

# Investigating the Child's Behaviour towards the Elements of Urban Furnishing in Public Spaces: An Analytical Study Using the Behavioural Mapping Technique in the "Ben Boulaid Square", Batna

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## Abstract

It is established that public spaces constitute the most important elements of the urbanisation of the city, considering that it is an outlet for society and a field for its interaction with the environment, as it is intended primarily to serve all demographic groups, particularly children; and those who require more time to establish a bond with their peers in the outside world, as these spaces are made up of components that enable this interaction, as seen in the urban furnishing elements;

On this basis, the study aims to analyze the behaviours of children towards the elements of furnishing in Ben Boulaid Square and how these elements with their different characteristics of colour, shape and location, affect the behaviour of the child ; and finding the characteristics of urban furnishing that positively affect the behavior of the child

The study relies on the behavioural mapping technique with the help of a geographic information system (GIS), which allows for assessing the use of urban furnishing elements within the framework of public space, and then we study the behaviour of children towards these elements and then evaluate their behaviour, all within the framework of the «environmental psychology» approach. This allows us to understand the subject more, adopt the observation technique in collecting data and information from its sources, and monitor the behaviour resulting from the study sample adopting the analytical method.

The study concluded that the elements of urban furnishing in the field of study affect the child's behavior more positively (8-13.28) more than negatively (4-7.03) and we reached the positive effectiveness characteristics.

**Keywords:** behavioural map, child behaviour, public space, urban furnishing.

## INTRODUCTION

Children interact with the urban environment in the same way that anyone else does, enjoying its clean and safe streets, parks, and fresh air, as well as everything else that promotes freedom of movement, social interaction, and a place to call home<sup>1</sup>, especially children who live in urban cities. Numerous studies have demonstrated the depth of their connection to and interaction with the environment and its constituent parts. As a result, many authors have speculated about the nature of life that a person finds in this environment, particularly the location that children choose and how they interact with other areas, as well as their movements and behaviour toward the environment's constituent parts<sup>2</sup>.

## THE IMPORTANCE OF URBAN SPACE IN THE CHILD'S LIFE

One of the most famous issues in contemporary social studies; where both «Heilman», «Breza» and others stated, is that the urban outer space enables the child to develop his social abilities and to communicate with his community through the elements it contains; For example, the child's sitting on the public seat reflects his acceptance of the other's sitting

- <sup>1</sup>Woolley.( 2007), Where do the children play? In Proceedings of the institution of Civil Engineers-Municipal Engineer (Vol. 160, No. 2, pp. 89-95.

- <sup>2</sup>Karsten, L. (2005) ; It all used to be better? Different generations on continuity and change in urban children's daily use of space Children's Geographies, p275-290.

and sharing the same seat<sup>3</sup>, and another study confirmed that the child, starting from the age of seven, needs to go out towards public spaces (from a street, a playground, and a garden) to develop his social relations with his peers<sup>4</sup>.

The child urgently needs to go out to urban public spaces because of the positive effects on his formation from various aspects. The researcher (Toms R, 2017)<sup>5</sup> states that the environment in which they live is a major determinant of their health, behaviour, and development in all respects, and this affects not only their childhood but the rest of their adult life.

The subject of the child's space, due to its great importance, raises many questions related to his life on the one hand, and the elements it contains on the other hand.

## **THE PLACE OF THE CHILD IN URBAN PLANNING**

In this respect, the architectural researcher «Ward,» who specializes in urban planning, believes that we should instead plan a city that integrates children into living in it according to their needs, a city in which we live with them rather than designing a city where every element is according to the size of children so that they can live there. Through the historical reading of urban planning, it can be recognized that it has not taken sufficient consideration of vulnerable groups, including children, and this was recognized at the 2016 United Nations Habitat III Conference on Sustainable Urbanization; Participants agreed on the principle that cities should provide equal rights and opportunities for people of all ages<sup>6</sup>, which was confirmed by Gil Benalouafi, who said, "Unfortunately, most cities do not prioritize children in planning and design, so we must go beyond designing our cities for an athlete. « At the age of 30, I started to think about the needs of the most vulnerable children, the elderly, and the poor. We must provide «safe, fun, and stimulating everyday experiences for the children in the city" (Penalosa) To what extent does the child find his place in the city in Algeria?

## **THE SITUATION OF THE CHILD IN THE ALGERIAN CITY**

The goal of Algeria, like that of other nations, is to create public spaces in its cities and furnish them with various urban fixtures. As stipulated in legislative laws, including Article<sup>7</sup> 124 of the Municipal Law 10-11, which placed on the municipality the preparation of green spaces and the placement of urban furnishing elements in addition to their maintenance in case of damage. The urban area, whose dimensions do not correspond to those of the location... It was improperly positioned within significant city landmarks, which caused it to lose focus and fail to serve the needs of the residents of its various constituent parts. From the child's behavioural, cultural, and health aspects..., are affected by it, so we can ask the following question: What is the impact of urban furnishing elements's characteristics in the square of Ben Boulaid on the behaviour of children?

## **OBJECTIVES OF THE STUDY**

The study aims to observe how children behave toward the furnishing elements in the square of Ben Boulaid as a public space and how these elements, with their various characteristics of colour, shape and location, affect the behaviour of the child ; and finding the characteristics of urban furnishing that positively affect the behavior of the child.

## **METHODOLOGY OF THE STUDY**

The researcher followed «the psychology of the environment» as an approach ;which is a study of the interactions between a person's physical and social environment through its spatial and temporal dimensions and the behaviours that result. This strategy is based on the observation technique of gathering information from its sources and watching the child's behaviour, and translating them into behavioral maps through geographic information system GIS.

## **RESEARCH TERMINOLOGY**

The following scientific terms and foundations are used in the study

- <sup>3</sup>Beaudoin A.. relation endant-space: adequacy between urban form, architecture and childhood and childhood in central neighborhoods. s.l.: School of Architecture, University of Laval, 2007.
- <sup>4</sup>Matthews. (2003), children and society, , p87.
- <sup>5</sup>Toms R. (2017) [Online]. [Citation: ] [www.designcouncil.org.uk](http://www.designcouncil.org.uk)
- <sup>6</sup>A habitat. (2016). [www.unhabitat.org](http://www.unhabitat.org) . [Online] 2016. [Citation: Sep 12, 2017.]
- <sup>7</sup>Algerian Official journal, Law 10-11 of December 1989 relating to the creation of public spaces.

## Behavioural Mapping

Behavioural mapping is a technique used in environmental psychology and related fields that is concerned with the systematic recording of people's behaviours and movements; such as explaining why these behaviours occur in certain locations<sup>8</sup>. The behavioural map in this way is the basis for recording the locations of people within a space, and monitoring the actions they do and the way their behaviours are distributed, and it is known that William Atelson, Olin Rivlin and Harold of New York University were the first to introduce behavioural mapping in the psychology of They defined behavioural mapping as «a technique for studying the relationships between the behaviour of individuals and the physical space in which they occur»<sup>9</sup>. Behavioural maps include descriptions of behaviour and statements about the relationships between behaviour and design features in physical space

## A Child's Behaviour

A succession of responses and actions taken by the child in an ongoing effort to fulfil his changing and evolving needs and goals.<sup>10</sup>

## Public Space

"To discuss a city's public spaces is to discuss a setting that is particular to that city."<sup>11</sup>

It is a space surrounded by a group of buildings and its functions and forms have varied to meet specific needs in certain historical stages, it is used as a meeting place for social and cultural activities, entertainment, and play. Kerry sees the square as the first public space designed by man.<sup>12</sup>

## Urban Furnishing

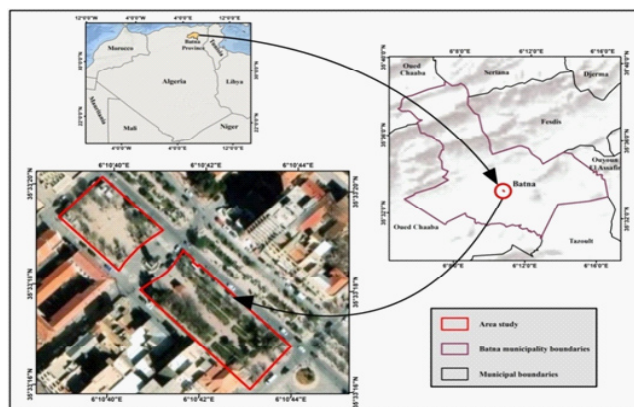
Urban furnishing refers to the objects harnessed in the public space to respond to the needs of users under the responsibility of local communities. The installation of urban furnishing elements depends on several areas, including urbanization, environmental protection, and connectivity for people with limited mobility<sup>13</sup>.

## MATERIALS AND METHODS

### Field Research Procedures

#### Introduction of the Studied Space

The subject of the study is a public space, which is the «Ben Boulaid square public space,» which is located in the plot of land occupation No. 08 with an area of 3100 square meters, and this square is considered the most attractive to citizens of different groups, including children<sup>14</sup>.



**Figure 1.** Case study geographical location map ;QGIS ; author exploration ; 2021.

- <sup>8</sup>Bechtel and Zeisel.)( 1998) ;Environmental Psychology, p. 128.
- <sup>9</sup>Cosco, N. G., Moore, R. C., & Islam, M. Z. (2010). Behavior mapping: A method for linking preschool physical activity and outdoor design. *Medicine & Science in Sports & Exercise*,p 349.
- <sup>10</sup>Regional Training Seminar on Guidance and Counselling.( 2000)Module 4. Behaviour Modification UNESCO February.
- <sup>11</sup>Merlin, P and Choay, F. (1988). dictionary of town planning and development, Paris, PUF, 1988, p209.
- <sup>12</sup>Krien, R. (1991), Urban Space, Academy Education,London,p134.
- <sup>13</sup>Jean-Pierre Gyéjacquot.(2013) ; mobilier urbain;p 13.
- <sup>14</sup>he master plan for the development and reconstruction of the city of Batna + Real Estate Agency. (2017).

## The Adopted Protocol For Behavioural Mapping For this Study

The behavioural mapping protocol requires the following basic components:

- A base map of the study site.
- Selection of data collection tools.
- Develop a systematic protocol for data collection.
- A set of observable data variables that address the research objectives represented in the behaviour and characteristics of urban furnishing

## The Study Sample

A study procedure was applied to a general group of 115 randomly chosen kids, with 37 girls and 78 boys between the ages of 8 and 12. Each subgroup was observed during the following time frame:

**Table 1.** The sub-groups of the study sample,author exploration, 2021/2022.

The first sub-group	29 boys	13 girls
The second sub-group	25 boys	12 girls
The third sub-group	25 boys	12 girls

## Types of Urban Furnishing

Through our field observation of the studied square, we identified the furnishing elements used by the study sample, which are:

19 trash cans, and 20 chairs.

## Characteristics of Urban Furnishing

colour

shape

Location

## Observed Behaviour

### Positive Behaviour

represented in, cooperation, dialogue, participation, competition, and cleaning the environment.

### Negative behaviour

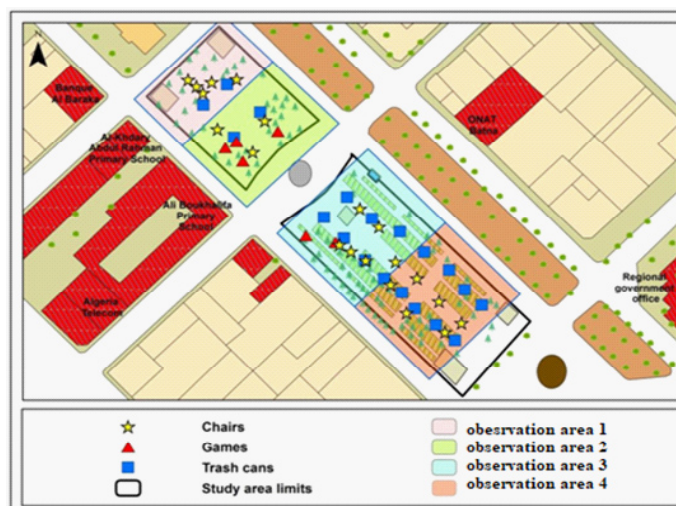
represented in bad talk, fights, isolation, and soiling the environment.

**Table 2.** Observed behaviours in Ben Boulaid square and their explanation,author exploration,2021.

Type of Behaviour	A summarized definition
Resting	It is the use of the chair after the completion of the game or immediately after entering the garden.
Waiting in line for their turn	It is the use of the chair to wait for their turn.
Cooperating	Children help each other play or clean the environment.
Conversation and communication	The children exchanged conversations with each other.
Sharing	The child accepts the other's use of the same element with him.
Cleaning the environment	It consists of throwing garbage in the trash.
Fighting	Monitor verbal or physical altercations between children.
Cursing	It is all bad and inappropriate words uttered by children.
Isolation	The child's use of furniture items individually and not sharing with others
Polluting the environment	It is every observed behaviour represented in throwing dirt next to a basket and not inside it or trying to throw dirt inside the basket and it falls outside it, and he does not take it and throw it inside again.

## Defining Observation Areas within the Base Map

Before making observations in this field, we had to divide the base map of our study into observation areas that contain the elements of urban furnishing desired to be studied, and then create observation areas to divide large sites into multiple smaller areas that facilitate observation by a single observer. Through this division, we were able to manage our time across the site and make sure all areas were evenly and thoroughly checked.



**Figure 2.** Observation areas in the studied square, author exploration, 2021.

**Table 3.** Furnishing elements in each observation area, author exploration, 2021.

Observation Area	trash cans	Chairs
Observation Area 1: It is located next to the main entrance to the square.	1;2	1;2;3;4
Observation area 2 : Located in the depths of the square	3;4	6;7;8
Observation area 3: Located next to the play equipment	5;6;7;8;9;10	09;10;11;12;13;14
Observation area 4 : It is located at the secondary entrance to the square	11;12;13;14;15;16;17;18;19	15;16;17;18;19;20

## Data Collection

The actual location of the object being monitored in space, its dimensions, colour, as well as the shape and personal information of the child being observed by gender and age, among other data, are some of the characteristics of the object being monitored that must be recorded during field data collection for behavioural mapping in public spaces. Regarding the interaction between the resulting behaviour and environmental data that was observed.

We recorded the actual location of the urban furnishing item as a point on the map of the study area, we recorded the corresponding child's personal characteristics and behavioural or environmental data in database tables, and we linked each event location recorded on the sitemap to a row or record of data in the table for analysis and presentation, then entered this data into QGIS.

## Systematic Timing of the Study

The study was conducted over three different time periods in the course of one year, in the public square of the Corridors Bin Boulaid. Our presence during these times allows us to monitor the maximum amount of data, and a 45-minute period is set for conducting surveys in one monitoring area. We monitored the high usage peak times of the studied area, which were from 10 to 12 in the morning and from 15.00 to 16.30 in the afternoon.



**Table 4.** Study periods and characteristics studied., author exploration,2021/2022.

Period	Timing	Studied urban furnishing characteristic
1	09/02/2021 to 09/17/2021	- Color where: - From 02/09/2021 to 10/09/2021 we moved on to study the color characteristic of chairs with colors: green-red, black and white. - From 11/09/2021 to 17/09/2021 we studied the green and black trash cans.
- 2	20/03/2022 to 04/04/2022	- Shape
- 3	02/07/2022 to 17/07/2022	- Location

## RESULTS AND DISCUSSION

### Trash Can

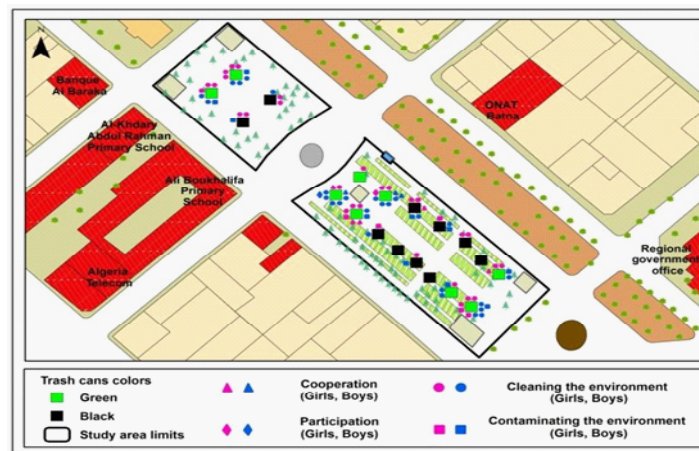
#### *In Terms of Colour*

The study sample is estimated at 42 children and is divided into 29 boys and 13 girls, as the observed behaviours amount to 79 behaviours, due to the repetition of some members of the study sample using the element in the specified time period of 45 minutes, which is distributed as follows:

**Table 5.** Distribution of behaviors according to the sex of children and the color of trash cans, researcher 2021.

Green trash can				black trash can	
Usage Percentage		%74		Usage Percentage	%26
girl 47%		Boy %53		Girl	Boy
positive behaviour	negative behaviours	positive behaviour	negative behaviours	– 14 positive behaviour – 05 negative behaviours	
26	03	27	05		
cleaning the environment, cooperation and participation ; Polluting the environment					

Through these results, we obtained this behavioral map :



**Figure 3.** Behavioral map showing the effect of the color of trash cans on a child's behavior, author explorationr, 2021, QGIS.

Through the results and analyze the obtained behavioral map above , it can be said that the green trash cans have a more positive impact on children than the black trash cans in the studied arena. Hence, it can be concluded that children tend to colour green more than black.

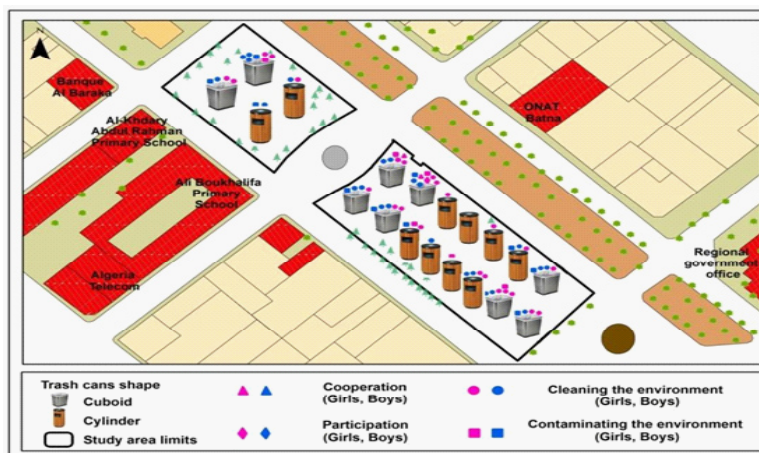
#### *In Terms of Shape*

The trash cans in the garden are divided into two shapes: cylindrical and rectangular, where the observed behaviours amount to 66 behaviours, 33 of them for girls and 33 of them for boys. The behaviours are distributed as follows:

**Table 6.** Distribution of behaviors according to the sex of children and the shape of trash cans, author exploration 2022.

cylindrical trash cans				cylindrical trash cans			
Boy		Girl		Boy		Girl	
3 Polluting the environment	6 cleaning the environment	2 Polluting the environment	7 cleaning the environment	6 Polluting the environment	17 cleaning the environment and 1 participation.	4 Polluting the environment	17 cleaning the environment 2cooperation 1participation

We translated the results of the table in addition to the data observed in the field of study into this behavioral map :



**Figure 4.** Behavioral map showing the effect of the shape of the trash cans on the behaviour of the child, author exploration, 2022,QGIS.

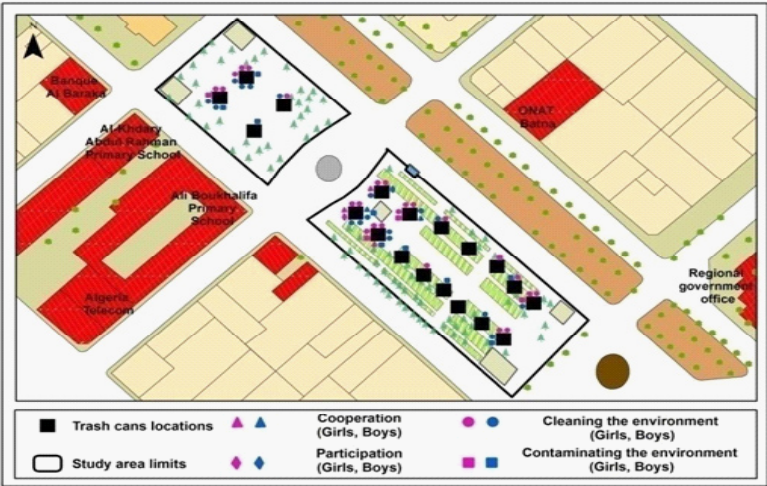
According to the results obtained in the studied square, the trash cans with a rectangular shape are more used by children and have a more positive impact on them, and this corresponds with what psychologists believe that children tend to prefer regular shapes that give them a sense of safety and stability, but the abundance of them generates a sense of boredom.

### ***In Terms of Location***

The study sample is estimated at 37 children, 25 boys and 12 girls. These elements were used 58 times within 45 minutes. Their use is distributed according to the four control areas as follows:

**Table 7.** Distribution of behaviors according to the sex of children and the location of trash cans,author exploration, 2022.

Observation area	Girl		Boy	
Observation area 1	5 cleaning the environment	1 Polluting the environment	5 cleaning the environment	2 Polluting the environment
Observation area 2	4 cleaning the environment	1 Polluting the environment	2 cleaning the environment	4 Polluting the environment
Observation area 3	10 cleaning the environment 1 sharing 3 cooperation	2 Polluting the environment	7 cleaning the environment 1 sharing 2 cooperation	2 Polluting the environment
Observation area 4	4 cleaning the environment	1 Polluting the environment	3 cleaning the environment	1 Polluting the environment



**Figure 5.** Behavioral map showing effect of the location of the trash cans on the behaviour of the child, author exploration.2022,QGIS.

The location of the trash cans installation affects the number of their uses as well as the behaviour of the child, as the trash cans installed next to the toys attract children to use them positively, while the baskets installed in the depths of the garden are not very popular, and the baskets installed in the main entrance to the park have a positive effect. On the child's behaviour, its location contributes to cleaning the perimeter of the yard.

**Chairs or Benches**

**Terms of Colour**

The chairs in the studied square are distinguished by four colours, which are green, black, red and white, where the behaviours are distributed according to colour as follows:

**Table 8.** Distribution of behaviors according to the sex of children and the color of chairs, author exploration, 2021.

Color	sex	Girl		boy	
the green chairs:	1,5,6,9,15,20	9 Resting Conversation and communication Waiting in line for their turn	1 isolation	06 Resting Conversation and communication Waiting in line for their turn	2 isolation
the Red chairs:	3 ;7 ;8 ;12	5 Resting Conversation and communication Waiting in line for their turn	1isolation	11 Resting Conversation and communication Waiting in line for their turn	//
the White Chairs:	04,10,11,17	3 Resting Waiting in line for their turn	1 Fighting	3 Resting Waiting in line for their turn	//
Black chairs:	02, ,14,18,19	2 resting	//	1 resting	1 isolation

As for chairs No. 01, 05, 14, 17, 18, no behavior was recorded in them during the study of the color characteristic.





**Figure 6.** Behavioral map showing the effect of chair colour on the child's behaviour, author exploration, 2021,QGIS.

The effect of chair colours on children is distributed according to the positive as follows: red, green, white, and black.

B.2 in terms of location:

**Table 9.** Distribution of behaviors according to the sex of children and the location of the chairs, author exploration, 2022

Observation Area	Girl		Boy	
	3 Resting	Waiting in line for their turn	7 Resting	Waiting in line for their turn
Observation Area2	2 resting	3 isolation	1 resting	11 isolation
Observation Area3	19 Resting	Waiting in line for their turn sharing ; Conversation and communication	22 Resting	Waiting in line for their turn sharing
Observation Area4	5 resting ;conversation and communication	//	7 Waiting in line for their turn sharing	Conversation and communication

Chairs 5, 6, 17 and 18 are not used as they are located on the outskirts of the square on the axes of movement and far from the playing equipment.



**Figure 7.** The effect of chair location on the child's behaviour,author exploration 2022, QGIS.

The findings from the analysis of the behavioural maps for each of the examined urban furnishing elements above allowed us to create evaluation maps of how the urban furnishing in Ben Boulaid Square affected the behaviour of the child, including

## EVALUATION OF THE RESULTS OF THE STUDY

The results obtained above, by analyzing the behavioral maps for each of the studied urban furnishing elements, enabled us to come up with evaluative maps of the extent of the impact of the elements of urban furnishing in Ben Boulaid Square on the child's behavior, as:

### For trash Cans



**Figure 8.** percentage of positive and negative behaviours towards trash cans map,author exploration,2022,QGIS.

It has a positive effect (6.96-10.19) more than a negative (1.62-2.43).

### Characteristics of the positive effect of the trash bins

It is made up of baskets 1, 6, 7, and 8, which are limited to values between 6.96 and 10.19 and have the following characteristics: green colour, rectangular shape, and placement next to the games in control area 3.

### For Chairs



**Figure 9.** Percentage of positive and negative behaviours towards chairs,author exploration, 2022, QGIS

It affects positively (8-13.28) more than negatively (4-7.03).

**Positive Effectiveness Characteristics of the Chairs:** This includes chairs that are only permitted in berths No. 9 and 10, are completed in the area value (8-13.28), are green and white, and are situated in observation area 3 next to the games.

## CONCLUSION

The following findings, which would help shape the child's behaviour, were reached through our investigation of the child's behaviour toward the components of urban furnishing and using the behavioural mapping technique with geographic information systems.

It affects the child's behaviour positively rather than negatively.

The positive effectiveness of girls is more than that of boys with regard to the use of trash cans.

The green colour for element furnishing is the most attractive for children using the Ben Boulaid square.

The importance of installing the furnishing elements and the necessity of linking them to each other to raise their positive impact of them..

Accordingly, the status of the child in the urban space remains dependent on the diverse needs of the child that the latter meets, which requires work to introduce this segment as an element in urban design and planning.

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