. However, we were also aware that the downsides of using pre-chosen routes for interviews were not to be ignored, since such a selection might negatively influence the feeling of control over the conversation [13]. We addressed this issue during our encounters with the interviewees.
Table 1. The Model of Measurements of Spatial Aesthetics

| Category/ Type of space | Ground length (m) from wall to wall * | Ground width (m) from wall to wall * | Heights of the buildings (m)* | Ratio | Number of type of prospects | Number of type of refuges | Mystery | Legibility | Preference |
|-------------------------|--------------------------------------|--------------------------------------|--------------------------------|-------|-----------------------------|--------------------------|---------|------------|-----------|
| Spacious, well-structured yard | 24.5 – 75 | 24.5 – 75 | 6.7 – 21 | 0.27 \(\pm 0.07\) | 1 primary | Not relevant | Not relevant | Not relevant | Liked |
| Open, undefined yard | 24.5 – 75* | 24.5 – 75* | 6.7 – 21* | <0.22 | Not relevant | Not relevant | Min. 1 | Min. 1 | Tolerated |
| Enclosed yard | 24.5 – 75* | 24.5 – 75* | 6.7 – 21* | >0.32 | Not relevant | Not relevant | Min. 1 | Min. 1 | Tolerated |
| Spacious, well-structured street | Not relevant | 7 – 21 | 5.5 – 16.5 | 0.5-1.5 ideal 0.75 | 1 primary | 1 secondary | Not relevant | Not relevant | Liked |
| Open-undefined street | Not relevant | 7 – 21* | 5.5 – 16.5* | <0.05 | Not relevant | Not relevant | Min. 1 | Min. 1 | Tolerated |
| Enclosed street | Not relevant | 7 – 21* | 5.5 – 16.5* | >1.5 | Not relevant | Not relevant | Min. 1 | Min. 1 | Tolerated |

* Size versus element progression: if one of * is twice as large as the maximum border, the double amount of mystery and legibility is needed. If the times larger, the times of mystery and legibility is needed for the scene to be tolerated.

The interviews included the questions: how do you like this space, where does the space end, how often do you use it? The open-ended style of the conversation permitted inquiry also into the issues that were proposed by the respondents themselves.

The interviews were analyzed discursively. For this article the utterances on trees with low growing branches and shrubs were filtered. Also non-verbal analysis was used, for instance, when a respondent used gestures instead of words.

All the collected material on trees with low-growing branches and shrubs regarding perception of the size and liking of a space is interpreted in a tabular way as well as in the form of the text. The analyzed cases are described also visually using birds-eye view images and landscape photos.

The information in both tables (the one resulting from the applying the model or visual analysis and the one stemming from the analysis of interviews) is compared.

3. Results and Discussion

We have conducted 72 interviews on 17 routes in four residential areas of the Soviet time in Riga. Trees and shrubs play a major role in the process of the perception of the size and space as well as in its likability. Trees with low-growing branches are of great interest. If an interviewee mentions this type of trees and shrubs in the spaces of an open-undefined category, which is theoretically known for its dislike, respondents’ positive attitude is registered. Mentioning of this type of trees in enclosed spaces is related to neutral or negative attitude.

It is possible to derive some primary metric information from the interviews, yet this information is too fragmented to be integrated back into the Model of Measurements of Spatial Aesthetics. However, the current state of the research suggests the following: tree-formed yard spaces that are categorized as open-undefined having a medium length of one side of a square yard ca. 100 m, with surrounding trees 17 m tall, is still perceived as tolerable by inhabitants, if such a site is occupied by ca. 40 – 50 % by
trees (amongst them at least few with low-growing branches) and shrubs. But tree-formed yard spaces of an enclosed category, the shortest side of which is 25 m, the height of trees (amongst them at least few with low-growing branches) is ca. 18 m, are perceived neutrally or negatively if ca. 20% of such a space is occupied by trees and shrubs. Regarding the amount of legibility elements as ascertained by the model, the following can be observed: in the tree-bordered spaces of open-undefined category more legibility elements than predicted by the principle of the “size versus element progression” mirrored in the model are needed for the space to be tolerated. In the case of an enclosed setting the number of legibility can be smaller as predicted by the model and the “size versus element progression” principle integrated in it for the setting to be tolerated. For more detailed information see Tables 2 – 12.

These findings are unparalleled to any other results in academic literature. To the best of our knowledge there is no evidence as to how the position of branches influences the perception of the size of the space or its likability. However, the findings that trees and greenery in general have a positive effect on variables starting from the reduced depression risks to the perception of beauty of a space are well known [14; 15; 16].

3.1. Trees with low-growing branches and shrubs in the spaces of open-undefined category

In Figure 1 scene A in ‘Agenskalna priedes’ is depicted. The yard has a trapeze shape if the buildings that surround it are considered to be the borders of this space. The yard measures are 210 × 140 × 210 × 90 m, the framing buildings are 14 m in height. According to the Model of Measurements of Spatial Aesthetics, such a yard falls under the category of the open-undefined space. The walls of the buildings provide some mystery and legibility, yet not enough for this place to be ranked as liked or tolerated. Thus the yard is theoretically disliked (see Table 2).

In the image of a bird’s-eye view, the white contour shows the size of the theoretically open-undefined and disliked yard as detected by the model. A white transparent field with black lines represents a significantly smaller area ‘up to the trees’ recognized by the inhabitants as ‘their yard’, which is quite liked. Black interrupted lines indicate groups of trees visible from the standpoint of the interviewer (a black point). The group in red has old trees with low-growing branches, and it is pointed out as the group of the trees that represents the border of the yard. On the right side a landscape photo depicting the yard in question is seen.

Yet the interviews with respondents reveal the contrary. Many of them claimed that they were rather satisfied with the given space. More detailed inquiry revealed that their understanding of the size of the space did not correspond to the size of space proposed by the model. The discrepancy is related to the fact that the model considers perimetrically placed buildings as the border of the yard, but the respondents quite often chose a particular group of trees to describe as “the end of their yard”. For instance, Evija said that the space of our interest had been divided by trees, “in front of the trees there is one space. Behind the trees – another one.” She also used gestures to point out the older group of trees. Evija and also some other respondents saw this group of trees as the border of their yard.

The striped layer in Fig. 1 depicts the space that the respondents claim is “their yard”. Its size is considerably smaller as the size of the yards proposed by us using the model. There are three distinct
groups of trees in the new space, which occupy ca. 40% of it. The most prominent group is situated in the north (the red field in figure 1), it is formed by chestnuts (Castanea), maples (Acer), lime (Tilia) trees. Five of those have low-growing branches. This group consists of older specimen (some have radius of trunk 0.4 m). There are also two smaller groups of trees, yet these possess younger, smaller trees and mostly include the ones with high-growing branches. The residents talking about the border of their yard referred to the largest and oldest group only.

Table 2. Scene A, Agenskalna priedes. Results of visual analysis

| Scene A | Open-undefined yard | Ground:145, 210, 90, 210 (mid.162.5) | Heights of buildings: 14 | Ratio: 0.08 | Mystery: 2 | Legibility: 0 | Preference: Disliked | Notes: Groups of trees, elevations |

As seen in Table 3, the respondents’ yard (the tree bordered space) is significantly smaller than the space estimated by the help of model, it is ca. 70 × 140 m large. The height of the new space is also different: it is equal to the height of the trees, in this case it is 17 m. Thus, a new ratio of height and width is 0.16, such a space is still considered to be open-undefined space according to the model. In terms of mystery and legibility, the trees in the new space are adding up mostly to the legibility, which, as described before, is a certain type of a refuge permitting to hide and to observe another part of the scene not visible well from the present position. Older trees with their denser structure offer also 2 elements of mystery as they form a space inside the space.

Mystery elements formed by the facades are only partially retained. It should be noted that the yard has also an elevated earth surface, which, as we know it from other interviews, potentially serves as a source of mystery. Trees alone add up 5 elements of legibility: 1 for every tree with low-growing branches to climb. They also add to the number of the cases of “mystery” in this case, which is known to boost likability, too. The choice of further examples addresses an impact on likability created by the items of landscape which are difficult to categorize regarding their mystery and legibility. As for this yard, the respondents express their mild satisfaction with it, but most of them do not spend their time here; in other words, the new yard is tolerated.

Table 3. Scene A, Agenskalna priedes. Results of Interview Analysis

| Scene A | Open-undefined yard | Ground:70, 140, 70, 140 | Heights of trees: 17 | Ratio: 0.16 | Mystery: 3 | Legibility: 5 | Preference: Tolerated | Notes: 40 % of trees |

Another example from Agenskalna priedes is a yard space that is evaluated by the Model of Measurements of Spatial Aesthetics as open-undefined and disliked. Its size (ground measures 145 × 55 × 160 × 80 m, surrounding buildings are 14 m high) produces the ratio of 0.12. Looking from the particular standpoint, extremely high mystery numbers and almost no legibility numbers were registered. This yard is visually depicted in Figure 2, its main measurements – in Table 4.

Figure 2. Scene B, Agenskalna priedes
About 60% of this space is occupied by lawn, which stretches from one longest side of the yard almost to a full size and occupies ca. three quarters of the width. Ca. 35% of yard’s territory is a dense belt of trees and shrubs that adhere to the other longest side of the yard. About 5% of trees grow on the opposite side of the yard in singular patches. The predicted dislike of the yard is also mirrored in the respondents’ answers.

The white contour in the aerial photo depicts the yard, which is categorized as a theoretically open-undefined and disliked yard. A white transparent field with black lines shows a smaller area, the “new” yard, which is visible from the stand point (a black circle) and defined by newly planted trees (a red field). Other tree groups are marked by black interrupted lines. The landscape photo depicts the yard in a wide angle.

Table 4. Scene B, Agenskalna priedes. Results of Visual analysis

| Scene B | Open-undefined yard | Ground: 145, 55, 160, 80 (vid.110) | Heights of buildings: 14 | Ratio: 0.12 | Mystery: 12 | Legibility: 1 | Preference: disliked | Notes: Belt of trees, singular trees |
|---------|-------------------|----------------------------------|--------------------------|-------------|-------------|-------------|---------------------|----------------------------------|

However, the inhabitants also propose to improve the space in order to foster the pleasant view of this yard. For instance, Natalia, a 70 years old lady, who is very passionate about the maintenance of Agenskalna priedes, has organised the planting of mountain pines (*Pinus mugo*) on the crossroads of two pedestrian paths to make the yard look more beautiful. Evija also who claimed that the yard is too empty proposed trees and benches in the very same spot.

The pines will compartmentalize the space as they grow to become large shrubs. If we draw the new size of the yard “up to the pines”, like in the previous case, then the following measurements of the tree-bordered space are extracted: 110 × 55 × 120 × 70 m. The position of the pines can be seen in Figure 2. About 50% of the area of the new yard is occupied by shrubs and trees. The highest of the trees is 6 m. Thus the height to width ratio is 0.18. The new space can be categorized just like before as open-undefined. The new pine trees, especially when grown to their full length, generate at least three elements of legibility – a safe point of observation that gives a possibility to look into the neighbouring yards not really being seen from the actual stand point. The scene harbours two more trees with low-growing branches that must be taken into account in the case when the tree related legibility components are estimated. All together there are 7 elements of legibility in the new scene. No extra mystery numbers are added by the presence of trees. The scene remains high in mystery due to the expressive facades seen from the stand point.

As it can be seen in Table 5, the ground measurements of the new yard “up to the pines” are considerably smaller, but the height measurements – larger. More importantly, the legibility numbers have grown and the preference ranking has changed to “tolerated”. The mystery elements formed by the facades are retained: they are well visible also in the new version of the yard.

Table 5. Scene B, Agenskalna priedes. Results of Interview Analysis

| Scene B | Open-undefined yard | Ground: 110, 55, 120, 70 (mid. 89) | Heights of trees: 16 | Ratio: 0.18 | Mystery: 12 | Legibility: 7 | Preference: tolerated | Notes: 50% of trees |
|---------|-------------------|----------------------------------|--------------------------|-------------|-------------|-------------|---------------------|------------------|

Another example regarding trees with low-growing branches is demonstrated by a case in Zolitude residential area. It is depicted in Figure 3.
In an aerial view, the white contour shows the street, which is categorized as theoretically open, undefined and disliked, but a white transparent field with black lines depict a smaller area, an alley (red dots), which is the space that is associated with this street by the residents as visible from the stand point (a black circle). The landscape photo shows the alley and the street scape.

The scene is a street adjoined by 26 m high residential buildings. At some portions the setting is interrupted by lower (10m) buildings such as a school, post etc. The width of the street is 40 m. According to the Model of Measurements of Spatial Aesthetics, this space belongs to the open-undefined street category. Due to many setbacks and protrusions, it is awarded many mystery and legibility elements, which permit to rank this space as tolerated (see Table 6).

### Table 6. Scene C, Zolitude. Results of visual analysis

| Scene C | Open-undefined street | Width and length: 50, 450 | Heights of the buildings: 26 | Ratio: 0.5 | Mystery: 3 | Legibility: 4 | Preference: tolerated | Notes: tree alleys, tree groups, parking |
|---------|-----------------------|---------------------------|-----------------------------|------------|-------------|--------------|----------------------|---------------------------------|

However, the trees on the street and especially the alley make this space liked by the inhabitants passionately. There is a 100 m long lime tree alley on one side of the pedestrian path stretching for 200m of the street visible from the given stand point (Figure 3). The trees are 20 years of age and have low-growing branches. The trunks are bare, there is no underwood. Foliage of the alley covers ca. ⅓ of the street’s width, thus the tree-lined space is ca 13 m wide. The trees are ca. 10 m in height. Thus, as Table 7 depicts, the tree alley forms a space that differs significantly in terms of the size and ratio from its surroundings (see Table 6). Irena, a 54 year old woman, exclaimed that she loved the street when asked about her attitude towards it, “I love this street. These lime trees that you see now have grown in front of my eyes.” Also, inhabitants Galina and Tatjana had a very similar attitude to this scene, they liked the greenery and also architecture of the scene.

### Table 7. Scene C, Zolitude. Results of visual analysis

| Scene C | Spacious, well structured street within an open-undefined setting | Width and length: 13, 100 | Heights of the trees: 10 | Ratio: 0.77 | Mystery: 3 | Legibility: 4 | Preference: liked | Notes: Mystery elements are due to the buildings. 30% of trees. |
|---------|---------------------------------------------------------------|---------------------------|-----------------------------|------------|-------------|--------------|----------------------|---------------------------------|

The height and width ratio of the tree alley is 0.77. For the streets scape the ideal ratio is 0.75, according to Alkhresheh [17], thus the tree alley reimagined as a street scape is very close to this rate. Also, the height and width resemble the ideal parameters of a spacious, well-structured street; the alley is awarded a category that is different from the one composed by the walls of the buildings. Multiple
trees with low branches provide the scene with a great array of legibility elements. Furthermore, even though the alley in itself does not possess a single element of mystery, it is reasonable to believe that because of the good visibility the architectural setbacks and protrusions in the building environment are very well noticeable behind the alley, they supply enough mystery to this street space. The visibility of architecture is also substantiated by the utterances of the respondents. Because a smaller setting benefits from elements of the larger setting it is embedded within, this scene belongs to two categories simultaneously.

3.2. Trees with low-growing branches and shrubs in the spaces of enclosed category

After discussing how trees with low-growing branches and shrubs change the perception and likability in the cases of open-undefined category, let us demonstrate two cases of enclosed category in the same context.

In the image of a bird’s-eye view, a theoretically enclosed and disliked yard is shown with the white contour. A white transparent field matching with this contour depicts the yard size as reported by the inhabitants. The stand point from which the interview was taken is showed by a black circle. Black interrupted lines show the group of trees, red dots – the trees with low-growing branches and shrubs. The landscape photo depicts the yard in a wide angle.

The housing ensemble in Lenina iela (now Brivibas iela) 177 is the smallest one amongst the presented areas. A mixture of the Soviet and historical buildings form the site. Its aerial view and streetscape photo are depicted in Figure 4. The yard is ca. 130 m long and 25 m wide. The broken lines of facades, a bent shape of the yard, the side street that flows into it gives this enclosed space a good number of legibility and mystery elements. The yard is theoretically tolerated (see Table 8).

| Scene D | Enclosed yard | Ground: 130, 25, 130, 25 (vid.25) | Heights of the buildings: 18 | Ratio: 0.72 | Mystery: 3 | Legibility: 3 | Preference: tolerated | Notes: very few trees, parking |
|---------|-------------|---------------------------------|-----------------------------|-----------|-----------|-------------|----------------------|-----------------------------|

| Scene D | Enclosed yard | Ground: 130, 25, 130, 25 (vid.25) | Heights of the buildings: 18 | Ratio: 0.72 | Mystery: 3 | Legibility: 3 | Preference: tolerated | Notes: very few trees, parking |
|---------|-------------|---------------------------------|-----------------------------|-----------|-----------|-------------|----------------------|-----------------------------|

The amount of trees and shrubs is rather small. There are three larger trees in the yard: a 18 m tall maple tree (*Acer*) at the far north-east border of the yard, a 14 m tall lime tree (*Tilia*) and a 9 m tall apple tree (*Malus*); the latter two possess low-growing branches. Older shrubs such as lilacs (*Syringa*) grow
under the mentioned trees. This main group of greenery takes up ca. 20 % of the yard, all compactly situated in one corner of the space. There are five singular, 1 m tall lilac shrubs in the south-west side. The inhabitants appreciated the yard, yet many of them explained that there was no need for more trees. The size of the yard was described by the residents as measured from wall to wall. In the case of Lenina iela, the trees have an impact neither on perceived mystery or legibility numbers, nor on ground size of the yard: the width and length as evaluated by the model and by the inhabitants are equal. Similarly, the height of the trees does not influence the theoretically estimated height of the space. Thus, the category of this space remains the same. The impact on the trees with low-growing branches and shrubs on the preference, if theoretical and respondents’ evaluations are compared, is neutral since none of the inhabitants mentioned the vegetation in their answers as having a positive or negative effect on their judgement.

![Figure 5. A yard in Kengarags I](image)

In the aerial view one can see a yard marked by a white contour; this space is categorized as a theoretically open-undefined and disliked yard. A white transparent field with black lines is a smaller area described by some inhabitants as “their yard”, which is visible from the stand point (a black circle); this yard is categorized as enclosed. A black interrupted line indicates the trees. A red field indicates trees with low-growing branches and shrubs. The landscape photo depicts the yard in a wide angle.

The last case is a scene in Kengarags. The yard in question is considered to be an open-undefined space according to the model. Its area measures 60 × 80 × 75 × 90 m; the yard is surrounded by buildings of 14 m in height. It also has three ca. 14 m wide gaps visible from the current stand point, which gives it 3 points of mystery. The yard does not possess a single element of legibility if only the walls of the buildings are taken into account (see Table 10).

**Table 10. Scene E, Kengarags. Results of visual analysis**

| Scene | Ground: 60, 80, 75, 90 (mid:.76,25) | Heights of the buildings: 14 | Ratio: 0.18 | Mystery: 3 | Legibility: 0 | Preference: disliked | Notes: Groups of trees |
|-------|---------------------------------|-----------------------------|----------|-----------|-------------|-------------------|----------------------|

The respondents, however, claimed that their yard is much smaller, it extends “up to the trees”. This tree-bordered space takes up ca. 50 % of the yard. The largest group crosses the yard to the east-west direction roughly along the central line and takes up ca. 60% of the trees in the scene. The group is quite transparent as there are no low-growing branches in it. The trees are taller than buildings, ca. 18 m in height. Another 25 % grow along the north-west and south-east direction of the yard, very close to the façades on both sides of a small side-street (6 m wide), it is a group or unevenly lined trees. Also, there are almost no trees with low-growing branches. A rather small group of trees (15% of all trees in the yard) is a birch (*Betula*) alley running along the north-west to south-east façade. There are also some decorative shrubs that are pruned above the line of a human eye in this yard, they are mostly situated along the north-east – south-west axis. The shrubs together with some trees with low-growing branches are somewhat blocking a distant view to the Daugava River. They compose ca. 5 % of the total tree amount and constitute ca. 4 elements of legibility. The interviewee who looks into the yard sees an almost even plane, framed by trees and shrubs. This plane which is ca ¼ of the whole yard is surrounded by the mentioned groups of trees as one can see in Figure 5.
If the new yard is considered to be the tree-bordered space, then the new parameters of the ground are $15 \times 20 \times 18 \times 23$ m, but the height is 18 m, the new ratio being 0.94. Such a space belongs to a category “enclosed”. The data are summarized in Table 11.

| Scene E, Kengarags. Results of Interview Analysis | Enclosed space | Ground: 15, 20, 18, 23 | Heights of the Trees: 18 | Ratio: 0.94 | Mystery: 3 | Legibility: 4 | Preference: disliked | Notes: Change of category |
|--------------------------------------------------|----------------|------------------------|--------------------------|-------------|------------|--------------|------------------------|--------------------------|

The respondents claimed that they did not like the space. One of the reasons is that there are too many trees here. For instance, 22 year old Janis said, “I would like to have less trees. More sun.” The respondents indicated that there was not enough space for them, which is an expected reaction to the spaces belonging to the enclosed category. Janis used a gesture to indicate the trees he was referring to. He showed to the shrubs and trees on the north-east – south-west axis, which was almost the only natural legibility elements in the scene. Consequently, there is a need to investigate more closely if these are the only trees he preferred to be eliminated. Janis is willing to sacrifice the legibility for a larger space.

4. Conclusion

It can be concluded that one of the specific reasons why trees with low-growing branches and shrubs play a role in the settings of an open-undefined and enclosed category is their association with the specific type of a refuge – legibility. Low branches permit to climb the tree and observe the scene from an advantageous position. Shrubs form a shelter that cannot been seen-through as well as depending on their position permit to observe the scene that is revealed behind them safely.

Moreover, the legibility seems to have a positive impact on the inhabitants in the settings that fall under the category of an open-undefined space. It can be assumed that trees with low-growing branches and shrubs in this kind of space known for its largeness and vastness create the necessary option to withdraw oneself.

On the contrary, legibility created by low growing branches and groups of shrubs in an enclosed space known for the feeling of entrapment it fosters, has a neutral or negative evaluation since enclosed spaces are well-defined and overseeable; in such a space a supplementary element of legibility is not necessary.

The article provides the basis for further investigation into the role of trees with low growing branches and trees in an urban context. For this reason, in situ interviews targeted towards the above discussed issues are necessary.

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