

Effect of Visual Pollution on the Child Behavior Cas of Batna

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Abstract

The issue of traffic congestion in front of schools is the result of the extensive use of private cars by parents; it is one of the main problems that all cities around the world suffer from.

Batna city is known for its rapid urban growth that does not go along with progress in various areas of life; among these problems is traffic congestion all the day, especially in front of schools when children go out due to the intensive presence of private cars that, despite their effectiveness for comfortable and safe transportation for the child, they cause many damages and negative effects such as pressure, tension and accidents before the school.

Through a field study based on observation, photography and a questionnaire, we tried to show the effect of the intensive presence of the car on the city scene on the part of the child. The results of the study enabled us to extract some suggestions that help to solve this problem.

Key words : Child ; Visual pollution ; Traffic congestion; Car; Batna.

INTRODUCTION

Through their publications, a lot of researchers express the degree of dynamism and complexity that exists between the child and the city in which he/she lives, which is sometimes worrying. Some authors point out, for example, that cities are less and less adapted to children, generally designed to meet the needs, habits and means of adults, particularly motorized adults¹. The importance given to the problems caused by urbanization is reflected in the abundant scientific literature devoted to the direct and indirect effects of urbanization on children, particularly in terms of health², mobility³ and social integration⁴.

With the industrialization of cities, transportation has improved greatly (railroads, cars and aviation were created), congestion is partly related to urbanization. Urban history gives many examples. In the 40s of the first century BC, Julius Caesar, who had become emperor, banned the circulation of chariots between sunrise and sunset in Rome in order to relieve the congestion of a network of roads that was unsuitable for a city of this size.

Like large Algerian cities, Batna city has experienced a sharp increase in the use of cars, an increase in demand for transport⁵. The fleet of the city, includes December 31, 2005, 31279 vehicles, against 31 December 2013 is 95239 vehicles⁶.

Motorized vehicles currently occupy two thirds of the road space in the city center, more than 80% in the periphery⁷. This increase is remarkable on the road networks and parking spaces in downtown Batna.

1 Commission européenne, 2002; Sutton et Kemp, 2002

2 Adelman et al., 2005; Pabayo et al., 2010; Smargiassi et al., 2009

3 Bachiri et Despré, 2008; Mcmillan, 2005

4 Granié, 2004; Hillman et Adams, 1992; Jutras, 2003; Moore et Young, 1978

5 DPAT, 2008

6 DRAG, 2012

7 Etudes de faisabilité d'une ligne de tramway à Batna (2009):RAPPORT DE SYNTHÈSE, mars 2009. P.24

Many researchers have taken into consideration the children, their needs, their health⁸, educational⁹, psychological and social requirements¹⁰, ignoring the needs of urban and architectural engineering and standards of urban planning in accordance with the standards and sizes of children¹¹.

Many problems are posed which concern, the route towards his/her school, and the surroundings of this last one according to his/her immediate environment notably the type of road used, the importance of the school as well as the age of the pupils who compose it.

Let us classify these problems according to their nature; let us first think about the danger generated by the car, this insecurity is both objective and subjective, linked to the speed and to the conflicts between the motorized vehicles and the weakest users which are children.

The importance in number of the use of the motorized private vehicle towards and around the schools, which generates a more than dense road traffic. And finally, the difficulty of parking in front of schools aggravates the congestion of the streets and generates dangerous behaviors for children. We can wonder about the influence of this congestion on the behavior of the child? How the urban morphology and planning can generate congestion in Batna city?

To achieve all these demonstrations, we used a conjunction approach that demonstrates that the behavior of individuals is inseparable from the environment (we will show here how urban morphology can generate visual pollution that will influence the child behavior).

The idea of a lived environment gives the phenomenology of perception (Merbeau-Ponty 1945) enormous relevance in the research on the child's reading of the city, this last is then studied through the child's own perception, so from this approach, instead of worrying about the impact of the city on the child, we are interested in transforming the city into a better place for growing up.

The "classroom" survey is a very important step; it allows the analysis of pupils' travel patterns through questionnaires and interiors conducted in classrooms and near schools.

This approach allows, in addition to the data it brings, to inform the pupils and teachers of the ongoing project and to push to the discussion the pupils of 4th and 5th year primary, who are between 8 and 11 years old.

The photo survey shows the problems related to pollution seen and encountered by the children.

Therefore, the objective of this research is to:

- Enhance the problem of traffic in front of schools.
- Confirm the effect of traffic on children's behavior.
- Confirm whether traffic congestion in front of schools is a visual pollution according to the child.
- Identify the characteristics of visual pollution according to the child.

PRESENTATION OF THE CONTEXT

Batna is located on a basin relief surrounded by mountains, Batna city ensures the articulation of regional spaces of North and South and also the east-west transition between Batna to Constantine, Biskra, Khenchla and Setif.

The urban development of the Batna city has experienced many difficulties despite the great advantages of its strategic position.

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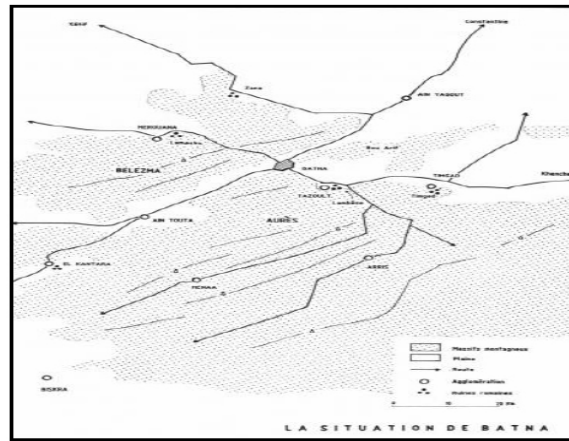


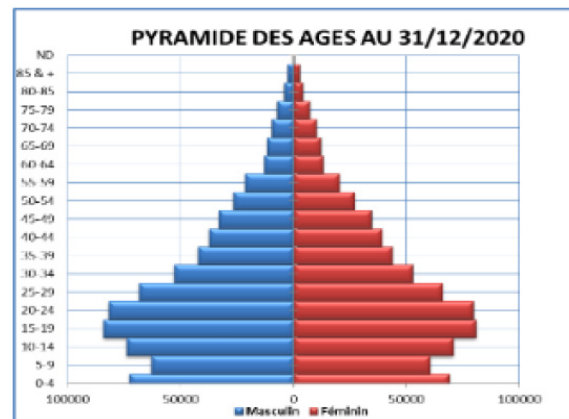
Figure 1. Situation and Limits of Batna City. Source: M. Cote, «Batna», *Encyclopédie berbère*, 9 | 1991, 1389-1394.

DENSITY AND POPULATION OF BATNA CITY

The population of the municipality of Batna is estimated at the end of 2020 to (355,460 hab²).

This last puts pressure on the goods, services and urban public transport network and the road network of Batna city.

The category of children of (6-18 years): category of pupils is estimated at 91961 people, or 25.31% of the total population of the field of study, which requires the realization of structure and equipment appropriate to accommodate this segment of the population¹².



Graph 1. Age pyramid to December 31st, 2020. Source: Monographie Batna, 2020

EVOLUTION OF THE URBAN FABRIC AND URBAN MORPHOLOGY OF BATNA CITY

The examination of the map indicates that the districts located in the center of the agglomeration are among the most dense ones, whereas in the peripheral districts the density is looser. This observation is explained by the fact that the city center is totally urbanized with a few constructions (collective housing).

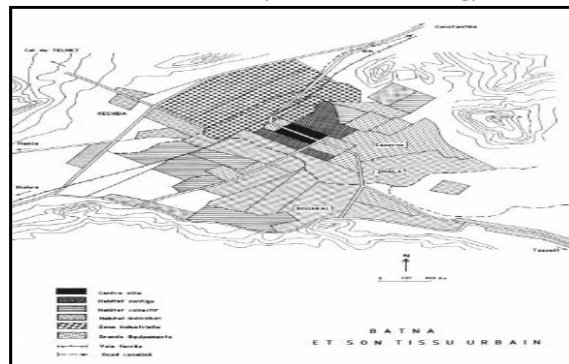


Figure 2. Batna and its Urban Fabric. Source: M. Cote, «Batna», *Encyclopédie berbère*, 9 | 1991, 1389-1394.

¹² 2020 statistical report for the benefit of all surveyed municipalities

The city center is the very type of the colonial creation, city laid flat in a uniform site, rigid checkerboard plan, small low houses with red tiles. The urban core still reflects today its origin; this redesigned old colonial core is now drowned in a disproportionately large fabric. Fabric made up of a certain number of large building complexes, built by the State, in contrast with complexes of self-built housing, lower down, very homogeneous in their detail variety¹³.

The analysis of the evolution of the urban fabrics of Batna city highlights the process of evolution of the urban structure, the different spatial and functional mutations and the current urbanization directions.

Having its specific urban fabric, the city center is both the city in its historical and heritage dimension and the center determining the attractiveness and influence of the city, given the concentration of commercial, administrative, cultural and service structures that contribute to its urban animation.

The surface of this fabric is 222,52 Ha. The constructions are generally dwellings in ground level (GL) and in GL+1. This fabric is undergoing interventions of demolitions and reconstruction in a modern style with a height which varies between the GL+2 and the GL+3 with integration of the commercial activities in the ground level. We can also note the concentration of commercial centers and the presence of equipment.

THE ROAD NETWORK, A FOUNDING ELEMENT OF THE CITY

The city is not an indifferent space, it should be based on education, its opening or closing, its facilitation or not to the meeting condition the modalities of the emotional experience in the knowledge of the daily life.

The structure of the city is in permanent transformation; the residential districts spread on the peripheries which requires the construction of new communication roads or the road network forms a space "closed" by built objects or equipment which distinguishes it from the way.

The latter can be defined as "a developed, artificial roadway" which is "intended to link localities and to serve rural areas".

The street has a certain importance, it has a layout, a longitudinal profile and a cross profile; it can be: straight, sinuous, with decreases. It is composed of: pavement, sidewalks, possibly lateral central solid earth, planted or not, lateral ways of desserts and other arrangements of circulation, cycles and for parking lots.

It can have a variety of urban furniture as in the case of central urban spaces and rarely in the suburbs.

Each era and each urban culture has its own uses and needs which are reflected by these street furniture objects. This is why the position of the building in relation to the street, the density of the buildings, their alignment, the presence of vegetation, all this creates very different urban forms.

The space of the city should be an educational space, because the meeting can stimulate and awaken a certain anxiety. The city is not an indifferent space; its opening or closing, its facilitation or not to the meeting condition the modalities of the emotional experience in the knowledge of the daily life.

The structure of the city is constantly changing, residential districts are spreading on the periphery requiring the construction of new communication roads or the road network forms a space "closed" by built objects or equipment, which distinguishes it from the way. The latter can be defined as "a developed, artificial roadway"¹⁴, which is "intended to link localities and to serve rural areas".¹⁵

The street takes up a certain right-of-way, it has a layout, a longitudinal profile and a cross profile: the street can be straight, sinuous, with decreases. It is composed of: pavement, sidewalks, possibly lateral central solid earth, planted or not, lateral ways of desserts and other arrangements of circulation for buses, cycles and for parking lots. It can have a variety of urban furniture as in the case of central urban spaces and more rarely in the suburbs. These urban furniture objects reflect the uses and needs of each era and urban culture. This is why the position of the buildings in relation to the street, the density of the constructions, their alignment, the presence of vegetation contribute to create very different urban forms.

13 M. Cote, "Batna", Encyclopédie berbère, 9 | 1991, 1389-1394.

14 Brunet R., op. cit

15 Merlin P., Choay F., Dictionnaire de l'urbanisme et de l'aménagement, Paris, Presses Universitaires de France, 1988

The Child and the Road Network

The child is thus in contact with the elements of the city. He (she) discovers his (her) own body, develops his identity and builds a personal image of the world through his relational experiences and his confrontation with the environment.

Any movement in space and time evokes birth and separation. The passage from the family space to the school space, subject of our research, is also configured as an initiatory rite.

A course of study is selected "Ben Boulaid alleys" has a critical size and a historical richness, structured along penetrating, receiving an important traffic mainly car traffic, this boulevard of 1 km shelter mainly 4 elementary school on the same axis where the mobility of children is very strong.

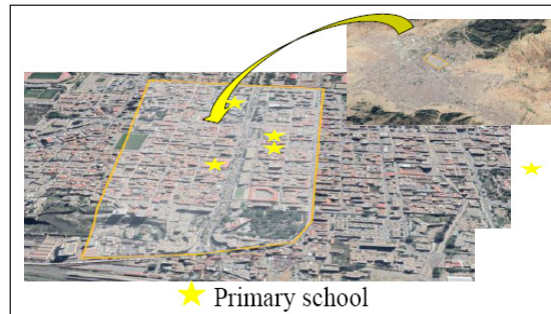


Figure 3. Boundary of the Case Study. **Source:** Author 2021

Historical Review: Modification of the Urban Landscape Depending to the Car

Over time, the urban landscape of Batna city has been transformed to accommodate motorized vehicles and to adapt the public space to the car.

This modification of the urban landscape was made by the intensification of the road network, particularly by widening the roads and creating others. It has been accompanied by a dense urbanization along the major road axis.

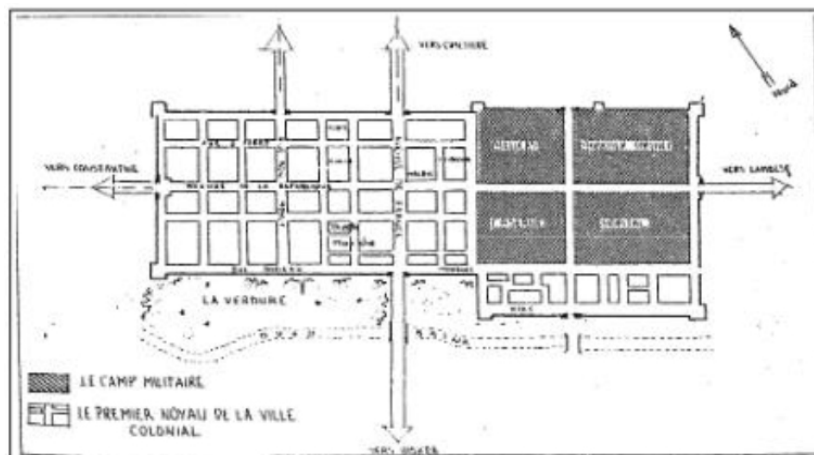


Figure 4. The Central Core of Batna City. **Source:** PDAU 1998



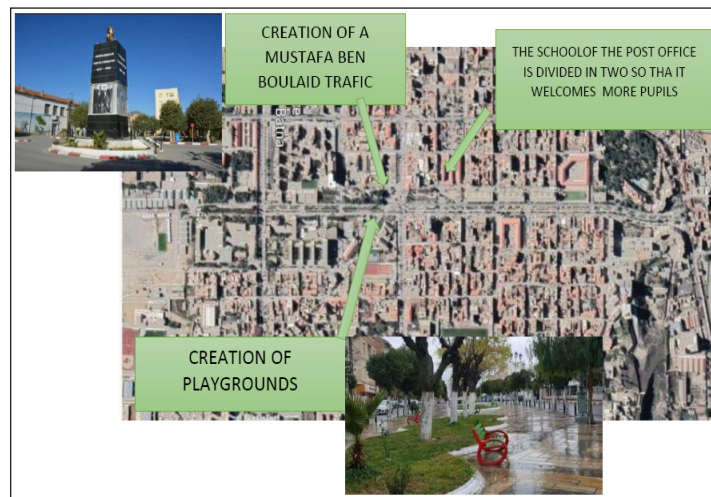


Figure 5. Changes in Urban Morphology Over Time. source: Author2021

THE PERPETUAL PASSAGE OF CARS

With the concentration of schools in certain districts of the city the case of Ben Boulaid Alleys in Batna where everyone arrives at the same time; on 1km along the alleys, there are four primary schools including two very important in terms of population. Result: Parking near the schools becomes a real challenge on a daily basis; the exit of the classes causes each day big traffic jams, so graceful that some parents park in front of the houses, preventing the residents from leaving their homes, a lively and fast traffic has gradually chased away the accessible users (a child crosses the street) the passage of the street is completely exhausted, replaced by a permanent scrolling of vehicles that constantly provokes the gaze, with the growth of traffic; the visual intruder of the infrastructure either (a road, a parking lot interpose themselves in the visual field of the passages especially to the scale of the child, until sometimes to bar the horizon by (a work ...) which causes pollution.

MATERIAL AND METHOD OF ANALYSIS

Description of the procurement questionnaire and analysis, the daily mobility of the pupils was questioned by a questionnaire presented to two classes of pupils (4th and 5th primary year) of three different schools. The questions related to their practices of the journey home-school in terms of autonomy, time and modality. These proposed questions led to a quantitative processing, also of the questions of a qualitative processing on the problems of displacements, their feelings towards the traffic.

The procurement was carried out in the presence of the researcher, which could help to overcome a certain number of difficulties.

DISCUSSION OF THE RESULTS

According to the tables, the majority of the pupils live in the neighborhood of the school, i.e. less than 1200m from the school, except for those who live very far from the school. In terms of school management, the majority of the pupils live in the neighborhood of the school to which they are attached.

❖ Table (1) shows the distance between the school “El Amir Abd El Kader” and the pupil’s house

Table 1. Check the distance between the school and the house

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 300m	17	31.5	31.5	31.5
	Between 300m & 600m	10	18.5	18.5	50.0
	Between 600m & 900 m	10	18.5	18.5	68.5
	Between 900m & 1200m	5	9.3	9.3	77.8
	More than 1200 m	12	22.2	22.2	100.0
	Total	54	100.0	100.0	

Source: Author 2021

-The results of the survey reveal that 31.5% of the respondents live very close to the school, 22.2% live very far from the school

❖ Table (2) shows the distance between the school “**EL akhdari**” and the pupil’s house

Table 2. Check the distance between the school and the house

	Frequency	Percent	Valid Percent	Cumulative Percent
Less than 300m	14	45.2	45.2	45.2
Between 300m & 600m	8	25.8	25.8	38.7
Between 600m & 900 m	2	6.5	6.5	45.2
Between 900m &1200m	3	9.7	9.7	54.8
More than 1200 m	4	12.9	12.9	100.0
Total	31	100.0	100.0	

Source: Author2021

- The results of the survey reveal that 45.2% of the respondents live very close to the school, 12.9% live very far from the school

❖ Table (3) shows the distance between the school “**Ali Boukhalifa**” and the pupil’s house

Table 3. Check the distance between the school and the house

	Frequency	Percent	Valid Percent	Cumulative Percent
Less than a 300m	12	52.2	52.2	52.2
Between 300m &600m	6	26.1	26.1	78.3
Between 600m &900 m	3	13.0	13.0	91.3
More than 1200 m	2	8.7	8.7	100.0
Total	23	100.0	100.0	

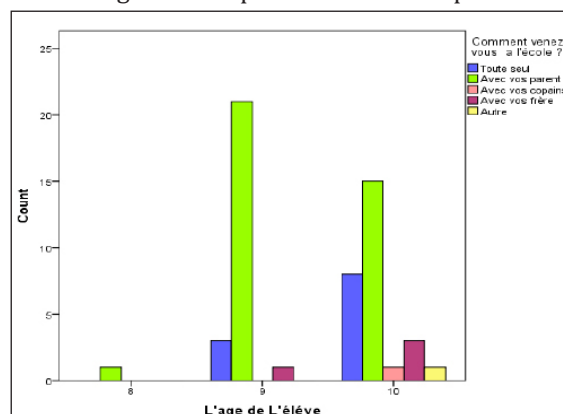
Source: Author 2021

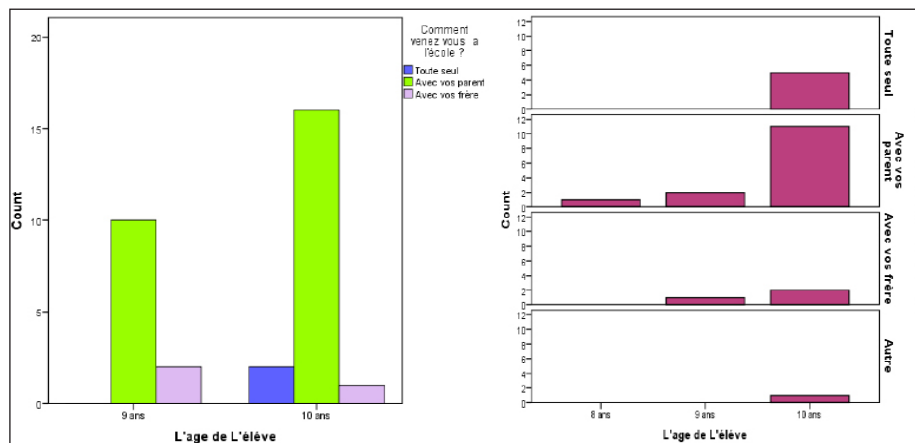
- The results of the survey reveal that 52.2% of respondents live very close to the school, 8.7% live very far from the school.

We can be surprised by this result, because in the 4th question where the pupils were questioned on their way of making the journey between home and their schools, in fact, out of our staff of 120 pupil’s of the three schools, only 15% make the journey home-school alone, on 85% who come accompanied to school, several factors allow to interpret this result:

Age

This table shows the relationship between age and the person who accompanies them.





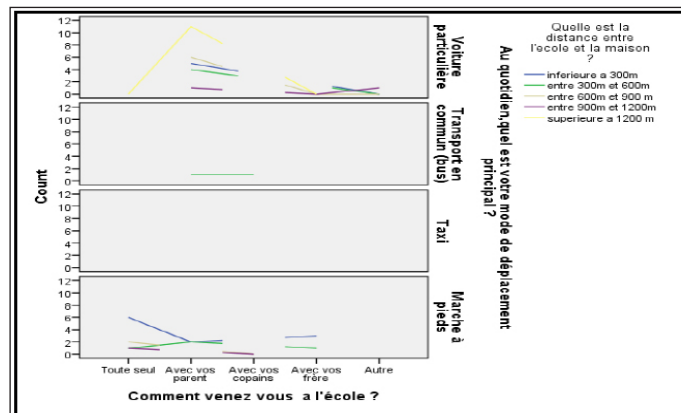
Graph 2. The relationship between Age and the Person who Accompanies them in the Three Schools.

Source: Author 2021

The length of the trip may explain the low autonomy of the pupils, yet 76% of the pupils accompanied are on a trip of less than 10 minutes.

THE MODE OF MOVING

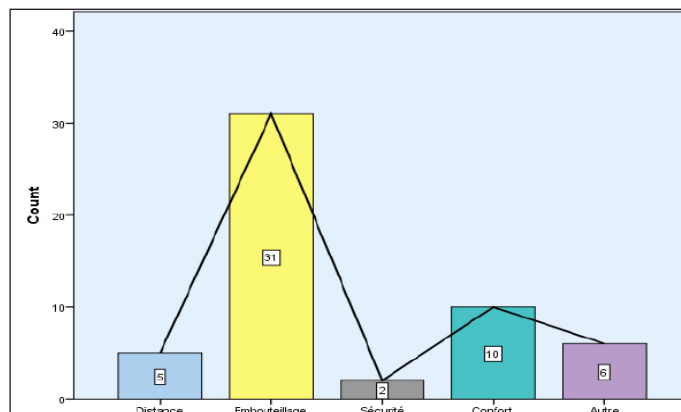
According to the survey, the motorized mode is dominant in the school trips of primary school pupils, accounting for more than half of all trips (fig No...).



Graph 3. Mode of Moving of Pupils. **Source:** Author 2021

MOVING UNDER STRESS

The answers vary, but they have the same continuous term, where the majority of answers are on the subject of traffic jams all the time during the school year, especially during peak hours, answers with feelings of anger of stress caused by traffic jams.



Graph 4. Moving Problems. **Source:** Author 2021

We note that the characteristics of the urban environment are undoubtedly involved, both in terms of the location of activities and the development of public spaces, more or less favorable to walking, also the influence of the length and time of the distance on the choice of mode of transport; the results of the survey indicate that the share of walking decreases rapidly as the distance becomes longer.

PARKING OF VEHICLES IN FRONT OF THE SCHOOL AS A BARRIER OF VISIBILITY

The demand for parking in the city center of Batna at the peak hour (between 10:30 and 11:30) is estimated at 1772 vehicles. Its distribution on all the available places (5100, of which 37%, or 1890, are authorized places and 54%, or 2740, are prohibited) highlights the degree of non-compliance with the regulations in force. Indeed, no less than 672 vehicles (38% of the total) at peak hour occupy no-parking spaces, causing an occupancy rate of prohibited spaces of about 24%. The demand for parking in the city center of Batna varies from one street to another. Indeed, for 15% of the supply, 40% of the demand was recorded, with an average occupancy rate of 95%. This is the case of the streets of the hypercenter of Batna. Conversely, 51% of the supply has received only 7% of demand with an average occupancy rate of 5%. This is the case of the streets at the edge of the city center¹⁶.

In Batna, as in other provinces, the sidewalks near schools are often a mess, some parents who bring their children stop in front of the school gates, ignoring the traffic. This is particularly true every morning, especially during peak hours.

For the children who come alone or accompanied by adults on foot to school, the task is not easy either, between the drivers who want to drop their children off as close as possible to the school gates, those who park wildly, those who live nearby and want to go to work and those who come from outside and are looking for a parking space in the neighborhood.

The situation is not specific to the front of the schools, the phenomenon of the parent motorists is not very conscientious.

The increase in the number of vehicles that circulate throughout the day, especially at the peak hours, is responsible for the traffic congestion.



Figure 6. Traffic in front of the school. Source: Author 2021

Traffic is suffocated in front of schools by lines of cars, which makes the circulation of children on foot or on two wheels disadvantageous, not only that but also the visual field of children becomes very congested because of the ubiquity of cars. This photo represents the visual field of a child on foot crossing the road during peak hours.

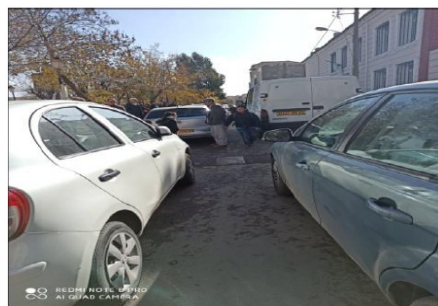
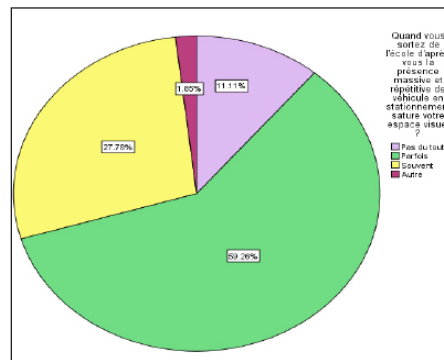


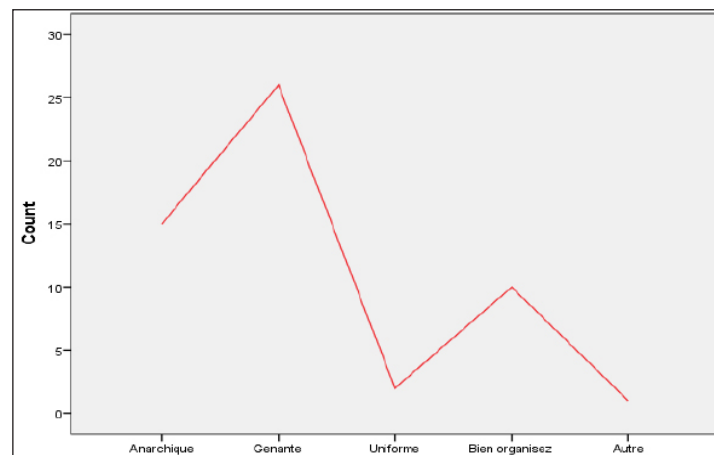
Figure 6. The visual field of a child crossing the road. Source: Author 2021

¹⁶ Study of the Transport and Traffic Plans of Batna city, Phase 5 - Transport and Traffic Plans P6



Graph 5. Relationship between vehicle and child's visibility. Source: Author 2021

According to the survey, 75.9% of the people questioned state that the car distorts and makes the urban landscape ugly, while the rest of the people questioned find that the presence of the car is attractive and pleasant even in the urban landscape of Batna.



Graph 6. Pupils' perception of the presence of the car in front of schools Source: Author 2021

WALKING CIRCULATION AND PARKING SPACE

The results of the survey show that in front of schools the speed is generally less than 30 km/h and with congestion throughout the day especially during peak hours; in this case usually the driver's angle of vision is widened; the problem arises with the anarchic parking of cars in front of schools, which disrupts the identification of the visual field of what is happening around the children, saturates their visual fields and hinders their movements.

In Batna, in the city center, 100% of the roads are now one-way; the negative consequences:

- For the pedestrians, the danger is generally increased. Certainly the traffic only comes from one side, but the speed of the vehicles increases

canyon that values the circulatory function at the expense of local life, the symmetry of the street is broken.

- Spaces devoted to parking have also flooded the streets; with a multiplication of parking lines along the sidewalks as a result of one-way bet...

In total, the car nowadays occupies most of the spaces in the city of Batna.

The walking circulation space that is too narrow prevents the easy crossing of pedestrians and children; and makes illusory any other use such as loitering, meetings or children's games.

- The aesthetic damage is very important:

Visual field crowded by cars driving or parked, facade degraded by pollution, perspectives and point of view inaccessible or ruined, the neighborhood looks ugly and under living.

CONCLUSION

With the transport revolution of the XXth century, the automobile quickly became the main means of moving. This new mobility has contributed to modify the city, both in its morphology (from a pedestrian and compact city to a spread-out and motorized city) and in the way of life.

This new mobility has created numerous traffic jams in Batna city, especially in front of schools where the car remains the preferred means of transport for parents.

In the absence of a research on the impact of traffic jams in front of schools on the child, we tried to answer our problematic. We are based in this research on a descriptive analytical analysis and then an analysis based on observation, photography and a survey by a questionnaire and a drawing where the child shows us his/her way between school and house, and his/her preferred and non-preferred places.

The results of the study confirmed that the child suffers in front of the schools of a harmful traffic jam either on their physical or psychic health.

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