

Road aesthetics – Traffic safety

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Abstract

The general aim of the study is to increase the understanding of the safety problem with regard to the aesthetic requirement of the road traffic environment.

This study is a first-step study within the area of aesthetics – traffic safety and it owes its origin to the need for a description of aesthetically pleasant road-traffic environments. It deals with aesthetics and safety from the drivers' point of view, and was carried out as a qualitative inquiry. The study focuses only on the drivers' need, since, from a traffic safety viewpoint, drivers are more dangerous than vulnerable users. The aim was to describe the traffic environment from the road users' perspective, in terms of the question of aesthetics and safety. What is *beautiful/pleasant; ugly/boring; safe/secure; dangerous/insecure* in a traffic environment. No specific hypothesis was formulated.

The general conclusion of the study is that attractive road environments make drivers feel better, but not necessarily safer. Pleasant road environments and pleasant views are regarded as important for the drivers. Well-defined, natural spaces and natural elements, that balance the environment, are preferred to wide-open asphalt areas. An important conclusion of this study is that drivers do relate aesthetics to the functioning of traffic safety. Despite preferences for aesthetically positive environments, drivers, in the first place, prefer those traffic environments which also facilitate functioning.

Keywords: *aesthetics, safety, beautiful, ugly, boring, pleasant, safe, secure, dangerous, insecure, environment, traffic safety, road user, taxi drivers, experienced drivers, inexperienced drivers, disabled drivers.*

1. Introduction

Conceived from the ethical principle that no one should be killed or seriously injured in a traffic accident, the Swedish National Road Administration has developed the concept of "vision zero" (Vägverket, 1996). According to this, the aim of the area of traffic safety is to try not only to reduce, but mainly to eliminate, the risk of health impairment due to road accidents.

On the other hand, the Swedish Road Act of 1999 requires architects and planners to take aesthetic considerations within planning (SFS 1998:803). In this regard there are, some opinions claiming that an aesthetically positive road environment could influence user-behaviour in a positive way, and thereby improve safety.

The process of road design involves many tug-of-wars and wills between architects and engineers, and the drafting of the final blue print of an aesthetically positive road environment should be that which gives a minimum of disadvantages from a traffic safety viewpoint, or that which also offers some safety improvements. The main challenge in order to realise this, is to know when the concept of aesthetics would improve safety and when aesthetic elements may jeopardise the user's security.

Just as there is a need for aesthetic design of the infrastructure, there is a need for knowledge of when planting, decorative elements, etc, are advantageous from a traffic safety point of view. This does **not mean** delimiting creativity but it does mean helping planners, engineers, architects and artists in taking responsibilities. As aesthetics has become a main trend within infrastructure planning, it has given rise to the idea that a beautiful road space would influence the traffic safety in a beneficial way. An aesthetic positive road traffic environment would be safer than any other - is this true?

In order to develop a relationship between aesthetics and traffic safety, an attempt must be made to find a general description of what an aesthetically positive or negative road traffic environment is. As our comprehension is that professionals have other aesthetic values than a layman (Nasar, Purcell, 1990), the basic assumption is to study the concept of road aesthetics from the user's point of view. Once road aesthetics have been described, we may continue to make some measurements in those environments from a traffic safety point of view.

This paper presents what a beautiful or ugly road environment looks like from the users' points of view.

2. Research method

This study is an exploratory qualitative investigation, designed to describe those aesthetic factors which contribute to the drivers' positive and negative experiences with regard to the traffic environment. Methodologically, this study is mainly an application of the *grounded theory*, (for a more detailed description see Strauss & Corbin, 1990).

The data was collected with the help of a general interview guide approach designed to explore the same concept with each participant. A set of issues was outlined before interviewing the participants. The main strategy was to design the study for *negative cases*. This means that I wanted to obtain, from the participants, not only the description of the concepts but also the description of the opposite of the described concepts. The wording of the

questions was not determined in advance, apart from the first question, which was the same for each participant: “Vad är det som får dig att säga att någonting är vackert eller fult?” (What do you mean by beautiful or ugly?). The reason for asking such a question is that one can better understand what people mean by *beautiful* if one also understands what people mean by *ugly*. This interview guide served as a basic checklist, making sure during the interview that all the premeditated concepts were covered.

With regard to the aim of the study, I wanted to find out what ordinary drivers mean by *beautiful/ugly*; *pleasant/boring*; *safe/dangerous*; *secure/insecure* generally and in a traffic environment. These factors are consequentially **premeditated** in this study.

The investigation involves four driver categories: *taxi*, *experienced*, *inexperienced* and *disabled drivers*. Each category contains 12 individuals.

The research setting is the road traffic environment of the city of Lund in the south of Sweden. For practical reasons, only some of the *experienced* drivers were interviewed in the traffic environment. The categories of *inexperienced* and *disabled* driver were not interviewed in the field, but at our department.

The professional (*taxi*) drivers were exposed to the traffic environment during the interview. The specific purpose of field-interviewing was to give the drivers the possibility of taking me to specially positive or negative traffic environments, and showing me details regarded by them as important. The procedure was to stopover in some of those environments, and let the drivers take pictures of those environments or details they chose to point out.

3. Analysis of the data

The main strategy in analysing the interviews was to begin with cross-case analysis, which meant grouping together answers from different respondents to common questions and analysing common viewpoints.

The data was voluminous, consisting of a wide but manageable nominal data (sentences or words). Due to the qualitative nature of the study, the frequency of occurrence of a particular description was not regarded as important and for that reason not determined, but noticed. During the transcription, the data was subdivided into four different units, expressing descriptions of what the respondents considered beautiful/ugly, safe/dangerous; secure/insecure; and pleasant/boring. This process of categorisation facilitated the analysis. The classification also includes a sorting procedure of the different categories into different levels: general, the physical environment, the traffic environment and the detailed elements of the traffic environment. The process of categorisation was a four step procedure.

4. Validity of Content Analysis

This study utilised only one coder: myself. This can prompt a variant of coding.

The validity of the analysis and findings is supported by the combination of the methodologies I used. I chose triangulation and negative cases, from different evaluation research strategies. According to Patton (1990), there are primarily four kinds of triangulation, which provide verification and validation to a qualitative analysis. Of these, I used principally *methods triangulation*, which means checking out the statement by different data collection methods and *theory/ perspective triangulation*, which supposes the use of multiple perspectives to elucidate the data. The integrity of the analysis is also protected by *negative cases*, which means testing rival explanations of the respondents. This procedure was done inductively to some extent, but most of all logically.

The integrity of the selected premeditated factors used as inputs can be defended by the fact that it is possible to describe experience of the physical environment with the help of words (Küller, 1991).

5. Results

For the sample of car drivers in this study, the main results are the **character** of the patterns, the **component** of the patterns and the **typology** of the road traffic environment from an aesthetic and safety point of view. The character of the patterns represents *the type* of the classification. The component of the patterns represents those *main* aesthetics and safety concepts that are representative for the traffic environment. The typology of the traffic environment describes the *main characteristics* of the traffic environment from both aesthetic and safety points of view.

The character of the patterns:

Aesthetics

Level	Positive Concept Beautiful	Negative Concept Ugly
General	Abstract	Abstract
	Concrete	Concrete
In the Physical Environment	Concrete	Concrete

Safety

Level	Positive Concept Safe	Negative Concept Dangerous
General	Abstract	Abstract
	Concrete	Concrete
In the Physical Environment	Concrete	Concrete

The components of the pattern:

Aesthetics

Level	Positive Concept Beautiful	Negative Concept Ugly
<i>Generally</i>	<i>Consideration</i>	<i>Monotony</i>
In the Physical Environment	Nature	Material
	Shape	Shape
	Colour	Colour
	Lighting	Rubbish Kitsch

The main *abstract*, aesthetic, positive concept on the general level is *consideration*. It is defined as describing the drivers' positive emotional feelings concerning the social environment. It consists of concepts such as *love, to care about each other, to take others into consideration, etc.*

The general pattern describing aesthetically satisfactory environments is made up of four *concrete* aesthetic concepts, which are *nature, shape, colour and lightness*.

The concept of *nature* includes all types of vegetation: *grass, flowers, trees* and generally *green areas*. The aesthetic experience of the driver increases when the environment contains natural elements such as trees and flowers.

The next concept, *shape*, includes regular forms, simple forms, gently rounded forms and organic forms. *Colour* is defined as soft, "earthy", clean, bright colours. Light, clean, earthy colours in the traffic environment are experienced positively from an aesthetic point of view.

The last concept, *lighting*, means a particular light in the environment, which gives brightness, and increases the pleasantness of the observed environment.

The main negative, *abstract*, aesthetic concept on the general level is *monotony*. It represents a rather varied area: *the same thing all the time, nothing ever happens, repetition, the same pattern, never any feedback from others, etc.* The same pattern and colour in large areas can be experienced as monotonous.

The pattern of the negative, aesthetic concept in the physical environment is also divided into five categories: *material, shape, colour, rubbish* and *kitsch*.

The concept of *material* includes *concrete* and *asphalt* when used in **large areas**. Due to this general opinion, it is not surprising that most of today's road traffic environments are not experienced as beautiful.

The *shape* describes "angular" "pointed" forms, but also imbalance between different objects. *Colour* describes *grey* and other indistinct *colours*, as well as *loud colours*.

The last concept *kitsch* is *too many details, too much decoration, many unnecessary elements, and trash*. Too many elements or too many details are experienced as negative.

Safety

Level	Positive Concept Safe	Negative Concept Dangerous
General	<i>Control</i>	<i>Lack of Control</i>
		<i>Criminality</i>
		<i>Ruthlessness</i>
In the Physical Environment	<i>Protection</i>	<i>Exposition</i>

The positive, *abstract* concept of the safety factor on the general level is *control*. It describes the need of the individual to be *prevalent*, to be able to *influence* the circumstances in order to experience safety.

The pattern of the positive concept of the physical environment consists of one concept: *protecting*, and it describes environments which give *protection* and *refuge*.

The negative, *abstract* concept of safety on the general level consists of three different categories: *lack of control*, *criminality* and *ruthlessness*. The concept of *lack of control* describes *helplessness*, being *exposed* to the circumstances and being *vulnerable*. The next concept, *criminality*, describes the danger of being victimised by intention. On the other hand, the concept of *ruthlessness* also describes the danger of being victimised not by intention, but *nonchalance*, *indifference*, and the *inability* to show consideration to others.

The negative concept of the physical environment also consists of one pattern: *exposure*, which describes environments that *jeopardise* safety.

The typology of the road traffic environment:

As the final goal of aesthetic design in the road traffic environment is to improve not only users' experiences but their safety as well, the concepts are regarded as negative or positive, according to the questions of traffic safety.

Road Traffic environment	The most positive concept	Negative concept	Positive Concept	The most negative concept
	<i>beautiful/safe</i>	<i>beautiful/dangerous</i>	<i>ugly/safe</i>	<i>ugly/dangerous</i>

Beautiful/Safe

The *beautiful/safe* traffic environment often contains vegetation, trees or flowers. The proportion between the houses is experienced as being in harmony. The road space is well defined and considers the users' requirements. The shapes are experienced as soft, partly because of the forms of the buildings and partly because of the contribution of the vegetation. Such a traffic environment often consists of particularly beautiful detail elements like flower-arrangements or set paving. The colour of this environment is mainly earthy and soft. The lightness in the environment emphasises the positive qualities. This kind of environment does not contain huge, grey areas of asphalt, concrete, or other patterns contributing to some monotonous or sad experiences. It is free of garbage and unnecessary elements. The driver experiences this environment as safe, mainly because it enhances control and it is easy to understand. Furthermore, it lacks complicated elements which could contribute to contradictory circumstances. It is also important to note that the traffic environment experienced as *beautiful/safe* is also very often an environment with a limited "volume of motor vehicles".



Fig. 1 Beautiful/Safe

Beautiful/Dangerous

The concept of *beautiful/dangerous* contains the same aesthetic patterns as *beautiful/safe*. Here, the built environment, and not "nature" contributes to aesthetically positive experiences. The environment is beautiful, due to the proportion, shape and colours of the houses, the existing detail elements, the experienced "right" proportion of the buildings, the road space and so on. This environment is experienced as dangerous as it contains important signs "hidden" for the driver.



Fig. 2 Beautiful/Dangerous

Ugly/Safe

The *ugly/safe* traffic environment contains large areas of asphalt or concrete and “pointed” shapes. Garbage is often present in this kind of environment. It is experienced as monotonous and grey despite the existing vegetation. The proportion between the buildings is experienced as a failure, and a *grey colour* often characterises the environment. This environment is experienced as secure as the design makes it easier for the driver to understand the existing situation and hence be in control (see fig. 3).



Fig. 3 Ugly/Safe

Ugly/Dangerous

The *ugly/dangerous* traffic environment is characterised by the same aesthetically negative aspects as the category of *ugly/safe*, but the character of extension is particularly emphasised. The most distinctive characteristics of such an environment are large areas of asphalt or concrete. The feeling of being *exposed* in this environment is consequently reinforced by the design. The “proportion” of the road space is experienced as too large and the “volume of motor vehicles” in this environment is also relatively high (see fig. 4).



Fig. 4 Ugly/Dangerous

6. Conclusions

For these results, a beautiful road traffic environment is:



Fig. 5 Beautiful road environment

- Well-defined.
- Often contains *natural elements* such as vegetation, trees, flowers, etc.
- In the absence of vegetation, then it is the built environment's *shape* and *colour* that determine aesthetic satisfactory experiences.
- The shapes are soft or softened by vegetation or flowers, and in the "right" proportions.
- The colours are natural, earthy and clear. Often bright.
- A special lightness which contributes to the brightness of the experienced colours

For these results an ugly road traffic environment is:



Fig. 6 Ugly road environment

- Not well defined.
- Huge traffic environment spaces
- In the absence of huge road spaces, then it is the built environment's *shape* and *colour* that determine aesthetically unsatisfactory experiences.
- The colour of the buildings are grey or experienced as such because of great distances.
- The shape of the built area is in a "failed" proportion.
- Contains huge *grey* areas of asphalt or concrete.
- Lacking in *natural* elements such as vegetation, trees or flowers.
- If vegetation exists, it is not taken into account because it is too distant.

General conclusions:

- Set pavements, crumble stones and pavement stones are experienced as beautiful but dangerous as they get slippery when wet.
- Set pavement is not appreciated if the same material or pattern is used in large areas.
- Natural elements of flowers or other kinds of vegetation are experienced as more beautiful than artificial flower-arrangements.
- The more in the centre of the built-up area the greater the acceptance of artificial flower-arrangements.
- The longer the distance from the centre of the settlement the less the acceptance of artificial-arrangements.
- The centre is identified by artificial flower-arrangements, and peripheral areas by natural vegetation-elements.
- Too many elements of concrete in the environment are not appreciated.
- “Beautiful” can be experienced as ugly if the subjective experience of danger is high.

The investigation was based on two assumptions. One, that ordinary drivers are able to describe aesthetics with regard to the road traffic environment and hence traffic safety. Second, that it is possible to find a pattern of aesthetics to describe the road traffic environment. The findings support these two assumptions.

The investigation has shown that *natural* elements such as flowers, trees and green areas contribute to positive environmental preferences from an aesthetic point of view. This finding is supported by earlier research studies confirming people’s preferences for trees or other natural elements and natural areas (e.g. Kaplan & Kaplan, 1989; Ulrich 1983, Ulrich, 1984). Previous research also suggests that drivers’ preference for beautiful natural environments can influence the choice of the route (Ulrich, 1973).

However, this does not mean that all that is natural is likely to be preferred. It has been confirmed that individual’s show preference for large, old trees whereas small trees and large densities of trees are not preferred (Ulrich, 1986).

One challenge from a safety point of view is that even if natural elements are aesthetically preferred, they do not necessarily improve traffic safety. Then, what differentiates preferred natural elements, which are favoured from a safety point of view, from those which are not? Apart from a few studies discussing the correlation between tree plantings and traffic accidents, there is practically no research indicating a relationship between natural-elements and traffic safety, especially not in a townscape (Vejdirektoratet, 1997).

Interpreting the results from a traffic safety point of view, it is important to note that the findings reflect the drivers’ subjective risk experiences and not the objective safety situation. If we accept the risk model of Klebelsberg (1982), that a high subjective safety is often inadequate from a traffic safety

point of view, then we can also say that the experienced *safe* traffic environments might not be very desirable.

However, the question is not that simple, but one conclusion from this study is that the importance of over-stimulation of drivers should not be underestimated, regardless of whether it takes effect in aesthetic or risk experiences. If the subjective risk considered by the drivers is “continuously too high” in the environment, then the individual is aroused over the intermediate level of risk-experience, which in time can be objectively dangerous for the individual. This intermediate arousing-level should also be considered in questions of aesthetics.

From these very different viewpoints, an important conclusion is that aesthetics in the road traffic environment should be related to the functioning of traffic safety. That drivers primarily prefer traffic environments that also facilitate functioning and safety is hardly surprising, and it is reasonable to assume that the aesthetics factor is marginal when the environment is experienced as dangerous. As long as the results have not been quantitatively tested, the findings of *beautiful/safe*, *beautiful/dangerous*, *ugly/safe* and *ugly/dangerous* types of traffic environments may serve as interesting hypotheses for further research.

7. Further research

From a safety viewpoint, the results reflected the drivers’ subjective (hence not objective) aesthetics and risk experiences in addition to the described environments. Once a general pattern for a *beautiful/ugly* road environment was founded, the next step was to investigate whether the drivers actual safety behaviour was different in aesthetically different environments. The next project attempted to elucidate whether the driver’s actual behaviour is different in aesthetically different road environments.



Before the cherry trees in blossom



During the cherry trees in blossom

Speed measuring, in an environment with possibilities of manipulating aesthetics, shows that aesthetics tends to induce changes in drivers’ behaviour in a positive direction.

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