

# Behavioral Response of Dogs to Interior Environment: An Exploratory Study on Design Parameters for Designing Dog Boarding Centers in Indian Context

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**Abstract**—Pet population in India is increasing phenomenally owing to the changes in urban lifestyle with increasing number of single professionals, single parents, delayed parenthood etc. The animal companionship as a means of reducing stress levels, deriving emotional support, and unconditional love provided by dogs are a few reasons attributed for increasing pet ownership. The consequence is the booming of the pet care products and dog care centers catering to the different requirements of rearing the pets. Dog care centers quite popular in tier 1 metros of India cater to the requirement of the dog owners providing space for the dogs in absence of the owner. However, it is often reported that the absence of the owner leads to destructive and exploratory behavior issues; the main being the anxiety disorders. In the above context, it becomes imperative for a designer to design dog boarding centers that help in reducing the separation anxiety in dogs keeping in mind the different interior design parameters. An exploratory research with focus group discussion is employed involving a group of dog owners, behaviorists, proprietors of day care as well as boarding centers, and veterinarians to understand their perception on the significance of different interior parameters of color, texture, ventilation, aroma therapy and acoustics as a means of reducing the stress levels in dogs sent to the boarding centers. The data collected is organized as thematic networks thus enabling the listing of the interior design parameters that needs to be considered in designing dog boarding centers.

**Keywords**—Behavioral response, design parameters, dog boarding centers, interior environment.

## I. INTRODUCTION

INDIA has witnessed a booming pet care market by 20% annually owing to the changing lifestyles with delayed parenthood among most urban and newly married couples, rising nuclear families, increasing number of urban household, demand for companionship, and rates of pet ownership [1]-[2]-[3]. The services segment of pet care industry has also seen a rise in the number of companies offering pet boarding, pet relocation, training, pet shops, veterinary clinics and grooming parlors [4]. The pet boarding center offers day care, short term, and long-term boarding facilities for the dogs of the pet owners who have changed attitudes from ownership to stewardship. These boarding centers provide required attention to the dogs in the absence of the owner (pet parents) and also provide grooming sessions, playing sessions, and food facilities. However, it is commonly observed that the dogs left in the boarding centers often become stressful that lead to many behavioral issues which includes anxiety, aggression, lack of

appetite etc. The most common behavioral issue is the separation anxiety defined as excessive vocalization, inappropriate elimination, and destruction associated with the owner's absence [5]. Anxiety disorders are among the most common disorders and are part of behavioral problems observed among the domestic dogs [6]. The issue of separation anxiety among the dogs are addressed in a dog boarding center with the help of professional veterinarians, and licensed professional behaviorist/trainer who engage in different types of enrichment such as social (contact with dogs and other species, especially humans), occupational (job that encourages physical exercises and mental stimulation), physical (quality and complexity of dog's living space), sensory (stimulate dogs senses of sight, sound, or smell), and nutritional (feeding enrichment) to enhance the animal's quality of life in dog boarding center [6], [7]. Designing of the animal shelters [8] and dog friendly hotels [9] have garnered considerable attention addressing the environmental enhancement with focus on physiological needs, social needs, psychological needs, environmental needs, and behavioral needs. Various shelter home design guidelines, along with other requirements draws attention to the requirement of adequate light during daylight hours with specific mention of any artificial light that requires to be turned off at night to allow natural sleep patterns [10].

Keeping in view the growing dependability on the pet service centers and considerable research on designing animal spaces; this paper proposes to explore the importance of design parameters (interior environment parameters) to be considered in designing dog boarding centers in Indian context with an objective of reducing the anxiety in dogs.

## II. METHODOLOGY

Focused group discussion is carried out to explore the interior environment parameters that are deemed useful for reducing the anxiety in the dogs. Focus groups is selected for the study since it helps in gathering opinion of individuals or groups on qualitative aspects of ideas and feelings concerned with certain issues [11]. For the research, focus group discussion is carried out involving professionals associated with the dog welfare include the veterinarians, owners of the dog boarding centers, pet owners, and behaviorist. The participants are asked open ended questions on their experience with behavioral changes of anxiety in dogs and the importance of design parameters in

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reducing the same in the context of designing dog boarding centers in India.

### III. DISCUSSIONS

The data collected is analyzed using thematic networks often used as a tool for assisting and organization of qualitative data

through different levels of analysis which includes coding, organizing themes, and globalizing themes. From the data coded, three themes emerged which includes reasons of anxiety, expression of the anxiety, and the design strategy to reduce the anxiety in dogs at dog boarding centers as given in Fig. 1.

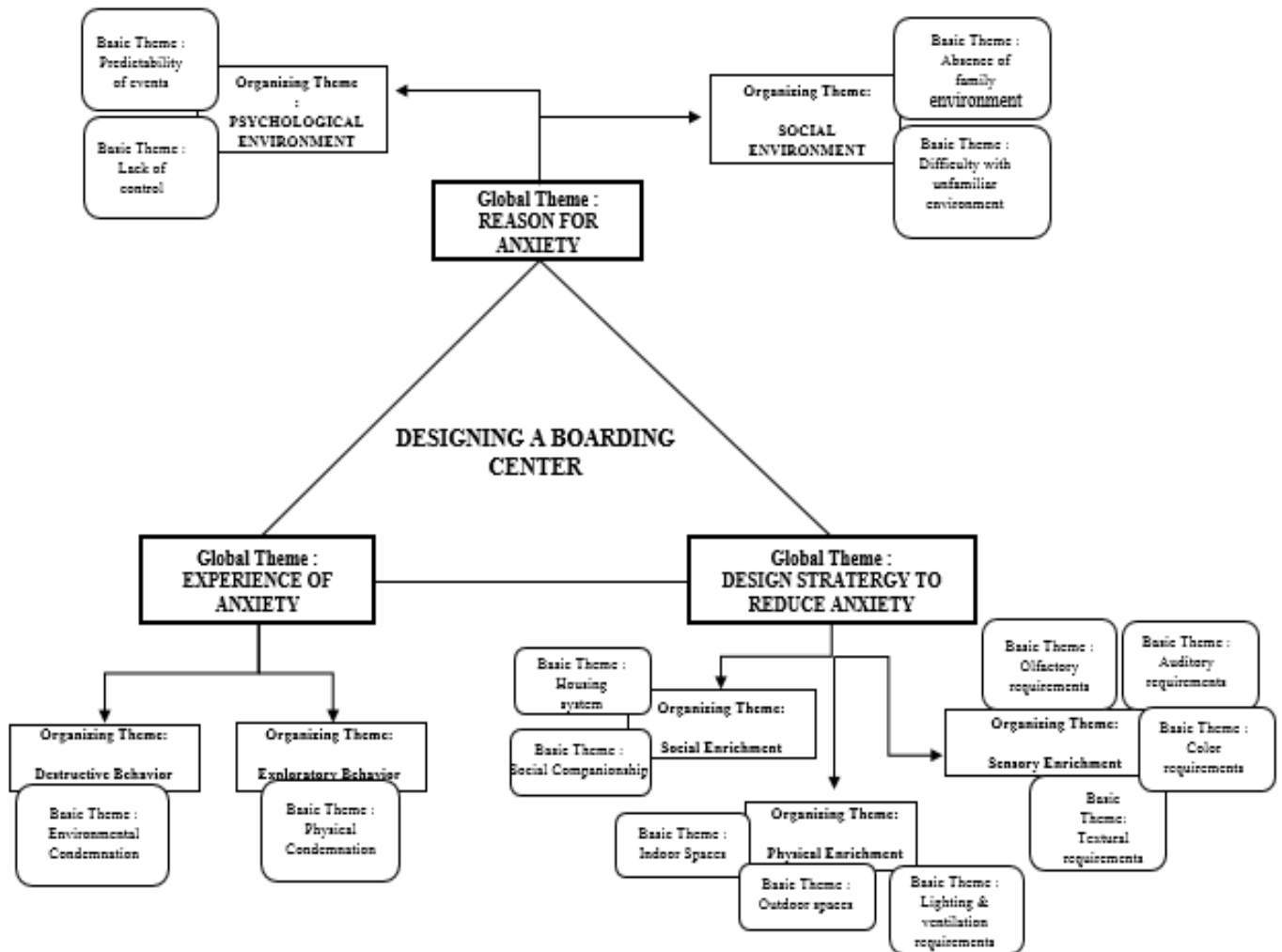


Fig. 1 Thematic Networks

The participants of the research are coded as DO (Dog owners); OBC (Owners of boarding centers), V (Veterinarians), and B (Behaviorists). The total number of responses received for each theme is represented as T and includes multiple responses from the same participant as opposed to total number of participants in the research.

*Reasons of anxiety:* Table I shows the conceptualization of the reasons for the dog anxiety in the boarding centers.

Participants are asked to state the reasons for the anxiety seen among the dogs in general and boarded at the center. The reasons attributed are related to the unpredictability of the events and the lack of control to the unfamiliar situations. The behaviorist and the dog owners also reasoned the absence of the owner and family environment towards the changes in behavior

of the dogs. The observations justify the observed disturbances in the animal subjected to unpredictable and uncontrollable events [12].

*Expression of anxiety:* Table II encompasses the expression of anxiety as viewed by the participants.

Participants are asked to state the different ways in which the dogs generally express their anxiety. The veterinarians and behaviorists stated that clinically the dog's express anxiety through constant licking of lips, hyper salivation, and circling in small areas termed as tail chasing. Also, the responses of continuous barking, lack of appetite, whining are stated by the dog owners as the mode of expression of anxiety commonly observed at home with unfamiliar people. The owners of the dog boarding centers reported common symptoms of digging

burrows, biting cages, and breaking objects as mode of expressing anxiety. The observations justify the research conducted by Talegon & Delgado, 2013 [13] on anxiety disorders in dogs.

TABLE I  
 REASONS OF ANXIETY

Basic Responses	Basic theme	Organizational theme	Global Theme	DO	OBC	V	B	T
Absence of the owner	Absence of family environment	Social Environment		✓			✓	7
Away from home				✓			✓	8
Unfamiliar people	Difficulty with unfamiliar environment			✓			✓	8
Difficulty in adjusting with other dogs in the boarding center				✓			✓	8
Changed routines such as food and exercise	Predictability of events		Reasons of Anxiety	✓	✓		✓	11
Change in bedding and kennel space				✓				5
Adjusting to the new environment	Lack of control	Psychological Environment		✓	✓		✓	11
Access to outdoor spaces				✓	✓	✓	✓	15
Cannot adjust to other people instructions mainly being controlled by owners				✓	✓	✓	✓	13

TABLE II  
 EXPRESSION ON ANXIETY

Basic Responses	Basic theme	Organizational theme	Global Theme	DO	OBC	V	B	T
Breaking objects	Environmental condemnation	Destructive Behavior			✓		✓	7
Digging burrows				✓		✓	6	
Biting cages				✓		✓	7	
Barking	Physical condemnation	Exploratory Behavior	Experience of anxiety	✓		✓		8
Loss of appetite				✓		✓	8	
Whining				✓		✓	8	
Constant licking of lips				✓		✓	✓	9
Hyper salivation				✓		✓	✓	9
Tail chasing				✓		✓	✓	8

TABLE III  
 SOCIAL ENRICHMENT

Basic Responses	Basic theme	Organizational theme	Global Theme	DO	OBC	V	B	T
Group housing helps reduce stress	Housing system				✓		✓	10
Individual housing is much preferred				✓			5	
Increased human contact is preferred in terms of petting, grooming, exercises etc.,	Social companionship	Social Enrichment	Design Strategy to Reduce Anxiety	✓			✓	10
Socializing sessions following with group housing of pets with same temperament is preferable						✓	✓	✓

TABLE IV  
 PHYSICAL ENRICHMENT

Basic Responses	Basic theme	Organizational theme	Global Theme	DO	OBC	V	B	T
Kennel space should be as per the size of the dog	Indoor spaces			✓	✓			7
Kennel space should include sleeping, excreting, standing areas				✓			✓	✓
Visual access to the rest of kennel area	Outdoor spaces	Physical Enrichment	Design Strategy to Reduce Anxiety	✓			✓	8
Provision of access to outdoor spaces				✓	✓	✓	✓	13
Access to exercise, and play areas				✓	✓	✓	✓	7
Kennels with high viewpoints make the dog look around and not feel confined inside the facility				✓			✓	7
Natural day lighting is much preferred				✓	✓	✓	✓	15
Natural ventilation is much preferred	Lighting and ventilation requirements			✓	✓	✓	✓	13
Air-conditioning of the kennel is much preferred				✓	✓			7
In night sufficient artificial lighting should be provided				✓	✓			7

*Design strategy to reduce anxiety:* The paper focusing on design parameters intends to elaborate the observations on design strategy that could help in reducing the anxiety in dogs.

*Social enrichment in designing dog boarding centers:* Social enrichment as organizational theme pertains to socialization of dogs through interaction with conspecifics (dogs) and other species (members of animal care staff) [14]-[16]. The same can be achieved by providing direct physical contact between the dogs [17] and simple companionship of petting, grooming/massaging or more active engagement, such as play, exercise or reward-based training [18]. The design strategy in terms of providing experience of social enrichment thus reducing anxiety is conceptualized in Table III.

The participants of the research opined that social enrichment in terms of providing inter species contact and intra species contact helps in familiarization of the new environment thus reducing anxiety in dogs. The behaviorists and veterinarians observe that socialization is a very important component in reducing the anxiety in dogs. However, the dog owners find that individual housing is much preferred keeping in view the fear of diseases and physical contact with other animals in the boarding center. The observations are substantiated with the guidelines provided by Prescott *et al*, 2015 [19] which states that socialization and habituation with humans or other dogs should be main objective in improving the animal's environment.

*Physical enrichment in designing dog boarding centers:* The physical space provided to the dogs in the dog boarding center play a pivotal role in enriching the dogs experience at the dog boarding center. The physical enrichment as organizational theme refers to providing physical environment encompassing temperature, humidity, illumination and sound exposure [16]; having visual access to the rest of the kennel environment [20]; providing sufficient ventilation which aids in dogs' well-being and also helps minimize odors, ammonia concentrations, and moisture condensation [10]. The different factors conceptualized for physical enrichment in designing dog boarding centers is given in Table IV.

The participants emphasized on providing kennel space, provision of outdoor spaces, along with natural day light and

ventilation for reducing the stress levels in dogs. It is opined by the participants that time spent in outdoor spaces provide physical exhaustion thus leading to calmness in dog. The observations are substantiated by the results of various researches which highlights the requirement of natural lighting [9] and access to outdoor spaces [20] as the primary needs of the dogs and also helps reducing the destructive behavior.

*Sensory enrichment in designing dog boarding centers:* The way in which dogs use their sensory and perceptual abilities (olfaction and taste, hearing and vocalization, vision, and touch) to interpret and assess physical environments and social interactions should always be considered when designing all aspects of dog housing and husbandry within a laboratory context [19]. It is observed that information is scarce on the effects of flooring surfaces on dogs of different breeds and sizes. A better understanding on the flooring types dogs prefer for standing, resting, and eliminating needs to be documented [21]. Auditory stimulation and olfactory simulation have garnered considerable attention with researchers reporting that the dogs respond to the classical music, audio books [22]-[23], exposure to ginger, coconut, lavender smells with improved restful behavior [24]. Additionally, this research attempts to find the association between the color and the anxiety levels of the dogs in the dog boarding centers in line with the findings of color in behavioral aspects of mice to different colored cages [25]. Dogs see the world in mostly yellows, blues and grays. They see green, yellow and orange as a shade of yellow. Violet and blue both appear blue [26]. The conceptualization of the factors that aid in sensory enrichment towards reducing stress in dogs boarded are given in Table V.

The participants opined that social and physical enrichment to a greater extent would help in reducing the stress levels in dogs. However, the participants pointed out at the requirements of rough and natural flooring along with sound insulation in designing the dog boarding centers. The factors of colors, aroma therapy and auditory requirements did not garner attention from the participants. The importance of insulation and rough flooring is substantiated with the results of Honari, 2014 [9], Ottesen *et.al*, 2004 [27] and Hurt, 2015 [28].

TABLE V  
 SENSORY ENRICHMENT

Basic Responses	Basic theme	Organizational theme	Global Theme	DO	OBC	V	B	T
Familiar smells help the dog reduce anxiety				✓			✓	7
Aroma therapy in terms of use of lavender, coconut, vanilla promotes relaxation	Olfactory requirements			✓			✓	7
Slippery areas should be avoided so that the animal doesn't slip and get stressed out				✓	✓			7
Natural materials like grass, gravel flooring helps the animal adjust to the new environment	Textural requirements			✓	✓		✓	10
Sound insulation provision helps the dog to avoid noise within and outside environment		Sensory enrichment		✓	✓			8
Soft music would help the dogs relax	Auditory requirements				✓		✓	6
Familiar colors help the dog adjust to the new environment				✓				4
Pastel colors with pop of bright colors are preferred	Color requirements			✓				4
Bright colors with pop of pastel colors are preferred				✓	✓			8

#### IV. CONCLUSION

The research emphasized on the separation anxiety observed in the dogs sent to the dog boarding center and the different design parameters that should be considered in enriching the environment for a comfortable stay. The thematic concepts derived from the data collected emphasized on the social, physical, and sensory enrichment to be provided to reduce the anxiety in dogs. The research also documented the reasons and common expressions of the anxiety experienced by dogs. The research with an objective reducing the stress levels in dogs drew emphasis on the requirement of enhancing the physical and social spaces of the dog boarding centers.

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