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An Audit of Behavioral Indicators of Poor Welfare in Kenneled Dogs in the United Kingdom

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This survey-based study describes the prevalence and onset of behavioral indicators of poor welfare in dogs kenneled at United Kingdom rescue shelters. It describes key factors contributing to individual variation in behaviors. At 8 rescue shelters, staff trained in the care of nonhuman animals recorded daily whether dogs in their care displayed each of 15 behaviors. The study originally involved 302 dogs; for the first 14 days, it monitored only 148 dogs daily. The study observed dogs for a maximum of 6 weeks from admittance, observing all 15 behaviors at least once during the first 2 weeks (n = 148). The proportion of dogs observed to perform each behavior differed within the sample. The most commonly observed behavior (24.3% of dogs) was excessive barking. The remaining 14 behaviors ranged from listlessness (20.3%) to repetitive tail-chasing (1.3%). Over the 6 weeks, the proportion observed to pace repetitively and wall bounce increased. The proportion who lacked appetite and displayed fear-associated behavior decreased. Breed differences, gender, and age partially explained variability in the onset and prevalence of behavioral indicators of poor welfare in kenneled dogs.

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Dogs entering rescue shelters encounter potentially stressful novel experiences, such as new surroundings; new routines; unfamiliar sights, sounds, and smells; and unfamiliar people and other dogs (Hennessy, Williams, Miller, Douglas, & Voith, 1998). These experiences, combined with the diversity in the quality of care provided to dogs entering these shelters, likely contribute to the stress experienced by many dogs in the kennel environment (Beerda et al., 2000).

Thus, confinement in a rescue shelter can result in a situation of unpredictability for the dog, often causing fear in the short term. Hubrecht (1995b) emphasized the importance for animals to have freedom to control their environment and to satisfy their social needs, both often restricted within kennel enclosures. Prolonged exposure to kennels may prevent a dog from engaging in species-specific behaviors (interaction with people and other dogs) that promote well-being and may result in the dog experiencing frustration in the long term. Furthermore, kenneled dogs separated from their familiar caregivers also may exhibit separation anxiety disorders. Research on these disorders demonstrates that dogs do depend on the existing relationship between themselves and their caregivers and severance of this relationship causes some dogs to experience distress (Overall, 1997).

Behavioral indicators of poor welfare in dogs have been investigated in both the laboratory (Beerda, Schilder, Van Hoof, & De Vries, 1997) and in rescue kennels (Hennessey et al., 2001). The presence of abnormal behaviors and the absence of normal behaviors can be used as indicators of stress when known stressors are applied (inadequate social interaction with conspecifics). Behavioral indicators associated with acute stress in dogs include very low body posture, oral behaviors, yawning, and increased restlessness (Beerda, Schilder, Van Hoof, De Vries, & Mol, 1998). Other behaviors observed in solitary-housed dogs include repetitive movements such as pacing, wall bouncing, tail chasing, and flank sucking (Hubrecht, Serpell, & Poole, 1992). In addition, the duration of time spent in the kennel has been reported to affect the level of chronic stress and the display of behaviors such as paw lifting, vocalizing, repetitive behavior, manipulations of the environment, auto-grooming, and coprophagy (Beerda et al., 1999a; Hetts, Clark, Calpin, Arnold, & Mateo, 1992; Hubrecht et al., 1992). Dogs also may become ap-
thetic and unresponsive due to the loss of an important companion, whether hu-
man or canine, (Broom & Johnson 1993). Such behaviors—along with signs of
frustration, fear, and lack of control over the environment—are signs that an
animal is struggling to cope and hence experiencing poor welfare (Wiepkema, 1987).
There is also physiological evidence to support that kenneled dogs experience
stress (Beerra et al., 1999b; Hennessy et al., 2001; Hennessy, Davis, Williams,
Mellott, & Douglas, 1997; Vincent & Michell 1996). Elevated levels of salivary,
urinary, and plasma cortisol have been found in dogs kenneled in poor environ-
ments and are correlated with the presence of behavioral indicators of stress
(Beerra et al., 1999b; Beerra, Schilder, Janssen, & Mol, 1996; Beerra et al.,
1998). This also supports the use of behavioral observations for the assessment of
poor welfare in kenneled dogs.

There is considerable variation in the behaviors exhibited by individual dogs
housed under similar conditions (Hubrecht, 1995b), suggesting that dogs perceive
the stressors differently within the kennel, respond differently to the same stress-
ors, or possibly both. Anecdotal observations taken by shelter staff indicate that
whereas some dogs appear to be relatively unaffected when housed in kennels,
others appear to show behavioral signs of poor welfare, including excessive bark-
ing, repetitive movements, and listlessness (K. Mughal, personal communication,
May 2002). The variability in behavioral changes observed between individuals
may be indicative of different coping styles by dogs in response to being kenneled.
An individual’s genetic predisposition, (Stur, 1987), life experience—particularly
when young (Levine, 1967)—prior kennel experience, and hormonal state
(Serpell & Jagoe, 1995) all contribute to the shaping of the individual’s tempera-
ment. Because temperament influences an individual’s ability to cope with stress
(Geverink, Schouten, Gort, & Wiegant, 2002), these factors may influence how
the dog reacts in the kennel environment.

The ability to cope is fundamental to an individual’s well-being (Fraser &
Broom, 1990). Because many owners prefer to adopt dogs who interact positively
with them at the shelter, the likelihood of a dog’s exhibiting abnormal behavior
will affect the dog’s chances of being successfully rehomed, (Wells & Hepper,
2000). Clearly, efforts must focus on improving the welfare of kenneled dogs, not
only for health reasons but also to increase the likelihood of the dog’s being suc-
cessfully adopted. This is vital because many shelters have limited resources and
are forced to humanely destroy dogs who are not readily adopted. To date, how-
ever, there is limited information indicating the prevalence of behaviors associated
with poor welfare in dogs kenneled at rescue shelters.

There also appears to be a dearth of information regarding the onset and preva-
ience of behavioral correlates of poor welfare in dogs housed in shelters for periods
longer than 2 weeks. This is important because the mean length of stay at many U.K.
rescue shelters is 2 weeks (K. Mughal, personal communication, May 2002), with
many dogs being kenneled much longer. Thus, this preliminary study aimed to ap-
praise the prevalence and onset of behavioral indicators of poor welfare in dogs kennelled over a 6-week period. Furthermore, this study evaluated the degree to which age, gender, and breed explain variability in behavior between individuals. We anticipate that this information will assist shelters in identifying those dogs that are most at risk from experiencing poor welfare in kennels.

METHOD

Sampling and Subjects

For survey results to be meaningful, the sample used to generalize the findings must be representative of the population (Eysenck, 1994); this was achieved by using a random sampling longitudinal approach to data collection. Initially, 302 dogs were involved in the study from the day of entering kennels, but only 148 dogs remained after the first full 14 days in kennels. Subjects consisted of 148 dogs obtained from seven different shelters: (a) an independent shelter located in southern England \((n = 4)\), (b) Battersea Dogs Home at Old Windsor \((n = 39)\), (c) RSPCA Millbrook \((n = 54)\), (d) RSPCA Derby \((n = 34)\), (e) RSPCA Bradford \((n = 6)\), (f) RSPCA West Hatch \((n = 4)\), and (g) RSPCA Ashley Heath \((n = 7)\).

The dogs included 99 males \((40 \text{ neutered}, 55 \text{ entire})\) and 49 females \((20 \text{ neutered}, 27 \text{ entire})\), ranging in age from 10 weeks to 13 years \((M = 2 \text{ years})\). Dogs originated from the following sources: relinquished by owner \((70.3\%)\), returned to shelter following failed adoption \((10.8\%)\), strays \((10.1\%)\), abandoned \((0.3\%)\), or brought in by RSPCA inspectors \((1.4\%)\).

Dog age was provided by relinquishing owners or assessed during the veterinary check. Dog breed was based on morphological characteristics as assessed by two staff members or one staff member plus the relinquishing owner. Purebred and predominant crosses \((76.4\%)\) were classified into one of the known breed group types: (a) Collies \((n = 17)\), (b) Staffordshire Bull Terriers \((n = 12)\), (c) Lurchers \((n = 14)\), (d) German Shepherd dogs \((n = 22)\), (e) Labrador Retrievers \((n = 12)\), (f) Terriers \((n = 23)\), and (g) Spaniels \((n = 13)\). Breed was recorded as ‘other’ \((n = 35)\) for dogs for whom no predominant breed could be agreed on and for breed groups represented by fewer than 10 individuals.

Housing

Shelters varied considerably in terms of individual kennel size \((\text{range } 1.11 \text{ to } 5.07 \text{m}^2)\) and whether dogs had access to an outside run \((6 \text{ shelters provided constant access}; 1 \text{ shelter provided controlled access})\). All dogs were housed singly, and one shelter did not allow visual contact with visiting public members. All adult dogs were fed twice daily in a traditional steel bowl. Dogs were fed com-
commericially available diets (suppliers varied between shelters) based on their weight, age, and health status. The amount of exercise that dogs received out of the kennel varied within and between shelters, depending on staff and volunteer time schedules (0 to 30 min per day).

Data Collection

An ethogram of 15 behaviors associated with stress in dogs was developed. Ten were derived from previous studies (Table 1; Beerda et al., 1999a; Hennessy et al., 2001; Hetts et al., 1992; Hubrecht et al., 1992; Overall, 1997; Vincent & Mitchell, 1996). An additional 5 were identified following consultation with members of shelter staff and were characterized by their highly repetitive nature, their alleged specificity to kenneled dogs, and their similarities with the other identified behaviors (Table 1). The first author trained members of animal care staff at each shelter to recognize the behaviors and to score their occurrence. An ad libitum sampling technique was chosen (Martin & Bateson, 1993) because of its appropriateness to the collection of preliminary data and the ease with which members of shelter staff were able to collect the data. Staff members monitored specific dogs at a convenient time as part of their daily duties (8 a.m. to 6 p.m.); these duties included feeding the dogs, cleaning kennels, and exercising and socializing the dogs during general inspections. Dogs were observed for between 4 and 10 periods per day for at least 20 min each. Based on these daily observations, each of the 15 behaviors was recorded as present or absent.

Statistical Analysis

The data were analyzed using nonparametric statistics with SPSS 10 for Macintosh. So that we could ascertain how the prevalence of each behavior changed over time, the data collection period was divided into three separate 2-week periods (Period 1 = Days 1 to 14, Period 2 = Days 15 to 28, Period 3 = Days 29 to 42). Sample sizes declined from Periods 1 to 3 as dogs were rehomed, relocated, or euthanized: Period 1, \( n = 148 \); Period 2, \( n = 46 \); and Period 3, \( n = 19 \). Results were omitted from the analysis when data for the full 14-day period was not recorded, which dramatically reduced sample size from the initial number of 302 dogs.

The percentage of dogs who displayed each of the behaviors at least once within each period was calculated. If only 1 out of 100 dogs barked excessively during Period 1, the percentage of dogs performing this behavior in Period 1 would be 1%. In addition, the total number of listed behaviors displayed by each dog within Period 1 was calculated. If 3 out of 100 dogs performed five different behaviors within Period 1, the percentage of dogs displaying five behavioral indicators was 3%.
<table>
<thead>
<tr>
<th>Behavior</th>
<th>Description</th>
<th>Reference Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repetitive pace</td>
<td>Dog repeatedly (&gt; 3) paces around kennel in a fixed route.</td>
<td>Hubrecht, Serpell, &amp; Poole, 1992</td>
</tr>
<tr>
<td>Wall bouncing</td>
<td>Dog repeatedly (&gt; 3) jumps up kennel wall from side to side.</td>
<td>Hubrecht et al., 1992</td>
</tr>
<tr>
<td>Tail chasing</td>
<td>Dog chases tail repeatedly (&gt; 3) for reasons other than discomfort or grooming.</td>
<td>Hubrecht et al., 1992</td>
</tr>
<tr>
<td>Circling</td>
<td>Dog walks around in small circle repeatedly (&gt; 3).</td>
<td>Beerda et al., 1999a</td>
</tr>
<tr>
<td>Play bouncing</td>
<td>Dog repeatedly displays the play bow posture (&gt; 3) and may bark repeatedly.</td>
<td>K. Mughal, 2002^</td>
</tr>
<tr>
<td>Chewing bedding</td>
<td>Dog chews its own bedding.</td>
<td>K. Mughal, 2002^</td>
</tr>
<tr>
<td>Self-licking</td>
<td>Dog licks or chews its own body repeatedly (&gt; 5 min per session).</td>
<td>Hubrecht et al., 1992</td>
</tr>
<tr>
<td>Polydipsia</td>
<td>Dog drinks large volumes of water in excess of what is normal.</td>
<td>Overall, 1997</td>
</tr>
<tr>
<td>Panting</td>
<td>Dog pants for reasons other than physical exertion or a warm ambient temperature (only recorded if temperature is &lt; 25°).</td>
<td>Beerda, Schilder, Van Hoof, &amp; De Vries, 1997</td>
</tr>
<tr>
<td>Lack of appetite</td>
<td>Dog does not eat more than 50% of the food that is presented.</td>
<td>K. Mughal, 2002^</td>
</tr>
<tr>
<td>Excessive vocalization</td>
<td>Dog barks for prolonged periods (&gt; 1 min) in the visual and auditory absence of people and other dogs.</td>
<td>Hetts, Clark, Calpin, Arnold, &amp; Mateo, 1992</td>
</tr>
<tr>
<td>Listless</td>
<td>Dog is withdrawn and unresponsive to commands.</td>
<td>K. Mughal, 2002^</td>
</tr>
<tr>
<td>Escape attempt</td>
<td>Dog attempts to escape kennel in a forceful manner whenever the kennel door is opened and closed.</td>
<td>K. Mughal, 2002^</td>
</tr>
<tr>
<td>Hiding</td>
<td>Dog is obscured from the view of kennel staff behind its bed or other kennel furniture for prolonged periods when not asleep (&gt; 2 min); may be accompanied by a low posture and trembling.</td>
<td>K. Mughal, 2002^</td>
</tr>
<tr>
<td>Chewing bars</td>
<td>Dog repeatedly chews and bites at the wire of the kennel (&gt; 20 sec).</td>
<td>Hetts et al., 1992</td>
</tr>
</tbody>
</table>

^Personal communication.
The mean latency for dogs to first display each of the listed behaviors was calculated (mean number of days). If only two dogs barked excessively, the first occasions being Days 4 and 6, respectively, the mean latency to bark excessively would be 5 days.

The onset and prevalence of behaviors was compared according to breed type, age, and gender groupings within Period 1 (comparing entire versus neutered dogs was not done because determining reliably whether female dogs had been neutered was impractical). This allowed us to investigate whether certain groupings were more likely to display behaviors sooner or more frequently. Chi-square tests were used to determine whether the number of dogs displaying each behavior differed between breed type and gender across the period. The age of dogs who did and did not display the behavior were compared using the Mann–Whitney U test for two independent samples. Differences in the onset of behaviors were investigated between gender groupings using the Mann–Whitney U test for two independent samples and between breed groupings using the Kruskal–Wallis test, followed by Dunn’s multiple-comparison tests for significant groups. Differences that reached the 5% level were noted; however, the 10% level of significance also was included to indicate potential trends. The relations between age and behavior onset were investigated by calculating Spearman rho rank order coefficients.

![FIGURE 1](Incidence of repetitive action behaviors Periods 1 to 3.)
FIGURE 2  Incidence of fear behaviors, Periods 1 to 3.

FIGURE 3  Incidence of repetitive oral behaviors, Periods 1 to 3.
RESULTS

Temporal Characteristics of Behavior

Figures 1 through 4 show the proportion of dogs who were observed to display each behavior over the first 6 weeks, Periods 1 to 3, grouped by Figure 1, repetitive locomotion; Figure 2, suggestive of fear; Figure 3, repetitive oral behavior; and Figure 4, other behaviors. Although the repetitive locomotion behaviors generally increased over time, behaviors indicative of fear decreased over time.

Behaviors characterized by repetitive oral activity were more varied, with biting of bars increasing over time and self-licking and bedding chewing decreasing. Panting increased overall during the 6 weeks, whereas tail chasing decreased. The incidence of excessive barking increased steadily over the three periods, whereas excessive drinking decreased slightly after Period 1; by Period 3, however, more of the dogs showed this behavior. Of the 5 dogs who remained in kennels for a further 14 days (56 days in total), those who had shown no previous signs of wall bouncing, tail chasing, excessive licking, biting bars, and hiding behavior continued to show no signs of these behaviors. However, there continued to be variation in other behaviors performed, such as pacing. One dog continued to pace over all 4 periods, whereas another individual had paced only during Period 3. In total, 93/148 (63%) of dogs displayed at least one of the surveyed behaviors within Period 1. Eight was the maximum number of behaviors displayed by a single individual (Figure 5).
FIGURE 5  Frequency distribution showing number of behaviors displayed by each dog during Period 1 ($n = 148$).

FIGURE 6  Latency for onset of each behavior ($n = 302$).
Onset of Behavior

Figure 6 shows the mean latency (± standard error) for dogs first to display each of the 15 behaviors. Those behaviors associated with fear (hiding behind bed, escape attempts, and lack of appetite) were displayed sooner than behaviors associated with long-term confinement (repetitive wall bouncing, pacing, and circling).

Individual Differences in Behavior Explained by Gender, Breed, and Age

By comparing the behavior of those dogs remaining in Period 2 with their behavior in Period 1, it is clear that dogs performing a behavior in Period 1 are not always the same dogs showing that behavior in Period 2. Although 10 dogs display listlessness in Period 1, and 6 dogs display it in Period 2, only 4 of those dogs are the same. However, of the 13 dogs who initially show panting, 7 of those dogs are the ones who show this behavior in Period 2. This adds further support to the degree of individual variation displayed by dogs and to how individuals react differently over time.

Gender

Females displayed tail chasing behavior sooner than did male dogs (Mann–Whitney: \(z = -1.24, p < .10\); males: \(n = 7\), mean latency 6.4 days, \(SE = 2.14\); females: \(n = 2\): mean latency 1.0 day, \(SE = 0.00\)). Although the sample size was 148 dogs for Period 1, that only 9 of those dogs displayed any tail chasing behavior makes this a weak result. Gender failed to account for differences

<table>
<thead>
<tr>
<th>Breed</th>
<th>N</th>
<th>M</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab</td>
<td>5</td>
<td>3.4</td>
<td>0.6</td>
</tr>
<tr>
<td>Spaniel</td>
<td>7</td>
<td>4.6</td>
<td>1.2</td>
</tr>
<tr>
<td>German Shepherd dogs</td>
<td>13</td>
<td>5.8</td>
<td>3.1</td>
</tr>
<tr>
<td>Collie</td>
<td>37</td>
<td>6.7</td>
<td>1.3</td>
</tr>
<tr>
<td>Terrier</td>
<td>15</td>
<td>8.1</td>
<td>2.3</td>
</tr>
<tr>
<td>Staffordshire bull terriers</td>
<td>5</td>
<td>10.0</td>
<td>3.6</td>
</tr>
<tr>
<td>Lurcher</td>
<td>7</td>
<td>17.7</td>
<td>4.9</td>
</tr>
</tbody>
</table>

Note. Kruskal–Wallis: \(n = 59, H = 11.7, p < .10\).
in the display onset of the remaining behaviors. The proportion of dogs performing each behavior in Period 1 did not differ between males and females.

**Breed**

Breeds differed in their latency to display excessive barking ($H = 11.67, n = 59, p < .10$). Breeds that differed significantly (Table 2) were Staffordshire Bull Terriers, who barked later than did German Shepherds (Dunn’s $Q = 2.1, p < .05$); Terriers (Dunn’s $Q = 1.9, p < .05$) and Spaniels (Dunn’s $Q = 1.9, p < .05$); and Lurchers, who barked later than German Shepherds (Dunn’s $Q = 1.7, p < .05$). The incidence of behaviors did not differ significantly between breeds at the 5% level, although some trends were identified (Table 3).

<table>
<thead>
<tr>
<th>Breed Group</th>
<th>Panting</th>
<th>Excessive Barking</th>
<th>Escaping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collie</td>
<td>23.5</td>
<td>29.4</td>
<td>17.6</td>
</tr>
<tr>
<td>Staffordshire Bull Terrier</td>
<td>25.0</td>
<td>8.3</td>
<td>33.3</td>
</tr>
<tr>
<td>Lurcher</td>
<td>7.1</td>
<td>14.3</td>
<td>7.1</td>
</tr>
<tr>
<td>German Shepard dogs</td>
<td>22.7</td>
<td>27.3</td>
<td>13.6</td>
</tr>
<tr>
<td>Labrador</td>
<td>0.0</td>
<td>25.0</td>
<td>25.0</td>
</tr>
<tr>
<td>Terrier</td>
<td>26.1</td>
<td>34.8</td>
<td>21.7</td>
</tr>
<tr>
<td>Spaniel</td>
<td>23.1</td>
<td>30.8</td>
<td>30.7</td>
</tr>
</tbody>
</table>

*Note. n = 113.*

**TABLE 4**
Mann–Whitney U Test for Two Independent Samples, Indicating the Mean Age of Dogs Who Display Behaviors in Period 1

<table>
<thead>
<tr>
<th>Behavior Displayed</th>
<th>Behavior Not Displayed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age$^a$</td>
</tr>
<tr>
<td>Period 1</td>
<td>$N$</td>
</tr>
<tr>
<td>Panting</td>
<td>27</td>
</tr>
<tr>
<td>Barking</td>
<td>36</td>
</tr>
<tr>
<td>Chewing</td>
<td>11</td>
</tr>
<tr>
<td>Play bounce</td>
<td>21</td>
</tr>
</tbody>
</table>

$^a$Age given in months.
Age

In Period 1, dogs who play bounced and chewed their bedding were younger than those who were not observed to perform these behaviors. In contrast, dogs who panted and barked excessively in Period 1 were older than those not exhibiting these behaviors (Table 4). The correlations between the age of dogs and the latency to display the behaviors were low \( (r < .2) \) and nonsignificant.

**DISCUSSION**

The aim of this preliminary study was to establish the prevalence and onset of possible behavioral indicators of poor welfare in dogs kenneled in rescue shelters in the United Kingdom. The temporal characteristics of the behaviors correspond with the occurrence of specific stressors in kennels. In particular, results indicate that the percentage of dogs performing behaviors associated with anxiety and fear (escape attempts, hiding, lack of appetite and listlessness) in an unfamiliar environment decreases throughout the first 6 weeks in kennels. However, the prevalence of behaviors associated with frustration (play bouncing, pacing, wall bouncing, and bedding chewing) increases in an environment that does not facilitate the performance of behavioral needs. The latency to first onset also differs for each of the behaviors, those associated with anxiety and fear appearing sooner than those associated with frustration.

It has been suggested that certain behaviors, such as barking and retreating to the back of the kennel, may delay adoption because prospective caregivers see such behaviors as undesirable (Wells & Hepper, 2000). This would imply that the proportion of dogs displaying behavior associated with poor welfare would increase over time as nonstressed dogs are adopted first.

Although these issues are avoided in laboratory-based studies (Beerda et al., 1999a), this survey provides a snapshot of the behavior of kenneled dogs in a working shelter facility. Nearly two thirds of subjects displayed at least one of the listed behaviors during their first 2 weeks in the kennels. This does not indicate necessarily that nearly two thirds of subjects are experiencing poor welfare within this period. Dogs may experience poor welfare without displaying the behaviors described in this study; the absence of positive behaviors has been suggested as another important aspect of determining well-being (Broom & Johnson, 1993).

Furthermore, some behaviors are associated with contexts other than those that elicit negative emotional states. In addition to being associated with anxiety (Serpell & Jagoe, 1995), increased levels of barking also have been associated with social facilitation such as during play (Bradshaw & Nott, 1995) and early warning signals (Adams & Johnson, 1994). Similarly, a lack of appetite could be indicative of disease or aversion to a new diet. Although behavior patterns such as
displacement behavior, learned helplessness, and stereotypic behavior all are potentially indicative of frustration (Webster, 1994), such behaviors also may be learned attention-seeking strategies or the result of dermatological pathologies such as repetitive auto-licking (Paterson, 2003).

However, a number of studies have observed that the incidence of these behaviors increases following exposure to stressors, suggesting that stress is likely to explain at least some of the observed behavioral changes. The listless state observed in 20% of dogs is similar to the “passively resistant and withdrawn” behavior described by Lindsay (2000) in reference to dogs who exhibit symptoms of learned helplessness. Seligman and Maier (1967) initially reported this latter state to describe individuals who are unresponsive and cease to react to positive situations such as interactions with their handlers.

Other commonly reported behaviors were escape attempts and panting, reported by Beerda et al. (1997) as being associated with states of acute stress in kenneled dogs. A lack of appetite, also observed by Beerda et al. (1997), was associated with anxiety in unfamiliar surroundings. Tail chasing and self-licking, observed rarely in this study, have previously been reported in dogs kept in impoverished conditions and in dogs suffering from anxiety-related disorders (Overall, 1997). As Hubrecht et al. (1992) also found, a small percentage of dogs displayed locomotor behaviors characterized by their repetitiveness—wall bouncing, pacing, and circling. These repetitive behaviors and chewing of kennel bars and bedding resemble those displayed by other species in barren, physically restrictive environments and have been reported to indicate poor welfare (Mason, 1991).

Previous work has cited female dogs as being more prone to experiencing environmental stress than male dogs (Beerda et al., 1997; Blanchard, McKittrick, & Blanchard, 2001; Garnier, Benoit, Virat, Ochoa, & Delatour, 1990); however, this study detected no gender differences. In this study, younger dogs were more likely to play bounce and chew their bedding. Siwak, Murphey, Muggenburg, and Milgram (2002) also reported that when monitored in their home cage, aged dogs were less active than younger dogs. Shelters provide more enrichment for younger dogs, indulging their increased tendency to chew and play, which may account for the tendency of older dogs to pant and bark excessively more than younger dogs (Hubrecht, 1995a).

Although some interesting temporal trends have been observed, not every dog responds in the same way to being kenneled. The variability in behaviors exhibited by different dogs might be attributed to differences in the design and husbandry of the kennels and to differences in the individual animal’s perception of potential stressors within the same kennel system (Hennessy et al., 1998). Both the perception of stressors within the kennel and the individual’s style of coping are linked intrinsically to the individual’s temperament and motivation to engage in certain activities (Schilder, 1992), which varies between breeds according to the purpose for which they were bred (Coppinger & Schneider, 1995). The degree to which an individual
will become frustrated or depressed as a result of being unable to perform behaviors that promote well-being will depend on the types of behavior that the individual is most motivated to perform (Clubb & Mason, 1999; Dawkins, 1988). Thus, it is feasible that differences in how dogs respond to being kenneled arise from the reasons for which they have been bred. Possibly, this explains why German Shepherds, a breed typically bred for guarding, barked sooner than other breeds.

The data collection method used in this study allowed us to survey a large number of kenneled dogs; however, the behavioral measures taken were rudimentary and did not reveal the amount of time that dogs spent performing these behaviors each day. Neither did the data collection method allow us to observe how dogs behave in the absence of their caretakers; it is recognized that dogs may behave differently in the absence of observers (Hughes, Campbell, & Kenney, 1989), such as at night, and that dogs may be distracted from certain activities whenever observers are present. If the presence of an observer does prompt dogs to display certain behaviors associated with poor welfare, this is relevant because dogs in rehoming kennels are consistently exposed to potential adopters and staff on a daily basis. Consequently, the results reported here may represent a conservative estimate of the prevalence of each of the behaviors. Furthermore, some behaviors, such as excessive barking, may be reported more reliably than more subtle behaviors because this behavior can both be heard from a distance and observed at close range. Therefore, although it is commonly recorded, there is an increased risk that this behavior may be overrepresented in comparison to other behaviors requiring direct visual observation.

Animal Welfare Implications

This study has undertaken an audit of the onset and prevalence of behaviors associated with poor welfare in dogs kenneled in rescue shelters and suggested some factors that account for the variability between individual dogs. Despite our understanding of the factors that lead to poor welfare in kenneled dogs, the problem still is a significant one. Shelter managers often attribute inadequate welfare management to a lack of available resources. So that shelter managers can target their limited resources at the most susceptible individuals, our future research will aim toward developing a method for the early identification of those dogs most likely to experience poor welfare in kennels.

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REFERENCES


