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Effects of spatial differences on visitor perceptions at zoo exhibits

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Zoos are the most important way of learning about animals for people. They are also effective educational environments for natural habitats of animals. Zoo design must be a successful exhibit of animals identical to their natural habitats. Therefore, the image of people about animals in natural settings can appropriately be formed. This study investigated whether the areas in which the animals are exhibited make any difference on the perceptions of visitors. The study has two stages, comprised of two questionnaire survey carried out with 420 zoo visitors. In the first stage, the reasons for visiting zoo and visitor preferences of exhibits were determined. In the second stage, we determined how spatial differences of zoo exhibits influence visitor perceptions. The collected data were analyzed using chi-square test, t test, and factor analysis. Results suggested that, spatial differences of zoo exhibits have significant influences on visitor perceptions. Animals exhibited in the semi-natural settings of the zoo are perceived as if they are in a natural setting, while animals in the caged exhibits that are perceived totally different from their natural living environment. The results have also shown that people visit the zoo for educational purposes especially for their children.

Key words: Visitor perception, semi-natural zoo exhibits, caged zoo exhibits, spatial differences.

INTRODUCTION

Developing technology and increase in population result in unplanned and careless use of natural resources and landscapes. Wildlife is destroyed and "modern cities" are formed in the places where billions of living beings live. This process leads to destruction of ecological balance, as a result of which billions of living species become extinct (IUDZG-IUCN/ SSC, 1997). While people increase their needs continuously in order to maintain their lives, they also destroy nature from where animals, with which people share the same world, to meet just three basics needs including meal, water and shelter. In order to prevent natural environment and natural ecological balance from being damaged more and in order for people and other living beings to maintain their lives by sharing the same environment, it is important that nature awareness should be increased. Taking these into consideration, it is seen that, recognition and education

should be more intense so as to protect natural environment and natural life. The future of human-beings depends on the education of extensive and effective environmental protection (Göktepe, 1998a). Therefore, zoos have a very crucial role in transmission of love of nature to many people as well as in global efforts for educating people. However, those zoos that enable efforts of educating people in order to reach their aims should be designed in a way that they should reflect natural lives of animals.

Zoos are the sequence of spaces that enable people to see, hear and even smell constantly active animals that are eating, playing, climbing as if they were in their natural environment and to observe their relations with other animals (Gökteke, 1998b). The zoos that are designed in this sense provide animals with interacting with their environment. The stable life that is caused by small cages in which the animals are kept cannot meet their expectations from the environment, thus, affecting their activities in a negative way (Shettel-Neuber, 1988). Moreover, if those expectations of animals are not met physiologically, those animals will have physical and

psychological problems.

Studying on this topic, are the chimpanzees that maintain their lives in their natural environments seem more active, more concerned about their environment and more humanlike when they get older whereas the ones who live in zoos have an appearance that is more meaningless and strayed year after year. According to the studies on the same topic and the results, the smallness of the places in which animals are kept and the exhibit of their destroyed community life lead animals to become aggressive (Fromm, 1993). The animals that are exhibited under those conditions become distressed, meaningless and insensitive. Therefore, the educational goal, which is the most important aim of zoos, can not be reached. However, visitors should see and perceive animals being exhibited in the places that consist of such symbols associated with their natural life. Thanks to this perception, they should learn about animals' features and the places they live in. While zoos are being designed, it should not be disregarded that how exhibition areas affect visitors and how this effect reflects the habitat of the exhibited animal. Nevertheless, some designs that cannot reach their aim do not only cause consumption of communal resources, but also prevent us from meeting the needs of animals. Zoos that reflect physical characteristics of animals' natural environment both encourage protecting natural life and providing learning for visitors (Tudge, 1992).

Artificial environment which is compatible with the original habitat of animals and is designed without destroying social structure of them is extremely attractive for the visitors. In those zoos that are designed accordingly, it is seen that the number of visitors has increased and the duration of watching animals has extended (Cerver, 1994). The extension of time in watching exhibition areas is an important method in determining the success of the zoo showing that educational goals have accomplished (Johnston, 1998). "Human senses only work when they are stimulated and the sources of stimulations come from the environment of the individual" (Gür, 1996). As environmental stimulations are visual, visual learning is the most effective way of learning. Perfectly designed areas and effective environment of zoos give the opportunity to provide visitors with true messages (Cerver, 1994).

Zoos in Turkey are designed in such a way that they cannot provide animals with their basic needs such as ecological environment, shelter and nutrition, and in those zoos that animals cannot maintain their social relations as they can do in nature. Many people who live in urban housing have the chance of seeing and recognizing animals in zoos, but animals that are sheltered in negative conditions in zoos cannot behave as if they are in their natural environment. The fact that zoos are mostly designed without regarding natural habitat of animals is one of the main reasons of conducting this research. Therefore, this study is expec-

ted to contribute establishment and management of zoos in Turkey.

Studies on zoo exhibition area

Studies on zoo visitors are invaluable for several reasons. They help us to understand how visitors engage with the zoo environment and interact with animals, identify people's needs, aid planners in developing and evaluating appealing exhibits, understand and promote utilization of exhibit areas, attract a broad representation of audiences, enable people to gain maximum benefits, provide adequate amenities. Research about visitors' characteristics has received most attention. Visitor attributes studied include demographic features, leisure values, interests, expectations, and motivations (Hood, 1983; Morgan and Hodgkinson, 1999).

The observation of visitor behaviour focuses on understanding how visitors utilize the zoo and assess, if zoos accomplish their goals with respect to the experiences they aim to provide. This process helps the evaluation of relations between the needs and expectations of visitors and the features of the exhibition areas. During the past few decades, zoo exhibits have evolved from the classic menagerie-type cages into modern naturalistic exhibitory that aims to improve animal welfare standards (Hancocks, 2001; Maple and Finlay, 1989; Shepherdson et al., 1998). The captivity in old style exhibits caused behavioural and physiological problems in many species, including the occurrence of stereotypic behaviours and also changes such as obesity and nutrient deficiencies (Maple and Finlay, 1989).

Evaluation studies in the zoo literature have investigated the effects of these changes on visitor behaviour. They have shown that visitors respond more positively to naturalistic exhibits with increased visit durations, viewing time, behaviour search, social interaction, animal-related conversation, and positive attitudes, and thus, add support to the on-going transformation of exhibits currently taking place in zoos (Price et al., 1994; Johnston, 1998; Nakamichi, 2007; Totfield et al., 2003). Including naturalism in zoo exhibits also influences the human experience of zoos positively. Naturalistic exhibits tend to be more aesthetically pleasing, stimulate visitor interest, foster appreciation of natural behaviours, and provide opportunities for conservation education and, therefore, are crucial for visitor enjoyment (Coe, 1985; Price et al., 1994; Totfield et al., 2003). In addition to this, evaluation studies in the zoo include the short durations and frequencies of visitor behaviours, predictable behavioural responses to endogenous and exogenous factors, and also circulation and orientation patterns (Bitgood et al., 1986, 1988; Davey and Henzi, 2004; Davey and Higgins, 2005). The changes in the design of exhibition areas in the zoo also have an effect on the perceptions of visitors on animals.

Rhoads and Goldsworthy (1979) conducted a laboratory study in which college students were asked to evaluate slides of eight animal species in the wild, semi-natural and traditional zoo environment.

The result showed that, exhibition setting evokes certain visitor attitudes and perceptions towards animals. Animals in semi-natural and traditional zoo environment perceived by the students as less dignified, happy, and independent than animals in natural settings. Animals in traditional, caged enclosures did not encourage visitor respect or learning. The results indicated that zoo animals should be displayed in a naturalistic setting that will enhance both the public appreciation and conservation efforts. Shettel-Neubers (1988) investigated post occupancy evaluation of a zoo exhibit among all three user groups of a zoo (the animals, the visitors and the staff). This study compared second-generation exhibits with third-generation exhibits at the San Diego zoo. A multi-method data collection approach found that the staff felt that new exhibits are more comfortable and respectful for the animals. However, there were no consistent clear-cut differences in visitor attitudes and behaviours toward the two types of exhibits. Finlay et al. (1988) conducted a laboratory study in which college students were asked to evaluate slides of eight animal species using eleven semantic differential scales. They compared animals in traditional caged, semi-natural and in the wild and found that, traditional caged and semi-natural zoo environments are perceived as tame, restricted and passive while animals in the wild are perceived as free, wild and active.

Consequently, examination of previous studies showed that depending on the features of the areas where animals are exhibited, visitors show different perceptual behaviours. Nevertheless, positive and negative features in exhibition areas create those perceptual differences which are not yet determined. Therefore, this study aims to assess the influence of different exhibits on zoo visitors' attitudes and their perceptions towards animals. More specifically, the main questions of this study will try to address as follows:

(i) Do animals faced with physical insufficiency in zoos display their characteristics different from their living environment in nature?
(ii) Do inappropriate designs of zoo exhibits cause animals to be perceived differently from their natural characters by visitors?
(iii) Which negative conditions are caused by inappropriate setting and inadequate plant coverage?

METHOD

This research comprised of two stages. In the first stage, negative effects of physical characteristic of zoos in perceiving animals have been investigated. This stage tried to test the following hypotheses:

(i) Animals exhibited conveniently to their environment in natural attract greater attention because they get active.
(ii) Animals exhibited in narrow cages attract less attention because of the insufficient conditions.

In order to test the above statements, a questionnaire survey is conducted to find out preferred exhibition areas by the visitors. In the second stage the effect of spatial differences on visitor perceptions of animals is investigated. This stage tried to test the following hypotheses:

(i) Animals exhibited conveniently to their living environment in nature act naturally and thus they are perceived in parallel with their natural characteristics.
(ii) Animals exhibited inconveniently to their environment in wildlife are perceived different from their natural characteristics, and as a result, zoos cannot achieve their educational goals.

A second questionnaire survey have been conducted among the visitors in order to examine conditions of animals, which live in preferred and not preferred exhibition areas in natural environments and in the zoos.

Study area

It is often seen that the designs for various animal species have the same features in zoos. Therefore, following the examination and observation of zoos in Turkey, Antalya Zoo is chosen as the study area in order to narrow the study area down. Antalya is a popular tourism destination located in the South coasts of Turkey. The zoo consists of 17 exhibition areas, 7 of which are narrow and caged and 10 of which are large and almost natural, but just have visible physical barriers.

The questionnaire

In this study, two questionnaire surveys have been carried out with 420 zoo visitors (210 per survey). In the first survey, a sample set of 210 people chosen randomly as a representative subset of the population. The questionnaire in the first part of the study included the visitors who have completed their visit in the zoo. Questions consisted of two groups as close-ended and open-ended questions. The questionnaire survey aimed to determine how visitors describe the zoo concept and to find out whether they like the exhibition sites in the zoos or not. The reasons why participants visit the zoo and visitor preferences of the exhibition areas were also investigated. Following the evaluation of the findings, four animal species are found as statistically significant.

In the second survey, depending on the discourses with the specialists and literature review, semantic scales of different works has been evaluated and a ranging scale (semantic evaluation scale) which consists of adjective pairs (happy-unhappy, effective-ineffective, healthy-unhealthy, strong-weak, beautiful-ugly, energetic-lazy, unusual-common, tame-wild, friendly-un friendly, active-passive, free-captive, well-kept-unkempt, harmful -harmless) that could describe animals and their relationship with environment, was created. In order to compose adjective pairs, the study is especially benefited from the research conducted by Finlay et al. (1998). Animals in two different exhibit areas were compared with their conditions in natural settings.

In order to describe the effects of places on perception of animals, pictures of animals both in the zoo and in the nature are attached to the questionnaire form which consists of the ranging scale (Figure 1). The pictures of the animals are presented to the participants with the help of Microsoft Office Power Point Presentation. Visitors were then asked to evaluate each picture by using a 7-point scale (1 – the most positive response and 7 - the

Figure 1. The pictures of the animals in the zoo-nature.

Table 1. Reasons for visiting zoos and preferences on exhibition sites.

	Reasons	Frequency values
Reasons for visiting zoos	For entertainment and relaxation	52
	To get to know animals/ to familiarize animals	114
	To entertain kids	34
	Others	10
Reasons for exhibition sites to be preferred	I am interested in exhibited animals	16
	I am interested in plant coverage in zoos	58
	Resemblance of exhibition sites to the natural setting	48
	Invisibility of barriers (cages, fences)	6
	Spaciousness of exhibition site	60
	Well-shaped enclosed land	12
Reasons for exhibition sites not to be preferred	I am not interested in exhibited animals	16
	Rareness or absence of plant coverage in exhibition site	24
	Dissimilarity between exhibition site and natural setting	27
	Visibility of barriers (cages, fences)	9.5
	Narrowness of exhibition site	34
	Unshapeliness of enclosed land	2.5

most negative response), to find out how they perceive animals in different environments. In order for participants to do their perceptual definitions about animals accurately, only visitors who visit the zoo at least twice are included to the survey.

Data analysis

In the first stage, x^2-tests were conducted by SPSS (v. 17.0) to determine if these responses are statistically significant. The results of the x^2-tests showed that all the categories are statistically significant. Data in the second stage, concerning with 8 sites (natural, semi-natural and caged setting), in which four animal species that determined by x^2 test were evaluated by means of factor analysis. In the second stage, the collected data were analyzed using factor analysis and Paired Samples *t* test. In factor analysis, factors whose eigen values is equal to 1 or greater than 1 were regarded as significant factors. Factors of which eigen values is approximately equal to 1, added to evaluation for the purpose of explaining total variance close to 70% values, according to cumulative percentage values. Thus, variables which had factor concentration greater than 0.7 on the factors that were subjected to rotation were determined as descriptive variables of these animal species. Description pairs which described the same animal in different locations have been ascertained as a result of factor analysis. Data belonging to the adjectives that define animals in different environments are evaluated by the help of "t-test" analysis from SPSS statistical software package. The mean value of analyzed adjectives defining the situations of animals in their natural environments and in the zoo is calculated. It has been examined that, if the differences in averages are statistically significant, and the differences between the conditions of the animals in their natural environment and in the zoo have been presented.

RESULTS

Results are presented in two sections. In the first section, findings of the questionnaire survey carried out among visitors in exhibit areas of Antalya Zoo are presented. In the second section, the findings of the second questionnaire survey regarding the conditions of animals in different exhibition areas (semi-nature exhibits, caged exhibits and natural settings) are presented. In this section, comparisons were made between the conditions of animals in exhibition areas of the zoo and animals that live in nature using the images of these animals.

The reasons for visiting the zoo and visitor preferences of exhibition areas

In order to test research hypothesis, the frequencies of reasons of visits and visitor preferences for the exhibit areas are evaluated. The results showed that, the participants explained their reason for visiting zoos as to get to know animals and to make them known (x^2 = 52.84, 2df, p < 0.01); chose the reason of resemblance between exhibition sites and natural environment and plant coverage in zoos and spaciousness of exhibition sites (x^2 = 91.12, 5df, p < 0.01) as their preference reasons for exhibition sites (Table 1). According to this fact preference values of the exhibition site of gazelle and baboon is preferred (x^2 = 680.919, 7df, p < 0.01) (Table

Table 2. Visitor preferences of zoo exhibitions.

Preferred zoo exhibits	Frequency values	Non preferred zoo exhibits	Frequency values
Baboon exhibit	218	Tiger exhibit	203
Gazelle exhibit	110	Leopard exhibit	134
Chamois exhibit	30	Bear exhibit	60
Snake exhibit	30	Dog exhibit	39
Dog exhibit	18	Snake exhibit	22
Camel exhibit	10	Others	18
Horse exhibit	17		
Others	10		

2). As their reasons for not preferring exhibition sites, the participants have shown the reason of dissimilarity between exhibition sites and natural environment and rareness or absence of plant coverage in exhibition sites and narrowness of exhibition sites (x^2 = 107.98, 5df, p < 0.01) (Table 1). Exhibition site of tiger and leopard have been determined as less preferred sites (x^2 = 344.513, 5df, p < 0.01) (Table 2).

Determining the effects of spatial differences in the zoo on visitor perceptions

In order to identify adjective pairs that describes the perceptions of the visitors on the animals in different areas factor analysis in SPSS program (v. 17.0) is used. For gazelle factor percentages greater than 6 factors, represent 71% of variables which describe this individual. When adjective pairs acquired from factor analysis and arithmetic mean of these adjective pairs evaluated, it was determined that gazelle in natural setting was described mostly as beautiful, effective, energetic and free. According to the data, adjectives of secondary descriptive group were friendly, healthy and unusual. For baboon in natural setting, factor percentages were greater than 5 factors represent 70% of variables which describe this individual. For baboon, mainly used descriptive adjectives were friendly, healthy and happy. Adjectives of secondary descriptive group were free and active. Gazelle and baboon in natural setting were described with positive definitions by participants (Table 3 - 4).

Gazelle in semi-natural exhibit was described with 5 factors. These factors represent 61% of variables which describe gazelles. According to the information about gazelle's environment in the zoo, most effective descriptions were free, wild, friendly and happy. Besides, healthy and active were secondary descriptions. According to the information obtained from factor analysis for baboon in semi-natural, 5 factors are significant. Factor concentrations of these factors represent 62% of variables which describe baboon in semi-natural exhibit. Baboon in the zoo was reminiscent of adjectives unusual, harmless, friendly and energetic. The adjectives healthy, effective and beautiful are constituted secondary

descriptive group for baboon. This result indicated that gazelle and baboon both in natural setting and in semi-natural exhibit were described with positive definitions by participants (Table 3 - 4).

According to the information obtained from factor analysis for leopard in natural setting, 6 factors were identified as significant. These represent 60% of variables which describe leopard. When the information about leopard's wildlife was evaluated, it was appeared that, most effective descriptive adjectives for leopard were unusual, wild and active. Happy and free were also in secondary descriptive group for leopard. There were 5 factors identified as significant according to the information acquired from factor analysis for tiger in natural setting. Factor concentrations on these factors represent 66% of variables which describe tiger in natural setting. According to this information, primary descriptions for tiger were active, friendly, harmless, wild and healthy and secondary descriptions were energetic, happy and effective.

The information and eigen values acquired from factor analysis for leopard in the zoo exhibit revealed 7 significant factors. These 7 factors represent 82% of the variables that describe leopard in the zoo exhibit. Leopard in the zoo exhibit was mostly characterized as common, unhealthy, passive and aggressive by participants. Furthermore, weak and tame were adjectives of secondary descriptive group for leopard. When data for tiger in zoo exhibit was evaluated, 4 significant factors were revealed. These factors constitute 71% of variables which describe tiger. Evaluation of adjective pairs acquired from factor analysis and arithmetic means of these adjective pairs showed that tiger in zoo exhibit characterized as common, unhealthy, lazy and unhappy. Moreover, aggressive, harmful and tame were adjectives of secondary descriptive group according to the data. These result indicated that leopard and tigers were defined as positive adjectives in their natural environments whereas, they were defined as negative adjectives in the zoo (Table 5 - 6).

Determining the perceptual differences in defining animals in their natural environments and in the zoo

A paired samples *t* test was conducted in order to

Table 3. Factor analysis for the gazelle and the baboon in zoo and wildlife.

			Rotation sums of squared loadings		
		Factors	Eigen values	% of Variance	Cumulative%
Wildlife	Gazelle	1	1.826	14.045	14.045
		2	1.790	13.766	27.811
		3	1.494	11.493	39.304
		4	1.432	11.014	50.319
		5	1.403	10.796	61.115
		6	1.247	9.590	70.705
	Baboon	1	2.381	18.313	18.313
		2	1.851	14.238	32.551
		3	1.488	11.448	43.999
		4	1.475	11.348	55.347
		5	1.474	11.342	66.689
Semi-natural exhibits	Gazelle	1	1.797	13.823	13.823
		2	1.763	13.560	27.383
		3	1.550	11.920	39.303
		4	1.455	11.193	50.496
		5	1.433	11.023	61.519
	Baboon	1	2.006	15.429	15.429
		2	1.665	12.812	28.241
		3	1.544	11.876	40.117
		4	1.485	11.425	51.541
		5	1.362	10.476	62.017

evaluate perceptual differences between animals exhibited in their natural environments, in the semi-natural exhibits and in caged exhibits (Table 7). Among the variables, the animals in their natural environment obtained the highest rate regarding the values in which there were perceptual definitions of animals. The analyses revealed that, the differences between the perception about animals in the semi-natural exhibition area and perceptions of the ones in their natural environment were meaningful for each variable (p < 0.01). The mean and standard deviation values are for the values that were perceived for the animals in their natural environment and in the semi-natural exhibition area.

These results on the perceptual definitions of the visitors about animals, determined significant differences between natural environment and in the semi-natural exhibit areas. However, as shown in Figure 2, the values representing adjectives of animals that live in their natural environment and in the semi-natural exhibit area were very close to each other. The differences between the perception of animals in caged exhibition area and those

in their natural environment were significant for every variable (p < 0.01). The mean and standard deviation values for the values that are perceived for the animals in their habitat and in caged exhibit area and the values related to t test are presented in Table 8. These results show that there are statistical differences in perceptual definitions of visitors about the animals in their natural environment and the ones in caged exhibit areas and those differences have the high rates. The values that belong to adjectives that define animals in caged exhibit areas and those in their natural environment are in opposite points as shown in Figure 3.

DISCUSSION

In deciding the quality of the zoos, the first important feature is that, whether they have areas where animals behave naturally. Designers should not regard those areas as just the places where animals are exhibited and visitors can easily reach. If exhibit areas have the quality that animals can live there as if they live in their natural

Table 4. The variables identified as statistically significant for the gazelle and the baboon in wildlife and zoo.

		Factors	Variables
Wildlife	Gazelle	1	Beautiful, effective
		2	Free, energetic
		3	Active
		4	Friendly
		5	Well-kept
		6	Unusual
	Baboon	1	Friendly
		2	Well-kept, happy
		3	Unusual
		4	Free
		5	Active
Semi-natural exhibits	Gazelle	1	Free
		2	Wild, friendly
		3	Happy
		4	Well-kept
		5	Active
	Baboon	1	Unusual, harmless
		2	Friendly, energetic
		3	Well-kept
		4	Effective
		5	Beautiful

environment, they can easily show their lives and even special skills. Consequently, visitors have the opportunity to learn true perceptual and ecological information about animals. Taking this idea into account, in this study, the questions that ask why we visit zoos, why we prefer those exhibit areas and how the spatial features of exhibit areas affect visitors' perceptions on animals are tried to be answered. From the questionnaire surveys that are conducted face to face, it is concluded that most visitors visit the zoo in order to have knowledge about animals and introduce them to their children. Therefore, it is obvious that, zoos have an important role in structuring environmental education. They are primarily defined as the areas that are formed with a purpose of providing environmental education. Consequently, people visit the zoo for educational purposes especially for their children. This finding is supported by previous research (Patrick et al., 2007; Yılmaz, 2007; Hancocks, 2001; Adelman et al., 2000) showed that the most important aim of zoos is to provide a great number of people education of environment and its protection. The results of the study also support four hypotheses. This study proved the idea

that the areas where the animals are exhibited have an effect on both animal behaviours and visitor perceptions.

The first hypothesis assumes that, the animals that are exhibited in the areas that are compatible with their natural environment attract the attention of visitors more as they are active. Findings of the study supported this hypothesis. The areas where gazelle and baboon are exhibited are determined as the areas that are preferred the most. As those semi-natural exhibition areas are broad, very similar to the natural environment of the animals and give opportunity to the animals to live in groups, they enable animals to become active. The second hypothesis assumes that the animals, exhibited in small cages, take little attention as they are influenced by the negative effects of the area. The areas where tiger and leopard are exhibited take the least attention as they are very small and lacks of sufficient botanical elements. The stable life affect animals because of the area they live in cause them to be perceived as inactive.

These results are also supported by previous research (Clarke et al., 1982; Goerke et al., 1987; Maple and Finlay 1987; Little and Sommer, 2002) suggest that

Table 5. Factor analysis for the leopard and the tiger in zoo and wildlife.

			Rotation sums of squared loadings		
		Factors	Eigen values	% of Variance	Cumulative%
Wildlife	Leopard	1	1.768	13.599	13.6
		2	1.701	13.082	26.681
		3	1.570	12.079	38.76
		4	1.523	11.718	50.478
		5	1.299	9.990	60.467
		6	1.257	9.670	70.138
	Tiger	1	1.257	9.670	70.138
		2	1.986	15.275	15.275
		3	1.946	14.472	30.247
		4	1.863	14.327	44.575
		5	1.431	11.011	55.586
Caged exhibits	Leopard	1	2.647	20.353	20.358
		2	2.086	16.043	36.401
		3	1.880	14.461	50.862
		4	1.420	10.919	61.782
	Tiger	1	4.395	33.808	33.808
		2	1.844	14.185	47.993
		3	1.614	12.415	60.408
		4	1.405	10.810	71.217

naturalistic exhibits are more likely to allow captive animals to display typical individual and social behaviours, and reduce the stereotypic or abnormal behaviours, compared with more traditional ones. Zoo visitors perceived primates in the natural exhibits more positively than in the caged exhibit (Nakamichi, 2007). Moreover, naturalistic environments can contribute to more successful exhibits in zoo (Hoff et al., 1998). The third hypothesis assumes that, animals exhibited in the areas that are very similar to their natural environment, are perceived as behaving more naturally. This study proved this hypothesis. Gazelle in its natural environment is described as beautiful, attractive, free, energetic, active, friendly and healthy, while, it is described in the zoo (in a semi-natural exhibit) as free, wild, friendly, happy, healthy and active. In its natural environment, baboon is characterized as friendly, happy, healthy, unusual, free and active, and it is characterized in the zoo (in a semi-natural exhibit) as harmless, friendly, energetic, healthy, attractive and beautiful.

The data showed that the adjectives defining animals in the exhibition areas are similar to their natural environment. These adjectives are often either the same as the adjectives that describe conditions of animals in their natural environment or they reflect positive emotions (attractive, beautiful and happy). However, it is identified

that invisibility of boundary elements have a role for both animals to be defined as wild and free in the zoo. For instance, boundary elements within the sight, prevented animals from being perceived as wild and free in the exhibition area of baboon. Similarly, in the exhibition area of gazelle, as boundary elements are seen less, they enabled the animal to be perceived as free and wild. This result is supported by the study of Yılmaz (2008), who suggested that, if the visibility of boundary elements decreases, it provides exhibition areas with being perceived as if they were the natural environment of animals.

The fourth hypothesis is assumes that, the animals are exhibited in the areas which are not similar to their habitat and are not perceived as they are in their natural environment. The exhibition areas of tiger and leopard are found as the less preferred areas. It is seen that the adjectives used to describe those animals are very different from the ones that are used to describe them in their natural environment. Tiger is described as active, friendly, wild, harmless, energetic, happy and attractive in its natural environment while it is identified as unhappy, aggressive, captive, lazy, unhealthy and ordinary in the zoo. Leopard is defined as wild, active, attractive, happy, free and beautiful in its natural environment whereas, it is characterized as ordinary, harmful, passive, aggressive,

Table 6. The variables as statistically significant for the leopard and the tiger in wildlife and zoo.

		Factors	Variables
Wildlife	Leopard	1	Unusual, beautiful
		2	Wild
		3	Active
		4	Effective
		5	Happy
		6	Free
	Tiger	1	Active, friendly
		2	Harmless, wild
		3	healthy
		4	Energetic, happy
		5	Effective
Caged Exhibits	Leopard	1	Common, harmful
		2	Passive, unfriendly
		3	Weak
		4	Tame
	Tiger	1	Common, unhealthy
		2	Lazy, unhappy
		3	Unfriendly
		4	Harmful, captive

Table 7. The mean and standard deviation values for the values that are perceived for the animals in their natural environment and those in the semi-natural exhibit – *t* test values (Baboon-Gazelle).

Baboon	t	df	Sig.	Semi-natural exhibits		Wildlife	
				Mean	sd	Mean	sd
Harmful	20.58	209	0.00	3.73	1.67	5.07	1.73
Well-kept	-18.68	209	0.00	2.62	1.10	1.47	0.94
Free	-10.73	209	0.00	4.51	4.49	1.20	0.44
Active	-22.83	209	0.00	3.56	1.10	1.47	1.12
Unfriendly	17.06	209	0.00	4.80	1.04	6.26	1.16
Tame	14.64	209	0.00	3.66	1.01	5.64	1.93
Unusual	-32.53	209	0.00	4.05	1.35	1.95	1.21
Energetic	-32.92	209	0.00	2.73	1.07	1.35	0.64
Beautiful	-3.89	209	0.00	2.99	1.01	2.01	3.93
Strong	-31.35	209	0.00	3.05	0.77	1.55	0.69
Healthy	-20.57	209	0.00	2.98	1.15	1.42	0.62
Effective	-20.38	209	0.00	3.30	1.24	1.46	0.71
Gazella							
Harmful	8.07	209	0.00	5.12	1.49	5.76	1.23
Well-kept	-12.90	209	0.00	3.16	1.41	2.22	1.28
Free	-20.62	209	0.00	3.29	1.20	1.36	0.84
Active	-9.30	209	0.00	2.72	0.72	1.59	1.64

Table 7. Continued.

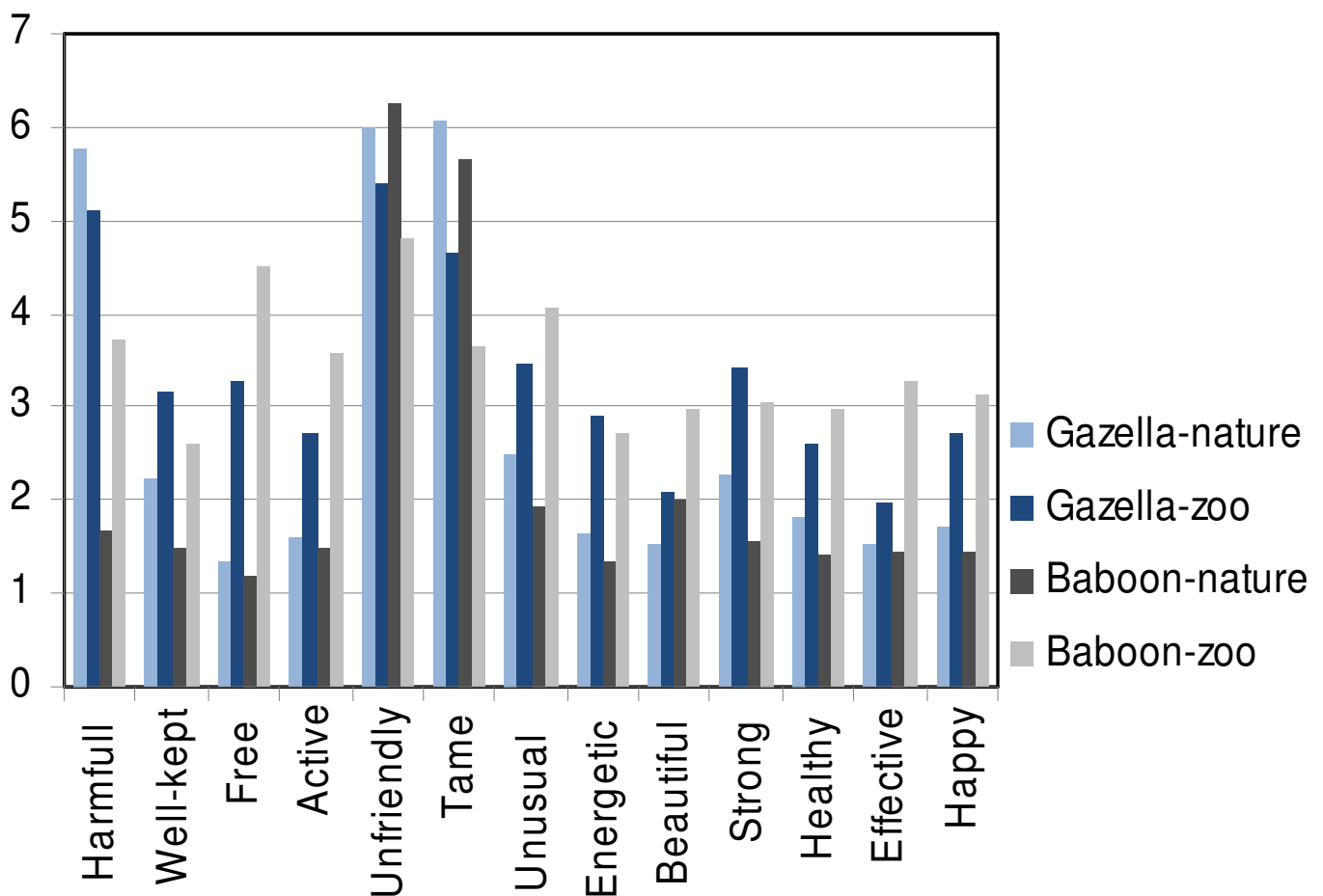|							
Unfriendly	7.91	209	0.00	5.41	0.89	6.00	1.00
Tame	18.54	209	0.00	4.67	0.90	6.07	1.10
Unusual	-14.87	209	0.00	3.47	1.33	2.49	1.32
Energetic	-16.11	209	0.00	2.90	1.05	1.65	0.76
Beautiful	-5.48	209	0.00	2.10	1.00	1.53	0.76
Strong	-20.01	209	0.00	3.43	1.26	2.26	1.05
Healthy	-14.56	209	0.00	2.60	1.19	1.84	0.95
Effective	-5.48	209	0.00	1.98	0.74	1.51	0.81
Happy	-5.69	209	0.00	2.71	2.05	1.72	0.85

Figure 2. Comparing the means of the values for definition of animals in their habitat and definition of those in the exhibit area (Baboon-Gazelle).

weak and domestic in the zoo.

These data have shown that the animals exhibited in small cages which do not include any natural elements are perceived negatively by the visitors. This result is very similar to the findings of a previous study (Fromm, 1993) suggested that, animals become more aggressive when their exhibition areas are small and social structures are destroyed. Those animals that are exhibited in such conditions are perceived as inactive, distressed and far from their glory in nature by the visitors.

Table 8. The mean and standard deviation values for the values that are perceived for the animals in their natural environment and in caged exhibit area- t test values (Tiger-Leopard).

Tiger	t	df	Sig.	Caged zoo exhibits		Wildlife	
				Mean	sd	Mean	sd
Harmful	23.39	209	0.00	2.21	1.18	5.53	0.57
Well-kept	-13.36	209	0.00	4.25	0.09	2.17	1.69
Free	-93.64	209	0.00	6.74	0.44	1.42	0.69
Active	-53.93	209	0.00	6.46	0.71	1.63	1.07
Unfriendly	36.06	209	0.00	1.34	0.58	5.55	0.71
Tame	25.78	209	0.00	1.85	1.40	5.60	1.74
Unusual	-11.41	209	0.00	4.87	0.69	2.54	0.78
Energetic	-45.15	209	0.00	5.79	1.27	1.78	0.99
Beautiful	-15.10	209	0.00	3.83	1.88	1.55	0.80
Strong	-26.91	209	0.00	4.55	1.73	1.40	0.69
Healthy	-15.01	209	0.00	4.30	1.65	1.95	1.17
Effective	-28.65	209	0.00	5.21	0.79	1.49	0.74
Happy	-51.16	209	0.00	5.97	0.93	1.67	0.81
Leopard							
Harmful	19.89	209	0.00	2.30	1.20	5.39	1.68
Well-kept	-13.02	209	0.00	4.27	0.05	2.28	1.66
Free	-74.27	209	0.00	6.65	0.68	1.40	0.73
Active	-47.78	209	0.00	6.43	0.70	1.76	1.19
Unfriendly	35.35	209	0.00	1.44	0.71	5.55	0.70
Tame	25.08	209	0.00	1.89	1.42	5.56	0.79
Unusual	-10.27	209	0.00	4.73	1.54	2.72	0.89
Energetic	-43.26	209	0.00	5.70	1.24	1.90	1.03
Beautiful	-15.02	209	0.00	3.94	0.93	1.71	0.98
Strong	-20.68	209	0.00	4.55	0.73	1.71	1.22
Healthy	-13.97	209	0.00	4.40	0.66	2.09	1.29
Effective	-24.54	209	0.00	5.16	1.76	1.66	1.00
Happy	-47.65	209	0.00	5.90	0.96	1.76	0.88

The data above support the results of the previous studies suggesting that exhibition environments evoke certain visitor attitudes and perceptions towards animals. For example, Rhoads and Goldsworthy (1979) revealed that, animals in semi - natural and traditional zoo environments perceived by the students as less dignified, happy, and independent than animals in natural settings. Our study also supports Finlay et al. (1988), who revealed that, animals in semi- natural and traditional zoo environments are perceived as tame, restricted and passive while animals in the wild are perceived as free, wild and active. Naturalistic exhibition areas in zoos reflect more information and positively described by the visitors (Yılmaz, 2008; Shettel-Neubers, 1988).

CONCLUSION

This study concluded that, the features of the exhibition areas and the perceptual effect of animals in the places, compatible with natural environment, are close to those of animals in nature. It is also seen that, if the proportion
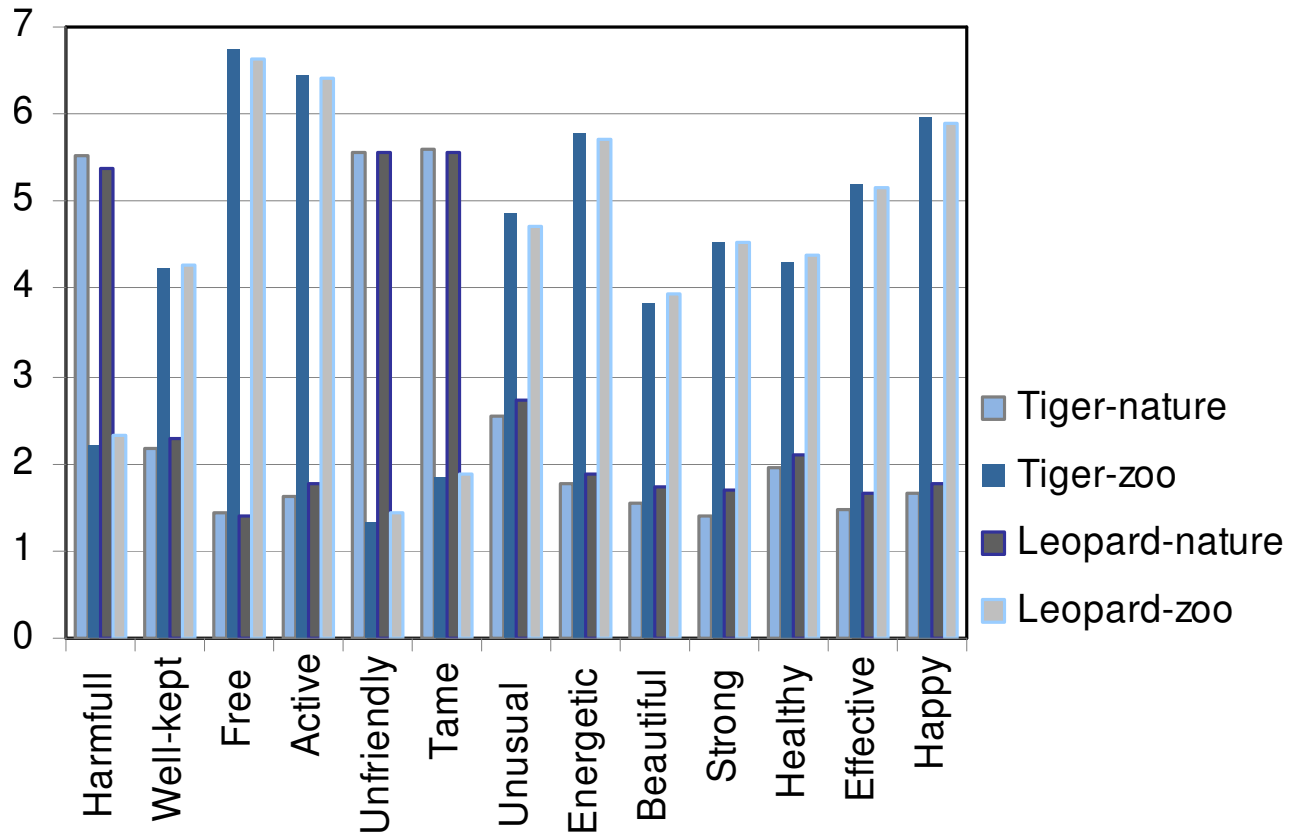
Figure 3. Comparing the means of the values for definition of animals in their habitat and   definition   of those in the exhibit area (Tiger-Leopard).

of similarity increases between the exhibition area and the natural living environments of animals, animals are defined as very close to the definition, when they are in their natural environment by visitors. It is indicated that, the exhibition of animals, either in the areas similar to their natural environment or in the ones that are artificial and ordinary, affect the perceptions of the visitors. Therefore, exhibiting areas affect definitions of the animals to a great extent as well. It is also concluded that zoos have also educational goals and provides opportunities for environmental education through their visual landscape features as one of the most important part of learning occur by seeing. Therefore, people learn about animals as how they see them in the zoo. The animals that are not exhibited in nature like areas loose their glory they have in nature. This results in a decrease in visitors' in respect towards animals. Whereas, various studies show that, the ideas of people about animals change positively after they visit zoos designed similar to natural environment.

The zoo environment is rich with stimuli including animal behaviours which attract the attention of visitors over the ecological and conservation messages of the exhibit. Learning in the informal setting is more attitudinal than cognitive. The zoo provides concrete experiences that are more valuable for long term retainment (Bitgood

et al., 1988). This becomes reality just when exhibition areas are designed as having the same qualities as natural life environment of animals. As most of the visitors consist of children and teenagers, zoos are one of the most important places where environmental education and nature conservation take place (Yılmaz, 2007). In zoos, as visitors search spontaneously by moving from an exhibition to another, they become informed about each exhibition area and evaluate each of them. Taking animals out of their natural environments for educational purposes can only be justified if zoo exhibitions designed to reflect the natural living environment of the animals. Zoos are the areas where people interact with nature and learn about animals, and they show that animals also have right to live. Therefore, in the future, research should be focused on naturalistic zoo designs.

REFERENCES

Adelman L, Falk J, James S (2000). Impact of national aquarium in Baltimore on visitors' conservation attitudes, behavior, and knowledge. Curator, 43(1): 33–60.

Bitgood S, Patterson D, Benefield A (1986). Understanding your visitors: ten factors that influence visitor behaviour. Am. Assoc. Zool. Parks Aquaria Proc. 52(2): 80–88.

Bitgood S, Patterson D, Benefield A (1988). Exhibit design and visitor

behavior: empirical relationships. Environ. Behav. 20: 474-491.

Cerver FA (1994). World of environmental design landscape of recreation II (Amusement Parks). John Wiley&Sons, Inc.

Clarke AS, Juno CJ, Maple TL (1982). Behavioral effects of a change in the physical environment: A pilot study of captive chimpanzees. Zoo Bio., 1(4): 371-380.

Coe J (1985). Design and perception: making the zoo experience real. Zoo Bio., 4 (2): 197–208.

Davey G, Henzi P (2004). Visitor circulation and nonhuman animal welfare: An overlooked variable? J. Appl. Anim. Welf. Sci., 7(4): 243-251.

Davey G, Higgins L (2005). Western visitor behavior principles are applicable to Chinese zoos. Inter. Zoo News, 52(16): 26–31.

Finlay T, James LR, Maple TL (1988). People's perceptions of animals: The influence of zoo environment. Environ. Behav, 20(4): 508-526.

Fromm E (1993). The anatomy of human destructiveness, Payel Press (Turkish translation: Alpagut, Ş), p. 335.

Goerke B, Fleming K, Creel M (1987). Behavioral changes of a juvenile gorilla after a transfer to a more naturalistic environment. Zoo Biol. 6(4):283-295.

Gökteke, E (1998a). The masterpiece of nature (In Turkish).: Tiger. Travel: National Geographic Traveler with Selections, 1(8): 47-64.

Gökteke E (1998b). Safari in Sabi Sabi (In Turkish). Travel: National Geographic Traveler with Selections Form, 2 (14): 68-84

Gür Ş (1996). Spatial Organization, Gür Press (In Turkish).

Hancocks D (2001). A Different Nature: The paradoxical world and their uncertain future. Berkeley: University of California Press.

Hoff MP, Hoff KT, Maple T (1998). Behavioral responses of a Western lowland gorilla group to the loss of the silverback male at Zoo Atlanta. Inter. Zoo Yearbook, 36: 90–96.

Hood M (1983). Staying away: Why people choose not to visit museums. Museum News, 61: 50-57.

IUDZG-IUCN/ SSC (1997). World Zoo Conservation Strategy, Head of Environmental Protection Department, Local Agenda 21, the 3rd publication of Branch Office (Turkish translation: G. Çevik).

Johnston RJ (1998). Exogenous factors and visitor behavior: A regression analysis of exhibit viewing time. Environ. Behav., 30: 322-324.

Little KA, Sommer V (2002). Change of enclosure in langur monkeys: Implications for the evaluation of environmental enrichment. Zoo Biol. 21 (6): 549–559.

Maple TL, Finlay TW (1987). Post-occupancy evaluation in the zoo. Appl. Anim. Behav. Sci., 18 (1): 5-18.

Morgan J, Hodgkinson M (1999). The motivation and social orientation of visitors attending a contemporary zoological park. Environ. Behav., 31: 227-239.

Nakamichi M (2007). Assessing the Effects of New Primate Exhibits on Zoo Visitors' Attitudes and Perceptions by Using Three Different Assessment Methods. Anthrozoös, 20(2): 155-165.

Patrick G, Matthews CE, Ayers DF, Tunnicliffe SD (2007). Conservation and education: Prominent themes in zoo mission statements. J. Environ. Educ., 38: 53-59.

Price EC, Ashmore LA, McGivern A (1994). Reactions of zoo visitors to free-ranging monkeys. Zoo Biol. 13(4): 355-373.

Rhoads DL, Goldsworthy RJ (1979). The effects of zoo environments of public attitudes toward endangered wildlife, Int. J. Environ. Stud., 13(4): 283-287.

Shepherdson D, Mellen J, Hutchins M (1998). Second nature: Environmental enrichment for captive animals. Washington, DC. Smithsonian Institute Press.

Shettel-Neuber J (1988). Second- and third-generation zoo exhibits: a comparison of visitor, staff, and animal responses. Environ. Behav., 20(4): 452-473.

Totfield S, Coll R, Vyle B, Bolstad R (2003). Zoos as a source of free choice learning. Res. Sci. Technol. Educ., 21: 67-99.

Tudge C (1992). Last animals at the zoo: How mass extinction can be stopped, Oxford University Press, Oxford.

Yılmaz S (2007). The role of zoos in protecting nature. 4th National Ecology and Environment Congress. September 10–13 (In Turkish).

Yılmaz S (2008). A design approach based on perceptual illusions for enhancing the "width" impact of zoo exhibition areas, Doctor of Philosophy, University of Black Sea Technical, Trabzon, Turkey.