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Tracing a biennial layout: Experiencing an exhibition layout through the syntactic analysis of Antrepo No. 3 at the 2013 Istanbul Biennial

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Abstract

The design of an exhibition gallery and its curatorial intension for either a temporary exhibition or a permanent museum installation requires understanding how its morphology influences the use of space, as well as the spatial experiences of visitors. The morphology of a gallery in terms of its shape and configuration may affect the display of the artwork, visitors' activities and their movement through the space. This paper examines the layout of Antrepo No. 3, the main exhibition gallery of the 2013 Istanbul Biennial.

This research explores: 1) how museum design influences integrated or segregated locations, as well as visitors' use of the space during their visits; 2) how spatial layouts influence visitors' explorations in gallery spaces; 3) which spaces are more or less visited; and 4) what the predominate path is depending on the number of visitors during a specific period of time. Answers to these questions are crucial for this study to understand the impact of the morphology of space on museum visitors. In this sense, syntactic correlations are key to grasping the idea of morphology and visitor experience relations in a curated space in exhibition design.

For this investigation, gate counts within the exhibition space and snapshots showing the number of people and their patterns of interaction with the exhibition are correlated with syntactic parameters. Visitors' spatial experiences and the use of the overall layout depending on the number of visitors during a certain period of time in a specific convex space are taken into account.

Keywords

Building morphology, Exhibition architecture, Space syntax, Spatial layout, Syntactic analysis.

1. Introduction

Built space is composed of patterns that are interrelated through different syntactic and semantic layers, and museum space layouts are no exception. According to Peponis and Wineman (2003), built space is to be understood as a relational pattern supporting that situation: "A pattern of distinctions, separations, interfaces, and connections, a pattern that integrates, segregates, or differentiates its parts in relation to each other" (Peponis and Wineman, 2003). The built environment has a "social logic" (Hillier and Hanson, 1984) that relates to the layout, the pattern of the space that hosts the activities of daily life or special occasions such as temporary or permanent curated museum exhibitions.

Spaces of the built environment such as museum spaces also structure social relationships such that society and culture become intelligible through their spatial form (Peponis and Wineman, 2003).

2. Antrepo No. 3 and the conceptual framework of the 2013 Istanbul Biennial

Antrepo is a complex made up of 4 buildings previously used as warehouses at the Salıpazarı Harbour in the district of Tophane, Istanbul (Figure 1). The buildings have been used as venues for various Istanbul Biennials, and Antrepo 3 was in fact honored as the best venue of the Istanbul Biennials. Antrepo 3 has previously housed major artworks by contemporary artists such as Renée Green, Hung-Chih Peng, Yan Pei Ming, Ivan Grubanov, and Michael Rakowitz. The venue also houses art fairs as well as temporary exhibitions other than the Istanbul Biennials. The neighboring building, Antrepo No. 4, houses the Istanbul Modern Art Museum.

The conceptual framework of the 13th Istanbul Biennial is based on the main theme, "Mom, Am I a Barbarian?" Curator Fulya Erdemci declared that, "The notion of the public domain as a political forum will be the focal point of the 13th Istanbul Biennial. This highly contested concept will serve as a matrix to generate ideas and develop practices that question contemporary forms of democracy, challenge current models of spatio-economic politics, problematize the given concepts of civilization and barbarity as standardized positions and languages and, above all, unfold the role of contemporary art as an agent that both makes and unmakes what is considered public." (Anon, 2015) This idea is grounded in diverse historic, philosophical, theoretical and geo-political ideas. Questions of democracy, equality, civic rights and political debate are interpreted through the works in the Biennial largely in the main venue, Antrepo No 3. "From the existence of an artwork to the freedom of social media and the designation of urban spaces as public, the notion of public domain can cover a vast area where social engagement and political public debate are possible. It is this potentiality of public domain discourse that the exhibition aims to articulate." (Anon, 2015)

The curated artwork in the exhibition is organized by several themes: fragility: "Am I Not A Citizen?"; spatio-economic justice: "How Is It Possible To Be 'Rich' In A World That Is Steadily Growing Poorer?"; agoraphobia: "Istanbul Is Ready, Target 2023"; the public domain as a battle-ground: "Conflict Or Consensus?"; and 'Between Agency And Action'. Reflections of these themes are also seen in the works presented in Antrepo No. 3 (Figure 3); a list of exhibiting artists

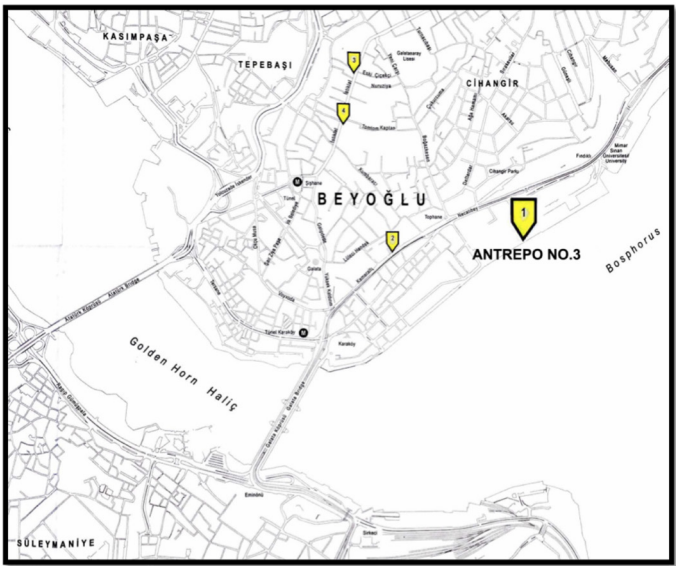

Figure 1. *2013 map of Istanbul Biennial spaces, highlighting Antrepo No. 3 in relation to the Bosphorus, the Golden Horn and the historic peninsula of Istanbul.*

is provided in this paper according to the locations of their artwork in the building (Figure 2). The syntactic values, such as the integration of visual and accessibility concerns in locating the artists' work, the circularity values of the convex spaces in which the artworks exist, and the visitor frequencies depending on the convex spaces and in relation to the works of these artists are also considered in this paper.

3. Research goals and relationship to existing theory and previous studies

This research seeks to explore the main venue of the 2013 Istanbul Biennial, Antrepo No. 3, through syntactic analysis and semantic explorations. This study includes the interpretations about the morphology of exhibition spaces' in terms of building morphology issues and explores the relations between the frequency of people and syntactic values of spaces. The relation between the geometry of the spaces and the perception issues in relation with the movement of visitors in those spaces are important in this study. In that sense, the term "building morphology" includes the issues about the shape of convex spaces that people move in or through while they are visiting the exhibition space. The physical pattern and the overall structure, layout of the exhibition venue, in terms of geometrical measures and shape characteristics of its convex spaces are important building morphology issues in relation with the syntactic measures such as "circularity" and "integration".

Experiencing the temporary exhibition layout of Antrepo No. 3 (Figure 2 & Figure 3) is crucial to understanding the syntactic and semantic patterns that complement the social and physical patterns exposed in this study.

Understanding the nature of Antrepo No. 3's layout also requires grasping the idea of "the theory of natural movement" (Hillier, Penn, Hanson, Grajewski, & Xu, 1993), that the distribution of movement is a function of spatial configuration. The theory of "virtual community" (Hillier, 1989) is also a key to this understanding and "brings focus to a particular form of community that is based on the pattern of coawareness and copresence arising as a by-product of movement" (Peponis and Wineman, 2003). From this perspective, museum spaces hosting temporary or permanent exhibitions have the opportunity to attract people from various communities and act as a gathering space and a space of information and burgeoning intellectual values. Here, the Istanbul Biennial also acts around these values and its main venue should be investigated with this awareness.

In this study, Perception and movement related issues should also be grasped in order to understand the morphology of exhibition layouts through their syntactic and semantic dimensions. Kuipers et al.'s (2003) study on the cognitive maps of movement of the people describes how visual perception and cognition plays a key role in the processes of navigation, movement, and wayfinding. In relation with the museum and exhibition environments, visual perception and accessibility of the spaces also play a significant role in movement and wayfinding. Dalton's (Zimring & Dalton, 2003) approach to decisions of people in terms of visual perception of the space that is similar to Kuipers et al.'s (2003) approach, Zimring & Dalton (2003) was interested in decisions that people head to during their navigation and in route choice decisions that are made at path junctions. "She created an environment in which participants were presented with a variety of different junction types and then noted the sequence of decisions." (Zimring & Dalton, 2003). Dalton (Zimring & Dalton, 2003) found that "Angles that deviated least from a continuous straight heading were preferable to sharp turns.". Another interesting finding was "a strong evidence that participants tended to select routes that approximated a straight line and avoided routes that were particularly convoluted or meandering." (Zimring & Dalton, 2003).

The study of Wineman and Peponis (2010) point out the issues that construct spatial meaning through visitors' movement in museum and exhibition spaces, "The ways in which visitors are encouraged to move through an exhibition, whether along a clearly defined path or more freely weaving a self-di-

rected path, will structure the overall impression of the exhibition." Wineman and Peponis (2010) argue these two polarized point of view and introduces the term, "spatially guided movement" and evolve it to "spatially dictated movement" and "spatially random movement" from a third point of view in between these two polarized views. "Spatially guided movement" kind of understanding makes the connection, interrelation of geometrical space with the perception and movement in space. The spatial order and form of space is always a parameter effecting the perception and movement issues.

Perception and understanding of visitors in exhibition spaces are constructed through "patterns of accessibility through the space of the exhibition, connections or separations among spaces or exhibition elements, sequencing and grouping of elements" (Wineman and Peponis, 2010).

The issues related with perception of space and movement of visitors become more clear when we think of spatial relations based on patterns of access and choices effected by visibility, where the curatorial message of the exhibition is also a parameter effecting the decisions. The experience of the visitors when they start to move through the exhibition space is also unfolding based on the artwork and the order of spaces in relation with the content (Wineman and Peponis, 2010).

"As a by-product of the exploration of museum content, visitors are seeing and being seen by others. Thus, museums function to construct a sense of community arising according to patterns of otherwise random copresence" (Wineman and Peponis, 2010; Hillier, Peponis, & Simpson, 1982; Peponis & Hedin, 1982). Actually, the circulation pattern and visibility sequence of the artwork were mentioned as key issues earlier in terms of cultural function in the literature (Gilman, 1923; Levin, 1983; Montaner & Oliveras, 1986).

In this study, examining the physical layout of exhibition spaces became possible using techniques of spatial analysis. Space syntax analysis is based on isovists (Benedikt, 1979; Hillier and Hanson, 1984); visual perception is taken into account and measures of

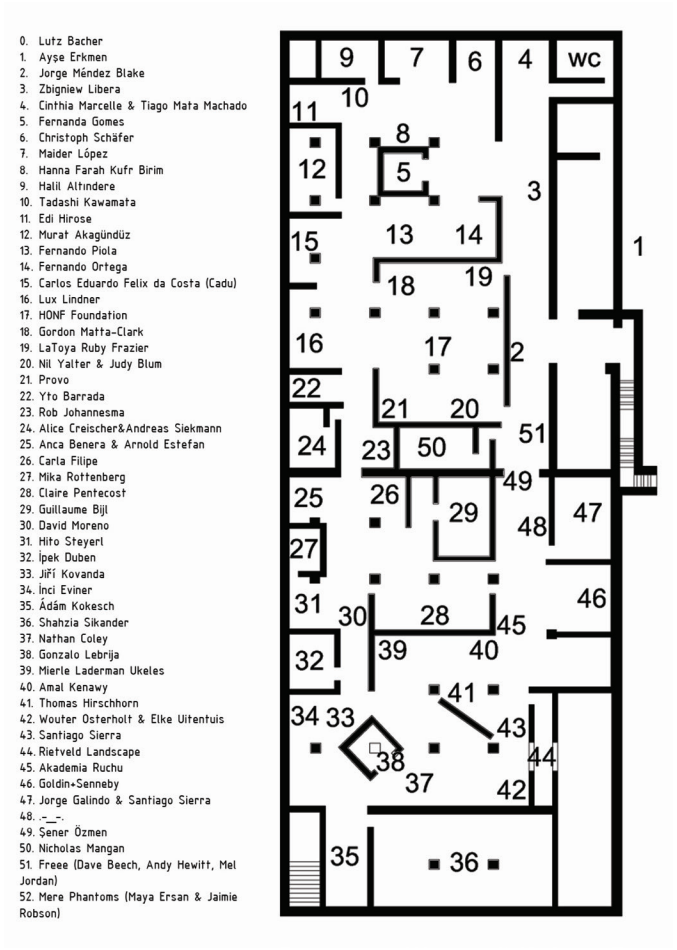

Figure 2. *Location of the artists throughout the exhibition space of Antrepo No. 3 at the 2013 Istanbul Biennial.*

Figure 3. *Various views from the exhibition space of Antrepo No. 3 at the 2013 Istanbul Biennial (View from Artist 42-Upper left; Artist 3&4-Upper right; Artist 2-Lower right; Artist 42&43-Lower left in relation with Figure 2).*

accessibility and movement are also considered in the analysis. The key definitions of space syntax theory and methodology, such as isovists and convex space (Hillier et al., 1987), should also be introduced for a better understanding of the concepts of space syntax and exhibition space in this study. An isovist is a concept of spatial recognition that defines any particular viewpoint in a space by its visibility field; the visibility field of a single viewpoint can also be called the isovist field.

Understanding the presence of the artwork in the exhibition space and the visitor frequency at the venue in relation to the isovist fields is crucial to understanding whether there is a correlation between the physical characteristics of the space and visitor frequencies depending on different convex spaces in the exhibition venue.

As Hillier et al. (1993) note in Figure 4, beyond the relationship between visitor frequency and the configuration of the space in the exhibition area, depending on the morphology of convex spaces as a whole, while attractors and movement may be mutually influential, the other two relationships are asymmetrical. The configuration may influence the location of attractors, but the location of attractors cannot influence configuration. Likewise, the configuration may influence movement, but movement cannot influence configuration. If strong correlations are found between movement and both configuration and attractors, the only logically possible lines of influence are from the configuration to both movement and attractors, with the latter two factors influencing each other. In this study, the relationship between visitor frequency and configuration is analyzed in detail; the attractors, namely, artworks by various artists, are also considered in this relationship through certain critical counts within the exhibition space.

Various techniques of spatial analysis have been used to discuss the functions of museums (Peponis & Hedin, 1982; Wineman & Choi, 1991). Choi (1999) has analyzed visitors' paths and found that integration was significantly correlated with "tracking scores," the number of people who reached each convex space, and the correlation of tracking scores with "tracking frequencies" was investigated. "Spatial variables play an important role in structuring exploration even where the purpose of exploration is not to comprehend the layout itself but to view the displays in it. Choi also studied the distribution of people present in the museum, using normal behavioral mapping techniques" (Peponis and Wineman, 2003).

4. Method of analysis in relation to the aim of the study

The space syntax method will provide significant data in terms of the method of analysis and is an important theory used to define the structural environment.

Used as a syntactic measurement method in the space syntax field, the Syntax 2D software developed by the University of Michigan makes its calculations starting from a logical ground built over vision fields we term "isovists" (Benedikt, 1979; Batty, 2001; Conroy, 2001; Edgü et al., 2012). As for the concept of convex space, ap-

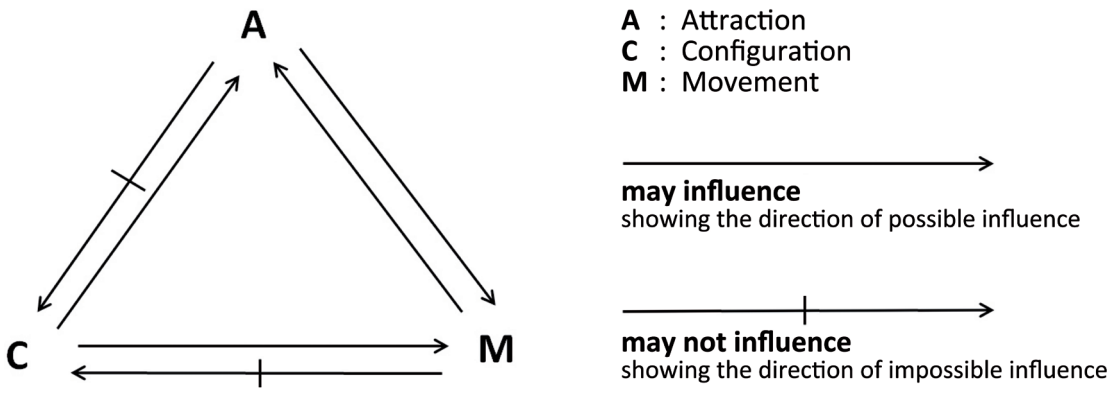

Figure 4. *Attraction, configuration and movement (Hillier, et. all., 1993).*

proached by scrutinizing interspatial relations within space syntax theory, it reduces the differently sized plans, spaces whose relationships will be examined as cellular spaces. In space syntax analyses, studies within the framework of a base logic that progresses by examining the relationships among these cells, or convex spaces, are performed. Syntax 2D handles the analyses based on isovists. Within the definition of an isovist, the walls, furniture, exhibition systems, artwork and other systems obstructing our sight in the space are handled as walls and affect the determination of the visual field (Benedikt, 1979; Turner and Penn, 1999; Batty, 2001; Turner et al., 2001; Conroy, 2001; Ünlü et al., 2009; Edgü et al., 2012; Salgamcioglu and Unlu, 2013).

For this study, it is key to specify an analysis method in Syntax 2D that will allow us to examine the relationships among the convex spaces of Antrepo No. 3, depending on the exhibition venue and visitor frequencies counted separately for the specified convex spaces on weekdays and weekends, which will be described in the next data analysis section of this study.

Syntax 2D works by creating a grid fragmentation. A plan proportional to the actual size of the site was drawn digitally using AutoCAD (.dwg) and transferred to the Syntax 2D program. This enabled us to compare the plan integration and depth comparison values through different convex spaces within the same plan. Visible, perceived field (on the plan platform) analyses were performed within this context. This research explores how integrated or segregated locations in a museum influence the installation of artwork, museum design and visitors' use of space during their visits; how spatial layouts influence visitors' explorations of a gallery space; how the integration value of a space affects the number of visitors to a specific gallery in the museum; the impact of visiting time (weekday or weekend) on the number of visitors to the museum during a specific period of time; which spaces are more or less visited and which artworks more or less viewed; the predominate path, depending on the number of visitors on this path during a specific period of time; and whether visitor frequencies in the convex spaces of Antrepo No. 3 are correlated with the syntactic values of the spaces.

Of the data generated as a result of the analyses, the data utilized for every convex space were:

- Mean depth
- Mean integration
- Mean circularity

These three data points are three of the primary concepts addressed in space syntax theory. These data were calculated separately for every convex space. Subsequently, the values at the active grids of the exhibition plan were separated into these three data groups and added on three different charts, and a mean data value was obtained for the three concepts (see Tables 1 and 2). Contingently, calculations were made via the arithmetic averaging of the grid values for every convex space.

To understand the impact of the morphology of space on visitors, gate counts and snapshot analyses were undertaken to understand visibility relations, the regions described and isovists. Gate counts for 6 gates (see Figure 6) in the exhibition gallery, which provide access to the exhibition and circulation areas of the exhibition gallery, are taken into consideration on a designated route (see Figure 6) for several time periods. During these gate counts, snapshots are also used to analyze the visitor frequencies in each convex space shown in Figure 5. Snapshots are created using the observations for one weekday and one weekend day in Antrepo No. 3. For both days, observations for the snapshots and gate counts were repeated 8 times per day, starting at 11:00 am and repeating hourly until 7:00 pm.. At the beginning of every hour, the researcher walked the route shown in Figure 6 and counted the number of visitors in each convex space (Figure 5). After completing the visitor count observations by walking the route, gate counts were taken for a period of 5 minutes at each gate, starting from gate 1 and ending at gate 6, to find the number of visitors passing through the gates; this is also shown in Figure 6. These gate count values provide information about the movement

Table 1. *Syntactic scores and frequencies (number of visitors) according to the counts made on a weekday at hourly intervals for all the convex spaces specified in Figure 5.*

Convex space number	Mean integration	Mean depth	Mean circularity	Snapshot 11.00 am weekday	Snapshot 12.00 pm weekday	Snapshot 13.00 pm weekday	Snapshot 14.00 pm weekday	Snapshot 15.00 pm weekday	Snapshot 16.00 pm weekday	Snapshot 17.00 pm weekday	Snapshot 18.00 pm weekday
CS1	485785.00	161.52	2.22	8	5	10	6	21	20	9	4
CS2	461897.00	151.65	2.24	10	12	4	24	12	3	4	5
CS3	207877.67	62.14	2.77	10	3	5	12	10	6	12	5
CS4	177923.00	56.12	2.73	2	5	1	15	7	8	1	3
CS5	89785.00	29.67	2.98	3	0	0	5	4	1	0	0
CS6	42111.00	92.59	2.85	20	0	7	11	13	6	4	7
CS7	221267.00	82.03	2.56	4	20	10	4	2	6	8	1
CS8	25659.00	52.66	3.18	1	1	1	2	1	3	3	4
CS9	265665.00	180.15	2.48	4	3	2	1	1	5	0	3
CS10	302639.00	221.84	2.36	1	6	2	3	7	8	1	2
CS11	195888.00	82.88	2.65	4	6	4	4	8	7	1	1
CS12	307059.00	141.57	2.55	10	0	10	6	3	4	6	1
CS13	259832.00	120.83	2.57	28	17	9	9	39	14	18	11
CS14	190268.50	93.32	2.70	2	0	5	0	5	5	2	3
CS15	10535.00	19.07	4.59	4	2	2	5	9	2	2	2
CS16	194992.00	127.12	2.72	1	3	9	5	5	5	5	3
CS17	183702.33	124.98	2.75	2	5	7	6	3	5	3	9
CS18	334739.00	277.37	2.25	0	0	2	0	0	0	0	0
CS19	209709.50	178.87	2.55	17	14	7	11	8	5	2	4
CS20	2680.00	20.85	5.63	10	0	11	6	5	1	10	9
CS21	158177.00	118.42	2.65	0	1	3	1	6	5	2	5
CS22	39099.00	48.11	3.51	12	12	2	3	26	3	4	1
CS23	127174.00	150.67	2.67	5	2	2	5	3	5	1	1
CS24	22777.00	23.50	3.98	0	0	0	0	4	0	0	0
CS25	52023.00	87.65	2.77	0	0	1	0	1	4	6	0
CS26	333477.00	204.53	2.22	0	7	1	0	0	3	1	0
CS27	148304.00	203.25	2.53	3	0	0	3	3	2	1	0
CS28	136294.00	133.46	2.56	8	0	5	4	4	4	1	13
CS29	65502.00	46.70	2.99	0	0	2	3	4	9	0	0
CS30	244243.75	115.98	2.55	19	10	9	5	7	5	20	3
CS31	3377.00	27.83	3.98	0	3	1	0	12	1	0	0
CS32	160970.00	141.29	2.55	22	12	3	0	8	5	5	2
CS33	237413.00	101.73	2.53	3	16	1	11	10	4	7	7
CS34	312821.00	202.07	2.41	0	3	2	8	0	3	0	0
CS35	61925.00	45.52	4.12	8	7	10	5	9	12	5	8
CS36	10759.00	35.28	3.64	0	1	2	6	0	1	1	1
CS37	351161.00	129.52	2.36	0	0	1	0	1	0	0	0
CS38	380872.50	180.00	2.27	1	8	20	5	14	7	9	1
CS39	4474.86	159.37	2.28	5	1	4	6	3	2	5	3
CS40	33192.00	4447.00	3.03	3	8	7	4	3	14	6	1
CS41	10412.00	20.68	4.97	3	0	3	0	0	2	1	2

of visitors in the exhibition venue and will help us understand the movement between different groups of convex spaces depending on the syntactic and curational issues. The number of people passing through the gates is also examined by analyzing the space syntax with Syntax 2D: gate counts are performed at the 6 gates, the visitor frequency is noted and the syntactic scores of the gates are also used to understand the relationship between the

Table 2. *Syntactic scores and frequencies (number of visitors) according to the counts made on a weekend day at hourly intervals for all the convex spaces specified in Figure 5.*

Convex space number	Mean integration	Mean depth	Mean circularity	Snapshot 11.00 am weekend	Snapshot 12.00 pm weekend	Snapshot 13.00 pm weekend	Snapshot 14.00 pm weekend	Snapshot 15.00 pm weekend	Snapshot 16.00 pm weekend	Snapshot 17.00 pm weekend	Snapshot 18.00 pm weekend
CS1	485785.00	161.52	2.22	7	0	7	13	45	11	10	9
CS2	461897.00	151.65	2.24	8	10	15	13	28	32	33	12
CS3	207877.67	62.14	2.77	7	9	18	33	15	35	32	24
CS4	177923.00	56.12	2.73	2	6	12	17	12	21	10	7
CS5	89785.00	29.67	2.98	0	0	0	0	2	0	0	0
CS6	42111.00	92.59	2.85	5	14	13	7	16	19	16	13
CS7	221267.00	82.03	2.56	0	8	5	15	20	14	20	15
CS8	25659.00	52.66	3.18	2	0	4	1	10	6	9	5
CS9	265665.00	180.15	2.48	3	2	6	8	11	14	6	8
CS10	302639.00	221.84	2.36	10	5	14	17	21	30	17	15
CS11	195888.00	82.88	2.65	8	0	4	2	4	12	8	5
CS12	307059.00	141.57	2.55	12	8	22	4	12	15	9	13
CS13	259832.00	120.83	2.57	19	16	36	33	47	53	46	27
CS14	190268.50	93.32	2.70	0	3	0	2	8	16	10	5
CS15	10535.00	19.07	4.59	3	5	6	7	15	13	7	16
CS16	194992.00	127.12	2.72	2	5	2	9	6	18	11	13
CS17	183702.33	124.98	2.75	0	5	4	20	9	17	16	8
CS18	334739.00	277.37	2.25	1	1	0	0	4	2	8	2
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CS22	39099.00	48.11	3.51	0	0	7	1	10	3	21	7
CS23	127174.00	150.67	2.67	3	3	4	0	6	8	8	6
CS24	22777.00	23.50	3.98	0	0	2	0	2	5	15	4
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CS30	244243.75	115.98	2.55	13	1	5	11	16	31	14	16
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CS32	160970.00	141.29	2.55	1	0	7	9	14	7	18	6
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CS36	10759.00	35.28	3.64	2	1	1	10	8	2	0	4
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CS40	33192.00	4447.00	3.03	3	3	9	3	6	15	13	23
CS41	10412.00	20.68	4.97	0	0	0	1	5	4	4	6

frequency of visitors and the syntactic measures such as integration, circularity and mean depth.

To investigate the relationship between the number of visitors and the syntactic values of the exhibition space depending on the convex spaces, gate counts within the exhibition space and snapshots showing the number of people are used. Visitors' patterns of interaction within the exhibition are correlated with syntactic parameters

and the results are discussed. During this investigation, visitors' spatial experiences, their contact with exhibition content and the use of the overall layout is also considered to gain a better understanding of the relationship of syntactic measures and visitor frequency in the biennial venue.

Finally, the statistical relationships between the number of people present during a certain period of time in a specific convex space and the syntactic measures of these spaces such as mean integration, mean depth and circularity are scrutinized and the correlations assessed using the Statistical Package for the Social Sciences (SPSS) program.

5. Data analysis: Comparison of syntactic values and visitor frequency

As noted above, in this study, it is important to specify an analysis method in Syntax 2D to examine the relationships among convex spaces shown in Figure 5 depending on the exhibition venue, i.e., Antrepo No. 3, a schematic of which is shown in Figure 6. The visitor frequencies are shown for a weekday and a weekend day in Tables 1 and 2, respectively, counted at hourly intervals for the specified convex spaces.

In addition to the convex space analysis, which depends on the visual field of the visitors and the accessibility to the spaces where artwork is exhibited, the gate count (see Table 3) analysis notes the visitor frequency (Table 4) and syntactic scores (Figure 7) for 6 gates to understand the relationship between visitor frequency and syntactic measures such as integration, circularity and mean depth. The number of visitors passing through a gate in the space of 5 minutes per gate at the selected hourly intervals in the daytime is counted to find the frequency data for gate counts. The gate count data are used to investigate the relationship between the syntactic values of the gates and the movement and circulation of people throughout the venue.

In the process of this investigation, the statistical relationships between the number of people and the syntactic measures are examined and the addressed correlations further investigated using SPSS. In the first step of the

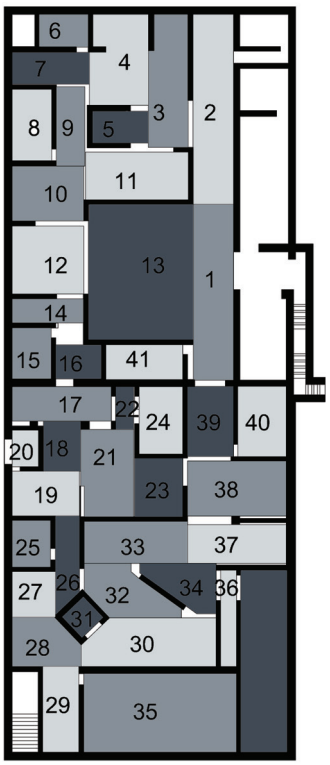

Figure 5. *Convex spaces in the exhibition space in Antrepo No. 3 during the 2013 Istanbul Biennial according to visitor frequencies, shown in Tables 1 and 2.*

regression analysis for Antrepo No. 3, the syntactic parameters of mean integration, mean circularity, and mean depth of the gates and the gate count frequency parameter (i.e., the number of visitors passing through the selected gate for 5 minutes; see Table 3) are considered. The dependent variable is always the number of people passing through the gates at the hourly observation points (see Table 3) and the independent variables are the syntactic measures such as mean integration, circularity and depth of the gates.

When the most integrated gate in the system, Gate 4 (see Table 3), has the highest frequency (see Table 3) at 14:00 pm on the selected weekend day, the regression analysis of the frequency value and integration value shows a positive regression result of R=0.525 (p=0.285>0.05) that is mildly close to significance. This type of relationship can be interpreted as meaning that when the number of visitors passing through a more integrated gate rises in the Antrepo No. 3 configuration of the Istanbul 2013 Biennial, the number of people passing through all gates in the

Table 3. *Frequencies (number of visitors passing through a gate for 5 minutes 8 hourly intervals) according to the counts made on a weekend day (WE) and a weekday (WD) for various hours in the gates shown in Figure 6.*

Gate Number	Gate Counts / Weekday - Sunny							
	WD 11.00am	WD 12.00pm	WD 13.00pm	WD 14.00pm	WD 15.00pm	WD 16.00pm	WD 17.00pm	WD 18.00pm
G1	24	28	28	33	32	34	20	23
G2	17	11	16	24	28	37	9	19
G3	18	35	24	20	33	16	41	14
G4	15	34	34	21	26	37	43	28
G5	47	46	28	31	30	18	34	17
G6	53	107	66	52	36	40	47	13
Total	174	261	196	181	185	182	194	114
Gate Number	**Gate Counts / Weekend Day - Sunny-Partly Cloudy**							
	WE 11.00am	WE 12.00pm	WE 13.00pm	WE 14.00pm	WE 15.00pm	WE 16.00pm	WE 17.00pm	WE 18.00pm
G1	12	32	22	70	89	66	55	29
G2	21	27	22	32	34	70	62	48
G3	32	29	19	33	62	73	64	32
G4	27	49	34	117	107	89	50	64
G5	25	18	32	56	82	71	63	85
G6	15	27	52	125	190	195	96	76
Total	132	182	181	433	564	564	390	334

system also rises in accordance with the gates' integration values, which has a slight significant correlation with the mean integration values of these gates in the system. One of the regression analysis results that supports this observation comes from the 11:00 am weekend count at Gate 4. At 11:00 am, the regression analysis between the parameters of the frequency value and the integration value in Gate 4 present no significance, with values of R=0.065 (p=0.903>0.05), because the number of visitors passing through Gate 4 is one of the lowest counts, which affects all the frequency values in the venue.

These types of results, which are taken into account by the change in the frequency of visitors, show that when the number of visitors passing through a highly integrated gate in the venue increases, the number of people passing through all the other gates in the system display a mildly significant correlation with the mean integration value scores of these gates. When the number of visitors passing through Gate 4, which is the most integrated gate, decreases, the number of visitors in the entire system may be still increasing—exemplified by the weekend visitor counts at 3:00 pm and 4:00 pm—but there are no significant regression results linking the integration values of the gates and visitor frequency at these hours. Visitors' tendency to leave the venue also increases by using the only entrance to the venue at these hours, Gate 6. Therefore, the entrance gate, Gate 6, shows high visitor frequency at those times of day.

Table 4. *The syntactic values of the 6 gate count nodes shown in Figure 6.*

Gate number	Mean integration	Mean circularity	Mean depth
G1	353866.50	164.45	2.43
G2	293775.00	201.71	2.42
G3	247349.33	146.21	2.41
G4	506976.50	166.48	2.14
G5	453497.00	163.09	2.27
G6	328015.60	135.41	2.47

The results for weekday counts are somewhat different. A negative regression result of R=-0.574 (p=0.233>0.05) that is mildly close to significance is seen at 3:00 pm for the frequency and

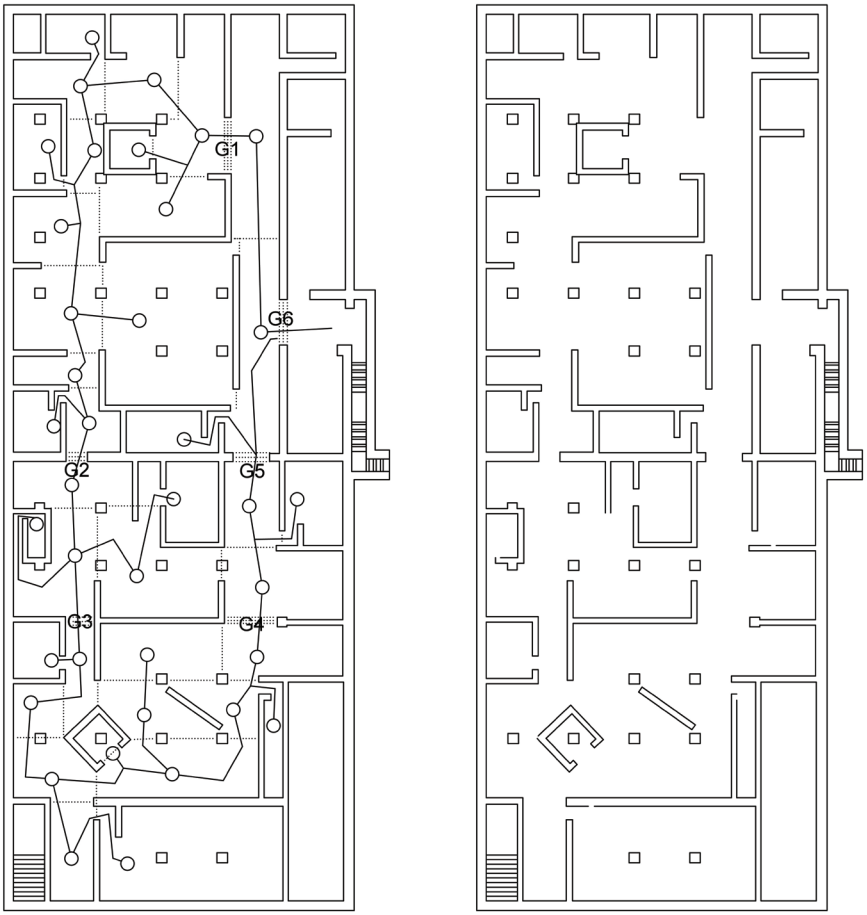

Figure 6. *Antrepo No. 3 Plan of 2013 Istanbul Biennial showing the gate count nodes and selected route for snapshot counts on the left and plain plan of the venue on the right.*

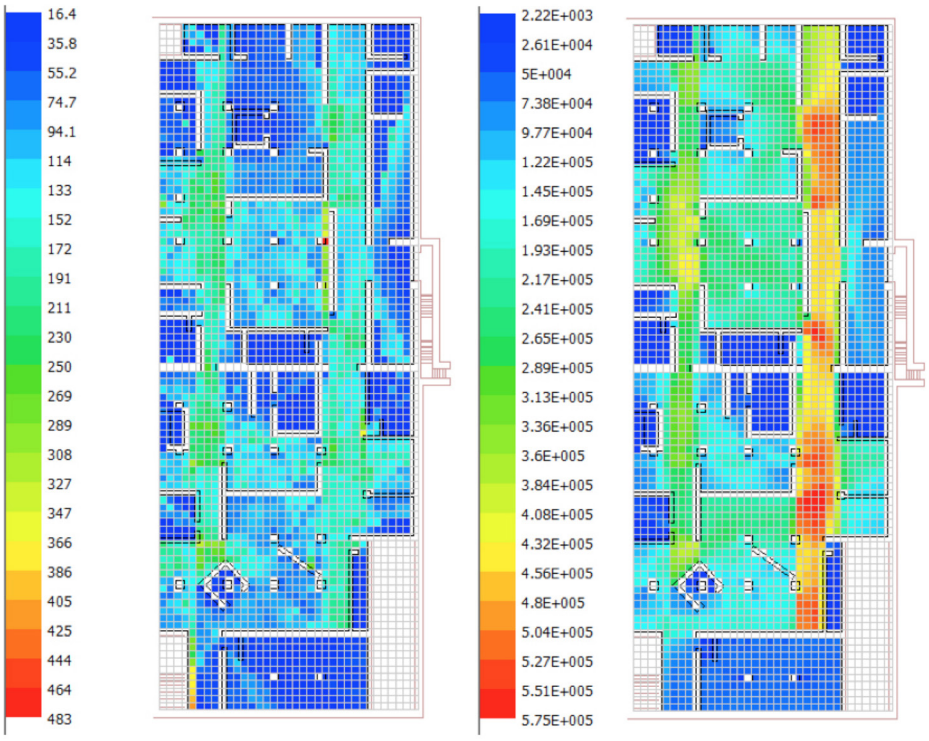

Figure 7. *Image of the circularity (left) and integration (right) analysis made using Syntax 2D to find the syntactic scores for gate count nodes and convex spaces.*

integration value numbers of the gates. On weekdays, the number of people passing through a less integrated gate increases at one of the peak venue hours in terms of the total number of visitors; in other words, the less integrated gates attract more visitors, but the most integrated gates attract fewer visitors. This interesting result is not seen at any other hours of the weekday regression analysis, but examining the results for 3:00 pm, it may be argued that the weekday visitors tend to visit the less integrated spaces of the venue. This may be due to the artwork exhibited in the venue. On weekdays, visitors may spend more time looking at the artwork presented in less integrated spaces by passing through the gates that are less integrated in the system.

As for the second part of regression analysis, the mean integration values of all the convex spaces and the number of visitors counted during the daytime hourly snapshots on both weekends and weekdays serve as parameters. The syntactic measure is independent and frequency is the dependent variable. At 12:00 pm, R=0.325 ($p=0.038<0.05$) is positively significant; at 1:00 pm, R=0.278 ($p=0.079>0.05$) is mildly positively significant; at 4:00 pm, R=0.279 ($p=0.078>0.05$) is also mildly positively significant. Similarly, on the weekend, the results for 11:00 am, R=0.327 ($p=0.037<0.05$); 1:00 pm, R=0.377 ($p=0.015<0.05$); 2:00 pm, R=0.312 ($p=0.047<0.05$); 3:00 pm, R=0.472 ($p=0.002<0.05$); and 4:00 pm, R=0.313 ($p=0.046<0.05$) all present positive, significant values. The result for 12:00 pm, R=0.245 ($p=0.123>0.05$) presents positive regression values that is mildly close to significance. These findings support the effect of configuration on the movement and frequency of visitors in the convex spaces.

The regression of the mean depth and frequency parameters also show positive significance at 4:00 pm on a weekday with the value R=0.357 ($p=0.022<0.05$) and positive values that is mildly close to significance at 6:00 pm on the weekend with the value R=0.256 ($p=0.106>0.05$).

The regression of the mean circularity parameter and frequency parameter of the convex spaces presents negative regression results that are also mildly close to significance at 12:00 pm and 4:00 pm on a weekday with the value R=-0.255 ($p=0.108>0.05$) and R=-0.238 ($p=0.133>0.05$), respectively; 12:00 pm on the weekend with the value R=-0.245 ($p=0.123>0.05$); 1:00 pm on the weekend with the value R=-0.265 ($p=0.094>0.05$); 2:00 pm on the weekend with the value R=-0.254 ($p=0.109>0.05$); and 4:00 pm on the weekend with the value R=-0.236 ($p=0.138>0.05$). The correlation of circularity and frequency, which is mildly close to significance, shows the tendency that the number of visitors increases when the convex spaces are more linearly shaped.

As a result of the test between the mean circularity parameter and the frequency parameter of the convex spaces as explained above, all have the probability value (p) above 0.05, but it is interpreted that the close numerical findings to 0.05 shows a statistically mild significance, a tendency, which is close to significant results.

A decrease in the value of mean circularity is an indicator of gradual differentiation throughout a convex space of the general averages of the mean dimensions. Briefly, this value is accepted as an indicator of dimensional tightening with the increasing differences between the width and the length of the convex space or a non-differentiating, a tendency to dimensional equilibrium of width and length of the convex space.

In that sense, the statistical evaluation carried out over different hourly intervals of some weekday hours like 12:00 pm and 4:00 pm and of some weekend hours like 12:00 pm, 1:00 pm, 2:00 pm and 4:00 pm shows that the number of visitors increases when the mean circularity values of convex spaces decreased. This shows the relation between the geometry of the space and the number of people visiting the space including their visual perception and movement. It could be inferred from this situation that when the differences among the lengths of the convex space morphologies in two dimension (i.e., width and length) began to decrease and that the plan center began to shift to the center of the convex space, the

people circulating in that specific convex space has the tendency to rise. Alternatively, with the findings of the increasing circularity values that is related with the geometry of the convex spaces, the convex spaces with different integration values throughout the plan began to overlap in a single narrow field with a high integration value and were forced to use this field as a connection field due to tightening of the interconnecting areas among the convex spaces. This kind of results should be interpreted and discussed particularly around the circularity value.

As explained, at some weekday hours like 12:00 pm and 4:00 pm and at some weekend hours like 12:00 pm, 1:00 pm, 2:00 pm and 4:00 pm an increase is seen on the number of people where a morphological structure similar to a circle was observed due to the decrease in the mean circularity value.

It was also observed that the general tendency toward a decrease in the mean circularity value was due to the divergence of areas connected with narrow interconnecting zones in the plan organization or more linearly shaped convex spaces in terms of the geometry of spaces. The mean circularity has a tendency to decrease in a structure in which the interconnecting areas among the areas are tightened, narrowed and concentrated on a single field with a high mean integration.

The remaining relationships among the various syntactic value parameters and the remaining periods not described above are not significantly correlated with the frequency parameter.

6. Conclusion

In summation, this paper traces the layout of Antrepo No. 3 at the 2013 Istanbul Biennial; as urban events, Biennial exhibitions can be discussed in terms of the interrelation of venues as well as that of art products and discussions. There are typically many exhibition venues at a biennial, and preferences are defined by pragmatic or thematic decisions. The goal here is to understand the performance of the main exhibition gallery's layout syntactically to understand whether these layout decisions influenced the movement and number of visitors to the convex spaces of Antrepo No. 3.

Ultimately, it appears that the attractors and movement were mutually influential in Antrepo No. 3, but the configuration of the venue had the strongest impact on the number of visitors. For example, the mild significant correlation of circularity and frequency at some weekday hours like 12:00 pm and 4:00 pm and at some weekend hours like at 12:00 pm, 1:00 pm, 2:00 pm and 4:00 pm shows that the number of visitors increases when the convex spaces are more linearly shaped in terms of the geometry of spaces. Such findings show that the geometry of the spaces has some strong impact on the perception of the spaces, the frequency and the movement through those spaces. When the total number of visitors to the venue rises dramatically at certain peak weekend hours, the visitors may be looking more to the artwork in the more integrated space in the venue, passing through the highly integrated gates such as Gate 4. On the other hand, when the number of total visitors in the system decreases on weekdays, visitors are more likely to look at the artworks in less integrated spaces, passing through a less integrated gate, as shown by the results for 3:00 pm on a weekday. This result shows that the increasing density of people circulating in the venue decreases the number of visitors circulating in the system and passing through less integrated gates. This further shows the situation depending on certain selected hours, but it is important to see that the impact of the configuration is independent from the installation of the artwork in relation to the number of people circulating in the venue. This kind of finding is also directly related with the geometry of the space and shows the highly strong impact of architectural design on the circulation of people in such exhibition spaces.

We may also argue that the configuration influences the location of attractors here, but that the location of attractors cannot influence configuration. When we examine most of the selected hourly counts of visitor numbers in the convex spaces, we find a mild significant correlation between frequency and the integration values

of each convex space. Similarly, mean depth and circulation show mildly significant correlations with visitor frequencies.

Finally, configuration may influence movement, but movement cannot influence configuration. We see the reflections of that relationship in the considerably significant correlations of gate counts with the integration values of these gates. There are some mildly significant findings pertaining to this exhibition space that contradict results from previous studies by Choi (1999) and Peponis and Wineman (2003), where no correlation between scores or frequencies was found, but the present study also shows the parallel idea that spatial variables play an important role in structuring exploration.

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Bir bienal yapısının izini sürmek: 2013 İstanbul Bienali Antrepo No.3 yapısının sentaktik analizleri üzerinden sergi mekanının deneyimlenmesi

Sergi galerilerinin mimari tasarımlarını ve küratörler tarafından belirlenen içeriklerini anlamak, bu galerilerin geçici veya kalıcı sergi mekanları olmalarına bağlı olmaksızın, morfolojilerinin mekan kullanımlarını nasıl etkilediğini ve ziyaretçilerin mekana ait deneyimlerini de anlamayı gerektirmektedir. Bir sergi galerisinin morfolojisi, bu galerinin konfigürasyonu ve formu gözönüne alındığı zaman, bu alanda sergilenen sanat yapıtlarının sergilenme biçimlerini, ziyaretçilerin aktivitelerini ve bu ziyaretçilerin mekan içerisindeki hareketlerini etkileyebilmektedir. Bu araştırma insan hareketleri ve sergilenen sanat eserleriyle ilişki bağlamında 2013 İstanbul Bienali'nin ana sergi mekanı olarak kullanılan Antrepo No.3'ün kurgusunun ve mekansal konfigürasyon özelliklerinin irdelenmesini içermektedir.

Bu araştırmanın amaçları: 1) Müze veya sergi mekanlarının mimari tasarımının, bu mekanlardaki sığ veya derin alanların oluşumunu nasıl etkilediğinin ve ziyaretçilerin mekan kullanımlarının anlaşılması; 2) Mekana ait planlamanın, mekanların bir araya geliş ilişkilerinin ve düzeninin ziyaretçilerin galeri mekanlarındaki keşfetme süreçlerini nasıl etkilediğinin anlaşılması; 3) Bir sergi galerisinde hangi mekanların daha çok, hangilerinin daha az ziyaret edildiğinin anlaşılması; 4) Belirli bir zaman aralığı içerisinde ziyaretçi sayılarına, frekansa bağlı olarak sergi mekanlarında baskın olan kullanım ve dolaşım rotalarının, mekanlar arası geçiş alanlarının özelliklerinin irdelenmesi olarak ifade edilebilir. Bu araştırma sorularına ve irdeleme alanlarına verilebilecek cevaplar, mekan morfolojisinin müze ve sergi ziyaretçileri üzerindeki etkilerini anlamak için de önem taşımaktadır. Bu bağlamda, mekan dizimi yöntemi kullanılarak yapılacak olan sentaktik analizler ve bu analizler sonucunda ortaya çıkacak olan sonuçlar son derece önemlidir. Mekanın tasarımından kaynaklanan, fiziksel durumuna ait veriler ile ziyaretçiler tarafından mekanın kullanımına ait frekans verileri arasındaki istatistiksel ilişkilerin ortaya koyacağı sonuçlar araştırılmıştır. Sentaktik analizler, mekan morfolojisi ile tasarımın ilişkisinin anlaşılması ve küratörler tarafından oluşturulmuş mekanlarda ziyaretçi deneyiminin nasıl olduğunun irdelenmesi için anahtar bir rol oynamaktadır.

Bu araştırmada, Antrepo No.3 sergi alanı içerisindeki konveks mekanlar arasında geçiş oluşturan 6 önemli noktada ziyaretçilerin hareket frekansına ait sayımlar (gate counts) yapılmıştır. Buna ek olarak, 41 konveks mekan içe-

risinde anlık olarak ziyaretçi sayısını belirlemeye yönelik sayımlar (snapshots) belirli bir rota üzerinde ve farklı günlerdeki farklı zaman aralıklarında sistematik olarak yapılmıştır. Sayımlar için hafta içine ve hafta sonuna ait birer gün seçilmiştir ve bu günler içerisinde 8 farklı zaman aralığında sayımlar yapılarak, ziyaretçi frekansları tespit edilmiştir. Mekanlara ve mekanlar arası geçişlere ait bu frekans değerleri ile bütünleşme (integration) ve merkezilik (circularity) gibi mekanın sentaktik değerleri arasındaki ilişkiler istatistiksel olarak, SPSS (Statistical Package for the Social Sciences) programı ile araştırılmış, sonuç olarak ortaya çıkan veriler yorumlanmıştır. Regresyon analizleri ile ilişkilerin ne derece kuvvetli veya zayıf oldukları sorgulanmıştır.

Araştırma sonucunda Antrepo No.3 özelinde ortaya çıkan sonuçlar, daha önceki çalışmalarla ilişkileri bağlamında değerlendirilmiştir. Müze veya sergi mekanlarında mekanın morfolojisine ait veriler ile mekanın ziyaretçiler tarafından kullanım verilerinin sanat eserlerinin mekan içerisindeki konumları ile ne derece ilişkili olduğu sorgulanmıştır. İnsanların hareketine ilişkin teorik altyapı ile Antrepo No.3 ziyaretçilerinin mekanlardaki hareketlerinin ilişkileri tartışılmıştır. Bu tartışmada mekanın fiziksel tasarımı, plan kurgusu ve düzeni ile mekan içerisindeki eserlerin konumlanmasının ilişkileri de irdelenmeye çalışılmıştır. Bu ilişkilerin araştırılması aşamasında ziyaretçi frekanslarındaki artış veya azalmanın mekanın geometrisi, mekanlar içerisindeki hareket ve kullanım ile nasıl bir ilişkide olduğu da yorumlanmıştır.

Antrepo No.3 içerisindeki farklı konumlarda çekici noktalar oluşturacağı öngörülebilecek birtakım eserlerin esasen mekanın kendi morfolojisinden bağımsız çekim noktaları oluşturamadıkları bulunmuştur. Araştırmanın yapıldığı belirli zaman dilimlerinde Antrepo No.3 içerisinde dolaşan ziyaretçi sayısı arttıkça daha derin geçiş noktalarında ve konveks mekanlardaki ziyaretçi sayılarının düştüğü görülmüştür. Buna karşılık, antrepodaki ziyaretçi sayısının düşmesi ile mekanın tümünde dolaşıma giren ve daha derin mekanları kullanan ziyaretçi sayılarında artışlar olduğu gözlenmiştir. Bu bulgular ışığında, mekan içerisindeki kurgudan dolayı derinleşen konveks mekanlarda insanların frekansındaki artışla birlikte keşfetme ve ziyaret düzeyi düşmekte, ziyaretçiler daha sığ ve görsel algısı daha yüksek konveks mekanlarda daha yoğun olarak dolaşmaktadırlar. Ziyaretçiler, toplam ziyaretçi sayısının artmasıyla Antrepo No.3'ü oluşturan 41 konveks mekanda ve bunları bağlayan 6 ana geçiş noktasında daha sığ fiziksel özelliklere sahip, daha dar bir dolaşım alanında kalmaktadırlar.

Bu araştırmada ele alınan bütün ilişkilerin yorumlanması sonucu ortaya çıkan veriler, sadece Antrepo No.3 sergi alanı için değil, aynı zamanda diğer müze veya sergi mekanı tasarım araştırmaları için de sorgulayıcı ve yol gösterici niteliktedir.