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VISITOR STUDIES Today!

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ZOO EXHIBIT DESIGN: IMPACT OF SETTING FACTORS ON VISITORS

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Introduction

There is an increasing body of knowledge from which to extract principles of design for exhibits of all types. Live animal exhibits (compared to most museum exhibits) pose a special problem because they must serve both as habitats for the animals and viewing/educational area for the visitor. From an animal perspective, researchers have come a long way in discovering how to design a habitat that is optimal for the welfare of the animal (e.g., Shepherdson, Mellon, and Hutchins, 1998). Fewer research studies have examined how zoo exhibit design influences visitors. The current article will focus on the setting factors associated with live animal exhibit design from the visitor perspective. Setting will include the physical features and events occurring in both the animal enclosure and the visitor areas. Due to the limited space allowed for this article, other important variables (e.g., social interaction, animal characteristics, and visitor characteristics) will not be discussed, although each is extremely important in understanding how visitors respond to zoo exhibition.

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Viewing time in a zoo is closely related to distance between animals and visitors.

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LAST CALL FOR THE 1999 VISITOR STUDIES CONFERENCE !

♥ "AT THE HEART OF IT ALL" ♥
Chicago – August 3-7, 1999

There's still time to sign up for the 1999 Visitor Studies Conference! Hosted by the Adler Planetarium, Field Museum, and Shedd Aquarium, this year's conference promises to be exciting, rewarding, and thought provoking. After the workshops and sessions, fun-filled evening events will give you a taste of Chicago's museums, zoos, aquariums, and other treasures.

The first keynote speaker is Paco Underhill, author of the recent book, *Why We Buy: The Science of Shopping.* (Check out the recent *New York Times* book review at

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Zoo Exhibit Design: Impact of Setting Factors on Visitors (cont.)

The Animal Habitat Area

If a zoo exhibit is divided into animal and visitor areas, the animal habitat is that area exclusive to the animal while the visitor area is the domain of the visitor. Some type of barrier (glass, fence, bars, moat) usually separates the animals from the visitor. Of course, this analysis does not apply for petting zoo exhibits (where animal and visitor share the same space), which is outside the boundaries of the current article.

Naturalism. Naturalism can be defined in several ways: subjectively from the visitors' perception, subjectively from recognized experts' view, or objectively by noting the presence or absence of specific features. Each of these definitions has its own shortcomings. For example, Swift (1986) reported that a survey of zoo visitors revealed an exhibit was judged to be naturalistic if it looked park-like with trimmed grass. Obviously, this perception differs from real-life naturalistic habitat.

Bitgood, Patterson, and Benefield (1988) compared visitor reaction to exhibits that differed in terms of natural elements (vegetation and rocks). Three species were represented in two areas of the Birmingham Zoo. The newer, more naturalistic exhibits were associated with longer viewing times than the older, less naturalistic ones.

Shettel-Neuber (1988) compared exhibits that were more natural (third-generation or state-of-the-art) with those less natural (second-generation). Longer viewing times were found at the orangutan naturalistic (third-generation) exhibit than at the less naturalistic (second-generation) one, but the reverse was true at the pigmy chimpanzee exhibit. Survey data, on the other hand, found that visitors preferred the more naturalistic exhibits for both species.

Finlay, James, and Maple (1988) asked participants to rate animals from three types of slides— those with animals in the wild, those with animals in naturalistic zoo exhibits, and those with caged zoo animals. Animals were rated using a semantic differential scale on several characteristics (free-restricted, tame-wild, active-passive, energetic-lazy, unfriendly-friendly, harmful-harmless, etc.). The researchers found that the environment (wild, naturalistic zoo, vs. caged zoo) and the species of animal were both important factors in participants' ratings. In general, animals in the wild were rated more positively than zoo animals, especially those in caged environments.

Johnston (1998) developed an objective scale for exhibit naturalism that included elements such as vegetation, exhibit barriers/walls/exits, water features, rock work and other permanent features. Viewing time was strongly correlated with this measure of naturalism.

Size of Animal Habitat. Size of the animal habitat could influence visitor behavior in terms of perceived animal welfare or it could interact with other factors such as proximity of animal to visitor, etc. Since modern exhibits use visual illusions to create their effect, perceived size may be quite different than actual size. For example, a naturalistic background painted on a back wall may give the viewer the illusion of much greater space than is actually there. Because of the numerous factors that may interact with habitat size, it would be challenging to make any strong conclusions about exhibit size even if there were studies addressing this factor. However, I could not find

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Last Call for the 1999 Visitor Studies Conference (cont.)

http://search.nytimes.com/books/). On Friday, Robert Eisenberger, Professor of Psychology at the University of Delaware will speak on "The Museum-Goer's Motives: The Social and the Sublime."

Come early! The Tuesday and Wednesday workshops are a great way to learn about new audience research and exhibit evaluation tools, find out how to develop better exhibits, and produce better grant proposals.

Stay late! Thursday through Saturday, there are more than 60 speakers and poster presentations covering a wide range of topics including what we know about how visitors make meaning out of their visits, using and evaluating websites, making female friendly science exhibits, the effectiveness of wayfinding maps and symbols, how to interview young children, and lessons learned from evaluations in museums, zoos, and national parks. Our own Mike Spock will reflect on the field of visitor studies at Saturday's closing lunch business meeting.

For more information, a detailed and up-to-date preliminary program, and registration information, check out the VSA website at http://museum.msu.edu/vsa. Or call the Registration Hotline at 847-550-9353. See you in Chicago!

CHICAGO HOST COMMITTEE

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any studies that attempted to isolate exhibit size as a variable influencing visitor attention.

Complexity of Habitat. Complexity, similar to naturalism, can be defined subjectively or objectively. Subjective definitions would involve some judgment measure of complexity (for example, a rating scale). An objective measure, on the other hand, might be defined in terms of number of different types and/or number of elements within an exhibit. For example, an exhibit that contained vegetation, rocks, and water might be judged more complex than one containing only two of these elements. Or, an exhibit with a large number of trees and bushes might be considered more complex than one with a fewer number of trees/bushes. Again, this variable, as with many of the others, is likely to interact with other exhibit characteristics (e.g., size, naturalism). There does not appear to be any empirical studies examining the impact of complexity on visitor attention.

Proximity of Animal to Visitor. Based on our informal observations that visitors try to get as close as possible to the exhibit object/animal in museums and zoos, it is reasonable to predict that the closer the animal is to the visitor, the greater the visitor interest. This relationship was validated by Bitgood et al (1988) and Johnston (1998) who found that viewing time was closely related to distance between animal and visitor.

Absolute Visibility (whether or not animals are visible). It should be no surprise that when an animal is not visible to the public, visitors spend less time viewing (Johnston, 1998); Bitgood et al., 1999). Related to this notion is the fact that visitors do not spend much time searching for the animal if it is not easy to detect. There is an exception — if a label instructs visitors to search or if another visitor visually finds the animal, visitors tend to view longer (Bitgood, Nichols, Pierce, and Patterson (1986).

Relative Visibility (degree to which there are visual obstructions such as glass, fence, low lighting, and vegetation). When visitors do not get a clear view of animals in an exhibit, their viewing time is decreased (Bitgood et al., 1988). Herein lies a dilemma: while vegetation and rocks may add to the perception of naturalism, these elements may also detract from relative visibility.

Lighting level within the habitat are also of concern with respect to visibility. Although no data could be found related to a zoo exhibit, Bitgood, Pierce, Nichols, and Patterson (1986) reported that lighting levels in a simulated cave exhibit influenced the duration of viewing time within the exhibit and visitors perception of the exhibit (more favorable perception and longer viewing times under intermediate levels of lighting).

Food Delivery Events. How food is delivered to an animal has more or less interest to visitors. Jackson, Ogden, and Maple (1989) demonstrated that spreading out food on a trial within the exhibit in front of visitors can increase the probability that visitors will see the gorillas since it encourages more foraging behavior than dumping food in a large pile. Bitgood, Lea, Ethridge, and van Gelder (1999) found differences in visitor interest between regular daily feeding of polar bear chow and feeding of enrichment items such as fish in frozen ice. When the animal had to work at getting the fish, it resulted in greater activity and more interesting viewing behavior for visitors.

Supplemental Nonfood Objects (toys, etc.). When animals are provided with objects to manipulate, an increase in visitor attention is likely to result. While Bitgood et al (1999) found an increase in viewing associated with a polar bear manipulating objects such as edible tree branches, data confirming this effect with non-edible items are absent.

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Visitor Area

The visitor viewing area of zoo exhibits is undoubtedly influenced by the same variables that play a role in museum exhibits. The major difference may be how the design of the viewing area is related to live animals rather than nonliving objects. For example, design may be dictated by the motivation to minimize stress to animals. It is also important to note that, since many natural history museums and science centers include live animals, the distinction between museum and zoo environments is more blurred than it once was.

Interpretive Design. The content, graphics, and layout of interpretive material have been shown in many studies to influence visitor attention. Most notably, label characteristics have been extensively studied (e.g., Bitgood, Benefield, & Patterson, 1990; Thompson & Bitgood, 1988). Serrell (1996) has incorporated this literature in her excellent guide to designing labels.

Data collected in zoos has produced results similar to those collected in museums. For example, Bitgood, Benefield, and Patterson (1990) found that the impact of label placement on visitors was the same whether from a zoo or museum. In addition, Bitgood & Patterson (1992) found that label reading in both a zoo and museum was increased by giving visitors a handout with questions, answers of which are contained in exhibit labels.

"Live animal exhibits pose a special problem because they must serve both as habitats for the animals and viewing/educational area for the visitor."

Layout of Exhibit Elements. How the exhibit elements (individual displays, size and placement of viewing window, etc.) are arranged can have a substantial impact on how visitors circulate through the space. Carefully designed interpretive objects can be used to attract an increasing number of visitors to an exhibit (Bitgood, Benefield, Patterson, & Litwak, 1990). This study found that life-size animal cutouts actually increased traffic flow to an exhibit that was not well-visited.

Size of Area. It is not clear exactly how size of the viewing area influences visitor attention. Obviously, this variable will interact with crowding conditions—when crowded, more visitors can fit comfortably into the viewing area. Size may also influence visitor comfort with the space. Large open spaces are less comfortable than small, intimate spaces. However, if the area is too small, it may foster a sense of claustrophobia.

Lighting. Both natural and artificial lighting are important, but only artificial lighting in the viewing area will be considered here (see below under "non-exhibit environment" for a discussion of natural lighting). Zoo exhibits are often designed so that there is different levels of lighting for the animals habitat and the visitor viewing area. Such lighting differences may help prevent glare through the viewing glass. It may also make it difficult for the animal to see the visitors in order to decrease psychological stress on the animals. If lighting is too dim, and if rear-projected lights are not used for labels, visitors may have difficulty reading the label text.

Comfort Factors. Several factors related to comfort are potentially important. Temperature is especially important in outside zoo exhibits where the visitor is at the mercy of the weather. Johnston (1998) found temperature to be a significant predictor of viewing time.

Other comfort factors lack evidence as to their impact on visitor attention. It seems reasonable to assume that a comfortable place to sit would increase viewing time, but there are no careful studies, only anecdotal evidence, to substantiate the impact of this factor.

Non-Exhibit Environment

There are several nonexhibit-related factors that can influence visitors. These are environmental elements that are extraneous to the design of individual exhibits, but serve a more general context for the exhibit(s).

Sensory Competition. Distracting sights and sounds are the major factors likely to interfere with visitor attention to exhibits. Melton (1972) described a study in a museum of science that demonstrated a moving gear shape attracted visitors toward the movement, but, in turn, decreased attention to other exhibits.

Architectural Features. The zoo exhibit, similar to the museum exhibit, must be designed within an architectural framework. Important architectural features may include doors (especially entrances and exits), windows, natural lighting, and architectural style. Melton (1935) reported on the influence of entrance and exits on visitor circulation through galleries (see also Bitgood & Lankford, 1995).

General Discussion

Understanding the factors that influence zoo visitors and all of the interactions among variables is obviously a complicated endeavor and will take years to unravel. Nevertheless, we have learned a substantial amount in a short period of time.

The current review indicates that several variables associated with the animal habitat influence visitors: naturalism of the exhibit; proximity of animal to visitor; abso-

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lute and relative visibility; and presence of edible and non–edible objects. However, other potentially important variables such as size and complexity of habitat have not been empirically examined.

Variables associated with the visitor area have been identified but not always researched. Thus, we know most about label design, somewhat less about the variables associated with layout of exhibit elements, and very little about size of viewing area, lighting, and comfort factors. Perhaps justifiably, the focus has been on interpretive messages. However, non-interpretive factors can play a critical role in whether or not the messages will be attended to, thus deserving more careful study.

The picture is incomplete if one only considers these setting factors. They are necessary but not sufficient factors in understanding an exhibit's impact. One must also consider the characteristics of visitors (e.g., education, age, knowledge and interest in the subject matter), social factors (e.g., group composition, crowding, presence of a staff person such as zoo keeper), and characteristics of the animals on exhibit (e.g., size, shape, activity level, reaction to visitors).

"Non-interpretive factors can play a critical role in whether or not the messages will be attended to, thus deserving more careful study."

References

Bitgood, S. (1992). The impact of a zoo visit on attitudes: A preliminary report on interaction effects. *Visitor Behavior*, 7(3), 7-10.

Bitgood, S., Benefield, A., & Patterson, D. (1990). The importance of label placement: A neglected factor in exhibit design. In *Current trends in audience research 1990)*. Chicago: AAM Visitor Research & Evaluation Committee, 49-52.

Bitgood, S., Benefield, A., Patterson, D., & Litwak (1990). Influencing visitor attention: The effects of life-size animal silhouettes on visitor behavior. In *Visitor studies: Theory, research, and practice (Vol. 3)*. Jacksonville, AL: Center for Social Design. 221-230.

Bitgood, S., & Lankford, S. (1995). Museum orientation and circulation. *Visitor Behavior*, 10(2), 4-6.

Bitgood, S., Nichols, G., Pierce, M., & Patterson, D. (1986). The effects of instructional signs on museum visitors. Technical Report No. 86-70. Jacksonville, AL: Psychology Institute, Jacksonville State University.

Bitgood, S., Pierce, M., Nichols, G., & Patterson, D. (1987). *Curator*, 30(1), 31-39.

Bitgood, S., & Patterson, D. (1992). Using handouts to increase label reading. *Visitor Behavior*, 7(1), 15-17.

Bitgood, S., Patterson, D., & Benefield, A. (1988). Exhibit design and visitor behavior: Emprical relationships. *Environment and Behavior*, 20, 474-491.

Bitgood, S., & Loomis, R. (1993). Introduction: Environmental design and evaluation in musuems. *Environment and Behavior*, 25(6), 683-697.

Bitgood, S., Lea, S., Ethridge, K., & van Gelder, S. (1999). What's good for the polar bear is also good for the visitor. In *Current trends in audience research, Vol. 12*. Cleveland, OH: Audience Research and Evaluation Committee of the American Association of Museums, 1-7.

Finlay, T., Lawrence, J., & Maple, T. (1988). People's perceptions of animals: The influence of the zoo environment. *Environment and Behavior*, 20, 508-528.

Jackson, D., Ogden, J., & Maple, T. (1989). Making visual contact at the gorilla interpretive center: A study of visitor traffic flow and gorilla visibility. In S. Bitgood, et. al., *Visitor studies: Theory, Research, and Practice* (Vol. 2). Jacksonville, AL: Center for Social Design, 225-237.

Johnston, R. (1998). Exogenous factors and visitor behavior: A regression analysis of exhibit viewing time. *Environment and Behavior*, 30 (3), 322-347.

Melton, A. (1935). *Problems of installation in museums of art.* American Association of Museums Monograph Series No. 14. Washington, D.C.: American Association of Museums.

Melton, A. (1972). *Visitor behavior in museums: Some early research in environmental design. Human Factors*, 14(5), 96-106. Technical Report No. 86-15. Jacksonville, AL: Psychology Institute, Jacksonville State University.

Serrell, B. (1996). *Exhibit labels: An interpretive approach.* Walnut Creek, CA: Altamira Press.

Shepherdson, D. J., Mellen, J. D., & Hutchins, M. (eds.), (1998). *Second nature: Environmental enrichment for captive animals*. Washington, D.C.: Smithsonian Institution Press.

Shettel, Neuber, J. (1988). Second and third generation zoo exhibitrs: A comparison of visitor, staff, and animal responses. *Environment and Behavior*, 20, 452-473.

Swift, J. (1986). How natural is "naturalistic"? *Visitor Behavior*, 1(1), 3.

Thompson, D., & Bitgood, S. (1988). The effects of sign length, letter size, and proximity on reading. In S. Bitgood, et al., *Visitor Studies: Theory, research, and practice.* Jacksonville, AL: Center for Social Design, 101-112.