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Review article

Saving normal: A new look at behavioral incompatibilities and dog relinquishment to shelters

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ABSTRACT

In this review, we challenge the perception that behavioral incompatibilities are an important factor driving relinquishment of dogs to shelters. This belief dates at least to the 1970's, when, in response to pet overpopulation, shelters and researchers began to collect reasons for relinquishment. We review studies on reported reasons for relinquishment, the prevalence of corresponding behaviors among owned dogs, and epidemiological analyses to determine the extent to which this perception is supported by data. With respect to analyzing reasons for relinquishment, when trying to get a handle on a new and complex problem, it is common to begin by reducing the data into categories of presumably similar items ("lumping"). However, lumping is prone to unconscious bias, and inevitably discounts differences among reasons. Additionally, we found that lumped-together behavioral incompatibilities were often compared to other reasons for relinquishment which had been split into smaller categories, giving a distorted impression of the relative weight of the behavioral reasons. This would tend to reinforce any impression relinquished dogs are behaviorally different from the owned population they are drawn from. We found only 2 epidemiological studies that compared a probability sample (control group) of owned dogs with relinquished dogs to assess risk associated with various behaviors. Neither study provides compelling evidence that particular behavioral incompatibilities are a strong determining factor in the decision to relinquish most dogs. Our review of studies of behaviors in owned dogs, moreover, reinforces what we already know from daily life – that dogs can and do live successfully in homes without expressing some ideal of canine behavior. Behavioral assessment and modification, along with restricting the potential adopter pool, can delay or limit adoption, and is often justified by shelters, in part, to prevent returns, despite the small proportion of all adopted dogs being returned for behavioral reasons (~6%–9%). Delays in adoption extend dogs' exposure to the stress of a shelter environment where their behavior may deteriorate, reduce the capacity of the shelter, and consume scarce staff time. A comprehensive view of the relinquishment data may help shelters reconsider the value of behavior evaluations relative to the welfare of the entire shelter population and better tailor their investment in behavior modification to their particular circumstances.

Introduction

This is the third in a series of papers (Patronek & Bradley, 2016; Patronek et al., 2019) in which we explore various aspects of the role of canine behavior problems (which we hereafter reframe as *behavioral incompatibilities* or simply as *behaviors*) in the perception and management of dogs in shelters.[1] In our experience, there

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[1] We adopt this convention because the phrase "behavior problems" implies that clearly defined canine behaviors have been shown to be consistently maladaptive for co-habitation with humans. We prefer the term, "behavioral incompatibilities," as we can only say with confidence that some individual humans sometimes find some behaviors incompatible with their expectations of a satisfying human/canine

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remain lingering beliefs that behaviorally, the general population of shelter dogs is somehow substantially different from the population of owned dogs from which they came, that these differences play a large role in dogs' relinquishment to shelters, and that consequently, various specific behaviors need to be rigorously screened for, and sometimes modified, in shelters prior to adoption to prevent returns and/or promote public safety.

The consequences of these beliefs may not always be optimal for dogs or shelters. They include devoting valuable time and scarce resources to attempt to identify dogs expressing these hypothetically incompatible behaviors using error-prone (Stephen & Ledger, 2007; Patronek & Bradley, 2016; Normando et al., 2019;), unvalidated behavior evaluations (Patronek et al., 2019). The consequences for dogs who are identified as expressing potentially incompatible behaviors include eliminating them from the shelter's adoption pool, sometimes via euthanasia (Marston et al., 2004; Bollen & Horowitz, 2008), having their stay in the shelter extended to perform behavioral modification before making them available for adoption, or limiting the type of home considered suitable, thereby further extending their stay in the shelter where the stress may promote deterioration of their physical and mental well-being. A contrary opinion holds that these procedures, despite being time-consuming and resource-intensive, may be best practices necessary to optimize canine welfare and promote successful integration into the new home after adoption. There is a large middle ground between these 2 extremes as well.

In an attempt to shed additional light on the issue of dog behavior and relinquishment to shelters, with the goal of helping shelters assess their practices using a data-based approach, we will examine how behavioral reasons for relinquishment have been assessed in the literature, the prevalence of various behaviors in both owned and relinquished dogs, and will review epidemiological studies where the frequency of behaviors reported for owned and relinquished dogs are directly compared (risk factor studies) to determine whether any specific behaviors have been reliably identified that owners consistently find objectionable in a pet dog. We will also discuss the limitations of these various studies and data collection methods. Although data are presented from studies in various countries, our recommendations and comments are from a US sheltering perspective.

A brief history of unwanted behavior as a driver of relinquishment

To the best of our knowledge, the relinquishment (and subsequent euthanasia) of dogs as a societal and animal welfare concern was first formally reported in the scientific literature (as opposed to being confined to discussions within the animal welfare community) in a paper published in the 1970s (Anonymous, 1971). This was followed shortly thereafter by 2 national conferences in the US attended by a much broader group of stakeholders, including, likely for the first time, leaders in the veterinary profession (Anonymous, 1974, 1976; Drenan, 1974). Concurrently, and consistent with the recommendations from these two meetings, a variety of interventions were promoted by national and regional animal welfare groups. These mostly focused on reducing unwanted births in pets. To support that goal, education of the public about the health and behavioral benefits of sterilization, development of non-surgical sterilization methods, and legislative efforts to promote sterilization (particularly prior to adoption from shelters) were advocated, as was increased compliance with licensing and more effective control of stray dogs (Rowan & Williams, 1987; Carter, 1990; Moulton et al., 1991; Olson et al., 1991).

To gain further understanding of the roots of the relinquishment problem, some shelters/investigators began tabulating reasons for relinquishment. To our knowledge, the earliest of these studies was published in 1976 (Wilbur, 1976). A brief description of selected results from studies published between 1976 and 2020 is presented in (Table 1A). It is well known that the reasons included a plethora of owner financial, health and lifestyle issues, pet characteristics including health problems, as well as a long list of behavioral incompatibilities between dogs and owners. Collectively, this body of work remains highly influential, particularly with respect to the role of dog behavior. However, it is important to note that, in general, behavioral reasons taken together are almost always less common than all other reasons taken together. Nevertheless, in full disclosure, in some cases frequencies are difficult to ascertain because of multiple reasons being allowed.

Unfortunately, one unintended consequence of collecting relinquishment reasons was that the bar was raised for what was considered a suitable new home for a dog living in a shelter. Shelters began to use reasons they heard given by owners for relinquishment in developing screening questions for prospective adopters. Without simultaneous consideration of comparative data about dogs living successfully in homes, there was no supporting evidence that the traits or behaviors reported constituted actual risk factors (i.e., occurring more frequently in relinquished than in owned dogs), or even what the behaviors actually looked like when expressed in a home.

To our knowledge, only one review of adopter screening policies has been published (Griffin et al., 2020). In that study, eighty-two rehoming organizations in the UK responded to a survey. One in 5 reported using screening criteria to match specific dogs with prospective adopters, most commonly to exclude families with children from adopting specific dogs. A wide variety of factors were considered by various shelters that could potentially disqualify a person from adopting. Moreover, there appeared to be little consistency in how these criteria were applied. One example of adopter pool exclusions from our own experience in the US, was of shelters where if staff began to encounter dogs relinquished because they were described as too active, then policies might be set in place to discourage, if not outright prohibit, adoption of dogs to people who did not have a fenced in yard or worked all day. Or shelter personnel might suspect that a dog had expressed separation anxiety in its former home, again disqualifying potential adopters who worked outside the home. A particularly ironic "catch-22" was that not having a job (and presumably being at home more of the day) could also preclude adoption. Sometimes, any large, young dog who did not display placid behavior could be presumed to be hyperactive, which could result in not being adopted into a home with young children. While the goal of ensuring the best match was well-intentioned, in all too many shelters, simply due to capacity issues, denial of an adoption translated into a death sentence.

Lumping versus splitting – what are we actually counting?

As Deborah Stone has eloquently described in her book "*Counting: How we use numbers to decide what matters*", our attempts at counting and classifying in order to make sense of any phenomenon are imbued with ethical and subjective components that we often fail to appreciate (Stone, 2020). As Dr. Stone points out, categories are often not biological facts but mental or social constructs, and every counting rule which creates a category involves a human judgment about which things belong together and which

relationship. This distinction is important because we do not know the extent of agreement among pet owners regarding which behaviors they consider irksome or even how those behaviors are defined, nor do we know the extent to which they actually put relationships at risk.

Table 1
Behavior as listed as a reason for relinquishment of dogs to shelters

A: Initial relinquishment (12 studies)	
Wilbur, 1976	The Pet Food Institute conducted personal interviews in 1975 of 150 former dog owners in 57 different urban, suburban, and rural areas of the USA who had been screened for eligibility due to having rehomed a dog. They reported that 21% of dogs were given away because of being "untrained, uncontrollable." The time period covered was not stated, nor was how the information was obtained described.
Arkow, 1985	In a convenience sample of 918 owners who brought their dogs to be put up for adoption at 13 shelters in 8 states in 1981, dog behavioral incompatibilities were cited by 26.4%, about the same as those citing "owner lifestyle" reasons (27.7%).
Rowan & Williams, 1987	Intake records for 1,680 dogs surrendered to a single shelter in Oregon as collected by the Humane Society of Willamette Valley in 1985. Behavioral incompatibilities were cited as the reason by 20% of relinquishing owners.
Miller et al., 1996	53 owners who surrendered their dog to a single shelter in Ohio over a 4-month period from October 1993–January 1994 completed a questionnaire which provided a list of behaviors and reasons which they could choose from. Behavioral incompatibilities were listed as a reason for 30% of dogs.
Salman et al, 1998, 2000	In the NCPPSP studies conducted at 12 shelters across the USA from February 1995–April 1995, 2,092 people relinquishing 2,631 dogs and puppies were interviewed in person. Participants were asked about the frequency ("always," "mostly," "sometimes," "rarely/never") of 10 specific behaviors in the month prior (ranging from house soiling and hyperactivity, to growling and attempting to bite people). Having actually bitten a person was recorded dichotomously (Yes/No). Respondents were also asked about the reason(s) they were relinquishing, and could list up to five reasons per dog. Less than half of the relinquishers (~40%) cited a behavioral incompatibly, and for dogs having only a single relinquishment reason listed, 27% cited behavioral incompatibilities. In terms of frequency, the authors noted that between 46%-89% of all relinquishers reported that the dogs "rarely/never" exhibited the queried behaviors in the month prior to surrender.
Marston et al., 2004	Paper intake records of all (n=3,123) dogs relinquished to 3 Melbourne area Australian shelters over a 1-year period covering June 2001–May 2002 or November 2001–October 2002 were reviewed. Of the records, only 10.8% (338 dogs) of the relinquishment reasons were listed as being due to behavioral incompatibilities. There were 100 dogs (3.2% of the total relinquished intake) for which "aggression" was listed as the relinquishment reason. Predatory behavior was mentioned for about 29 dogs (<1% of total relinquished intake). Notably, however, for over one-third (34.3%) of all dogs relinquished, no reason was recorded.
Diesel et al., 2010	In a survey of owners of 2,806 dogs relinquished to 14 shelters in the United Kingdom in 2005, about two-thirds (~n = 1,853) of owners reported their dogs as having behavioral incompatibilities, but these were only listed as the actual reason for relinquishing the dog by about a third (n = 959, 34.2%). A total of 470 (16.7%) of relinquished dogs were described by owners as having shown aggression to people and 213 (7.6%) were described as having shown aggression to pets. Reasons for relinquishment, as well as dog behaviors, were collected via mostly closed questions (one open-ended). Behavioral reasons, however, were not broken out in detail when reasons for relinquishment were reported.
Kwan & Bain, 2013	A convenience sample 80 owners relinquishing their dogs to three shelters in Sacramento, California was obtained from a two-month period during the summer, 2010. Surveys were either handed to owners by staff or, in some cases, completed with an interviewer. The survey contained both closed and open-ended questions. An added dimension to their survey was that they asked owners to provide a rating (0=no influence and 5=a very high influence) on the effect of dog behaviors on their decision to relinquish. Nearly two-thirds (52/80, 65%) provided a rating of >0, which indicated that behavioral incompatibility played some role in the relinquishment. However, only about half (49%) listed a score of 3, 4, or 5. There were 38 (~47%) who listed a rating >0 for aggression to people or other dogs (barking/growling and nipping/biting), and 23 (29%) provided a rating ≥3.
Weiss et al., 2014	A convenience sample of owners was used to examine reasons that large dogs (estimated >40 lbs.) were relinquished to two municipal shelters, one in New York City (76 dogs over an 8-month period, 2012–2013) and one in Washington, D.C. (88 dogs over a 5-month period, 2012). Relinquishment reasons were obtained through in-person interviews. No specific behavior questions were asked; however, behavioral incompatibilities were indicated as the primary reason for ~10% of dogs in New York City and ~18% in Washington, D.C.
Dolan et al., 2015	Personal interviews of people approaching a municipal shelter to relinquish a dog in a low socioeconomic area of Los Angeles were conducted, predominantly during July–August 2014. The reason for them considering relinquishment was asked in an open-ended question, and there was no limit to the number of answers given. Of the 162 owners who answered, "behavior" was indicated by 12 (7.4%) as either a primary or secondary reason. The majority of owners (76.9%) mentioned cost as a reason as a primary or secondary reason. It is unknown how many of the survey participants interviewed for relinquishments ultimately relinquished their dogs.
Summerton, 2015	This short communication describes a study starting in February, 2015, which solicited reasons for relinquishment from 114 consecutive owners surrendering dogs to a shelter in the United Kingdom. These reasons were then categorized into four broad groups. Most (n = 59, 51.8%) fell into the category of what the author described as "social issues affecting the owner" (e.g., moving, relationship breakdown, bereavement, long work hours), whereas only 11 (9.6%) comments fell into the category of behavioral incompatibilities (e.g., barking, nipping, boisterous, escaping).
Jensen et al., 2020	Records of 3,204 dogs relinquished to a single urban shelter in Denmark over a period of 20 years (1996 to 2017) were examined. Behavioral incompatibilities accounted for 732 dogs (23%), and none specifically mentioned aggression to people; "Owner-related issues" (e.g., owner health, housing issues, lack of time, lack of interest) were highlighted as the most common (75%) reason for relinquishment.
B: Dogs returned to a shelter post-adoption (6 studies)	
Wells & Hepper, 2000	A postal survey sent to 1,547 adopters was used to assess their experience with their dog or puppy 4 weeks after adoption from a shelter in Northern Ireland. Owners were asked about 10 different behaviors, whether they still owned the dog, and if not, why. Of the 556 responders (response rate, 37%), 36 (6.5%) indicated they had returned the dog to the shelter. Of owners who returned their dogs, 89.7% indicated that they had displayed at least one of the surveyed behaviors. However, 67.1% of the owners who still had their dogs 4 weeks later also indicated that they had displayed at least one of the behaviors listed above.
Marston, 2004	Details of parent study are described in section A. A total of 318/4,405 (7.2%) adopted dogs were returned, and of these, ~70 (22%) were due to behavior incompatibilities.
Mondelli et al., 2004	People who adopted and later returned a dog to a shelter in Milan, Italy during a 6-year period (1996–2001) were given a questionnaire to complete when returning, which included reasons for relinquishing the dog. 307/431 owners who returned dogs completed questionnaires. About 13% of female and 17% of male dogs who were adopted were later returned. When reporting the reason for relinquishment, 46 people (14.9%) noted aggression towards people and 120 (38.8%) noted other behavioral incompatibilities including vocalizing too much, hyperactivity, destruction / soiling the house, escaping, disobedience and problems with other pets. However, it should be noted that the reason for relinquishment was collected on the second page of the questionnaire under the sub-heading of "Dog's behavior".
Shore, 2005	In 2004, phone interviews were conducted with 78/100 people who had returned a dog or cat to a single shelter in Kansas within a 2-year period following adoption. Most (n=82) of the animals were dogs. The interview included open-ended questions about what led to the return. Because responders were allowed to list more than one reason, it is not possible to determine the exact percent of dogs for which the 59 behavioral incompatibilities mentioned applied.

(*continued on next page*)

Table 1 (*continued*)

Diesel et al., 2008	4,500 dogs from 14 different shelters in the United Kingdom were followed prospectively after adoption in 2005 into a new home. A questionnaire with predominately closed questions was sent out by mail 6–8 weeks after adoption, and follow-up phone calls were made 6 months after adoption. Of the 662 (14.7%) dogs returned to the shelter within 6 months, 388 (58.6%) owners reported the return was due to various behavioral incompatibilities.
Hawes et al., 2020	102 dogs (~6% of adopted dogs during the 4-month study period in 2018) were returned to a shelter in Texas whose population includes animals considered difficult to adopt and transferred from other facilities. More than half had been in adoptive homes for more than 60 days and one reason for the return was recorded for each dog by shelter personnel. 55.9% were recorded as being returned for behavioral reasons, most commonly aggression toward humans (23.5%) or animals (14.7%).

things are different. Importantly, categorization inevitably involves deciding which differences to ignore. Therefore, how various reasons contribute to our understanding of relinquishment is heavily influenced by how we choose to group them in the first place. For example, it may not seem unreasonable to lump reasons as different as aggression to other animals and inappropriate elimination into the same category for purposes of exploring the data, but it is important to recognize that decision has a highly subjective component, especially if the individuals doing that type of grouping already have strong prior beliefs about the role of dog behavior in relinquishment. We wonder how much of current belief about the role of behavioral incompatibilities harks back to the choices about lumping versus splitting when these various reasons were tabulated. This is a challenge in many fields of scientific investigation (Zerubavel, 1996). For shelter dogs, if all behavioral incompatibilities are lumped together into a single category and other types of reasons (e.g., lifestyle, economic) are looked at individually, especially if there are a large number of other categories, then it may be technically correct to state that "behavior" lumped together is the most common reason for relinquishment. As previously noted, although there is admittedly imprecision in the available data, all behavioral reasons lumped together tend to be less common than all other reasons lumped together, in some cases, dramatically so (Jensen et al., 2020). The lumping of non-behavioral reasons into vaguely defined categories (e.g., "lifestyle", "family-related", "health", "housing issues") is similarly problematic, but perhaps less likely than the label "behavior" to suggest a single solution.

Beyond the lumping/splitting issue, Lambert et al. (2015) expressed a number of other concerns regarding methodological inconsistency among studies reporting reasons for relinquishment. These include the frequent lack of definition of a particular behavior itself and of behavior problems, the inconsistency in reporting of the number of reasons relinquishers were instructed/allowed to report, and of whether respondents were given a list to respond to or given open ended questions, among others. For example, two studies specifically allowed up to 5 reasons to be provided (Salman et al., 1998; Weiss et al., 2014). Another study that collected data from interviews with relinquishers at a Los Angeles shelter allowed respondents to "indicate as many reasons as they wished" (Dolan et al., 2015). It is unknown whether allowing multiple reasons overall to be selected in some of the studies may have encouraged respondents to report more behavioral incompatibilities than would have been offered if owners had to think of reasons themselves or prioritize a single, over-riding reason. The paper by Scott et al. (2018) raises the question of whether providing free text responses versus a series of pre-ordained choices might affect our understanding of these reasons, because in that study the most common behavior complaints from owners were of behaviors that were not specified in the survey. Regardless, the only study which found that behavioral incompatibilities lumped together accounted for a greater percentage of reasons in comparison to any single non-behavioral reason, involved a small convenience sample (Kwan & Bain, 2013). This was also the only sample in which owners providing information were explicitly informed that their responses would not be seen by shelter staff (and potentially affect the fate of their dog). Moreover, when researchers (or shelters) take behaviors as diverse in motivation and expression as showing anxious actions when left alone and showing enthusiasm for physical activity, and then lump them together under a single category of "behavior problems," it becomes misleading if the only thing they have in common is that they sometimes annoy some people.

A question that has long concerned shelters is to what degree people relinquishing a dog honestly and/or accurately report behavior. One small study (n = 54) attempted to assess this (Segurson et al., 2005). All owners relinquishing a dog filled out the commonly used Canine Behavioral Assessment and Research Questionnaire (C-BARQ) at intake. In C-BARQ, owners are asked to rate their dogs from 0 to 4 according to how frequently or how intensely they express 103 behaviors, which are then grouped and given a score for each of 7 behavior groupings (e.g., activity level, owner directed aggression, separation related behavior, etc.). A score of 0 represents the absence of the behavior, with scores of 1 through 4 representing increasing severity of the problem. One group of relinquishers (n = 27) were told their information would remain confidential and a second group (n = 27) were told their information would be shared (not confidential) and used to help place their dogs. Mean and median scores were calculated for the behavior categories in each group. Only two of the behavior categories (owner-directed aggression and fear of strangers) had significantly higher scores in the confidential group compared to the non-confidential group, but scores in both groups were very low (Owner-directed aggression: 0.68 [0.50] and 0.23 [0.0]; Fear of strangers: (1.2 [1.0] and 0.6 [0.08], for confidential and non-confidential groups, and mean [median] scores, respectively. However, when we compare the mean and median scores between the 2 groups, both the confidential and non-confidential respondents report levels of behavior between 0 and 1.2 out of a maximum score of 4.

Another factor that can reinforce negative beliefs about shelter dogs and their behavior is the return of an adopted dog to the shelter, which is referenced by some (i.e., Shore, 2005; Diesel et al., 2008) as the so-called "failed adoption." This choice of descriptor potentially carries the pejorative implication that the return was due to dog-related problems, as opposed to an owner-related issue. At the extreme, the returned dog may be in jeopardy of never being able to be matched with a permanent home due to the stigma of what is believed to be a very bad outcome. This is understandable, because shelter workers may have had time to develop a relationship with a dog under their care as well as with the adopter. Thus, due to the level of personal investment, a return may stand out and exert a disproportionate influence on perception about the risk of return for other dogs and other adoptions. To be fair, this perception is bolstered by some data. For example, in the handful of studies where reasons for return were reported, behavioral incompatibilities were listed as a prominent reason, ranging from approximately 38%–90% of returns (Table 1B). Nevertheless, we char-

acterize this reaction as disproportionate because, overall, studies indicate that the proportion of adopted dogs overall known to be returned to the shelter for any reason, including behavior, remains rather low (Patronek, 1995 (18.8%); Wells & Hepper, 2000 (6.5%); Marston et al., 2004 (7.2%); Mondelli et al., 2004 (13% females, 17% males); Diesel et al., 2008 (14.7%)). These numbers become even less worrisome when viewed in the context of the proportion of dogs returned for behavioral reasons, which in three studies for which data on both returns and reasons were available, is in the range of 6%–9% of all adopted dogs (Wells & Hepper, 2000 (5.6%); Mondelli et al., 2004(~6%); Diesel et al., 2008 (8.6%)). Indeed, one summary of outcomes based on 21,409 records of dogs admitted to a large municipal shelter in the southwestern USA questioned the whole framing of a return as a "failed adoption" as opposed to a potential opportunity, akin to being placed in a temporary foster home, to learn more about the dog's behavior and needs in a home environment without the stressors inherent in a shelter (Patronek & Crowe, 2018). Of 816 (~3.8%) dogs returned within 30 days of adoption, almost all were subsequently readopted (96.9%), with a median (mean) length of stay of 4 (10) days. It should be noted, however, that in the study any dogs returned after 30 days were recorded as a regular surrender, and not as an adoption return (Patronek & Crowe, 2018).

Behavior of owned dogs

In considering the question of the role of behavioral incompatibilities between dogs and their owners, we would do well to consider the words of 1 of the pioneers in the field of veterinary behavior, Victoria Voith. Referring to a survey of a large sample of veterinary clients she completed more than three decades ago, Dr. Voith reminded us that "clearly many people keep pets despite behaviors the owners consider problems" (Voith, 2009). She refers specifically to a 1981 sample of 711 dog owners at the Veterinary Hospital of the University of Pennsylvania that found that 42% of owners who completed the questionnaire reported that their dog engaged in at least one behavior they found problematic (Voith et al., 1992). Subsequent studies in general veterinary practice settings have generally confirmed these findings (Vacalopoulous & Anderson, 1993; Guy et al., 2001) (**Table 2**).

With respect to dogs and owners in the general population, three studies involved a probability sample (Patronek et al., 1996; New et al., 2000; Kobelt et al., 2003) (as opposed to a convenience sample), and those results also indicated that many owners lived with dogs some might consider as problematic. From our own personal experience, we find this not at all surprising when considering the behavior of the dogs owned by our own friends and family, as well as dogs owned by one author's (GJP) thousands of veterinary clients over the years. Being loved and cherished is not incompatible with having some behaviors or habits owners might prefer dogs not have, if given the choice. Two studies on recently acquired dogs have directly addressed this issue. In a sample of owners who are participants in the 'Generation Pup' longitudinal study in the United Kingdom and Republic of Ireland, owners reported that approximately a third of dogs exhibited behaviors that could qualify as a behavioral incompatibility when they were 6 (n = 302/965) and/or 9 months of age (n = 276/784) (Lord et al., 2020). Yet, despite the occurrence of these behaviors, many of the surveyed owners did not characterize them as being problematic (Lord et al., 2020). The authors stressed the complexity and importance of owners' perceptions, which involve much more than "the characteristics, nature, and severity of the behavior". In a separate study, a convenience sample of 107 persons who adopted a dog from a shelter in Australia were surveyed anywhere between 575 days post-adoption (Scott et al., 2018). As shown in (Table 2), the owners who responded were overwhelmingly satisfied with their dogs overall (very satisfied: n = 90; satisfied: n = 12), and mostly satisfied with their dogs' behavior (very satisfied: n = 69; satisfied: n = 28), despite the fact that over half reported that they had experienced an "undesirable behavior" with their dog (n = 57).

It is difficult to know what might be concluded with respect to prevalence of various behaviors as described in studies based on investigator-selected (e.g., Blackwell et al., 2008; Casey et al., 2014) or self-selected convenience samples of owners (e.g., Dinwoodie et al., 2019; Yamada et al., 2019) where the potential for bias is high (Tyrer & Heyman, 2016). Similarly, tabulating the frequencies of various behaviors among dogs presented to specialized animal behavior practices (Landsberg, 1991; Bamberger and Houpt, 2006; Col et al., 2016) cannot provide any hints as to prevalence of specific behavioral incompatibilities among all owned dogs in the general population. Such studies can, however, provide a window into the range of behaviors owners experience. Taken together, these studies make it clear that many owners find it possible to live with dogs whose behavior other owners might decide is cause for relinquishment. Indeed, numerically, in consideration of the approximate size of the owned population (~78 million dogs) in the USA compared with the estimated relinquished population per year (~3 million), which includes litters of puppies, far more people live with dogs described as having behavioral incompatibilities than chose to relinquish them to a shelter (ASPCA, 2021).

Behavior as a risk factor, rather than a reason, for relinquishment

To pursue more scientifically-based solutions to the pet relinquishment problem in the USA, in 1993, a group of national stakeholders began to collaborate as the National Council for Pet Population Study and Policy (NCPPSP) (Anonymous, 1993). Their goal was to gather scientifically sound data and map out appropriate epidemiologic studies to better clarify the problem of unwanted pets. An important feature of their study was to obtain a representative national sample of dogs currently living in homes for comparison to dogs relinquished to shelters. Indeed, the work of the NCPPSP was critical in highlighting the difference between a reason and a risk factor for relinquishment. For example, that a reason becomes a risk factor only when it is more common in the relinquished population than in the owned population.

For their case-control study to identify risk factors for relinquishment (New et al., 2000), the NCPPSP used responses from 2,092 owners relinquishing 2,631 dogs and puppies to 12 shelters in four regions of the US between February 1995 and April 1996 (Regional Shelter Relinquishment Survey). Surveys were administered in-person on randomly selected days for 1 year by different trained interviewers at each location. The responses from relinquishing owners were then compared to responses from a nationally representative sample of 3,434 dog-owning US household (National Household Survey) who were members of a consumer panel maintained by a commercial research company. To facilitate using the data in a planned study to explore the rehoming of pets to other sources, approximately half of the control households were selected because they had a dog or cat leave the household during the previous year. With one exception (i.e., the source of dog), the National Household Survey contained the same questions as the Regional Shelter Relinquishment Survey. However, control households completed their surveys at home and returned them by mail rather than being interviewed in person, as was done for the relinquishing owners. With respect to dog behavior, respondents were asked to report the frequency (i.e., "always/almost always", "most of the time", "some of the time", "rarely/never") of multiple different behavioral incompatibilities (i.e., soiling in the

Table 2
Frequency of behaviors that could potentially be considered behavioral incompatibilities, as reported in select studies of owned dogs

Voith et al., 1992	711 paper questionnaires were completed by clients in a waiting room at a University veterinary hospital in Pennsylvania in 1981. The survey included the question: "*Does your dog engage in any behavior which is a problem for you? Yes / No. Please explain briefly*." Forty-two percent of respondents answered "Yes", and 20% of those that identified a specific behavior after a "Yes" answer reported multiple behaviors their dogs engaged in as problematic.
Vacalopoulos & Anderson, 1993	A study conducted in veterinary hospitals in Minnesota was described only in a conference abstract. More than 90% of surveyed clients indicated that their dog had one or more behavior problems. The studied owners reported that jumping on people was the most frequent behavioral problem (55%).
Patronek et al., 1996	A random-digit dial telephone survey of 748 dog owners in St. Joseph County, Indiana was conducted in 1994. Owners were asked about six specific behaviors and how frequently they occurred. For any frequency of occurrence ("daily," "weekly," "≤2 times/month), the reported prevalence was 62% for barking, 28% for chewing, 45% for hyperactivity, 29% for inappropriate elimination, 12% for aggression to other pets, and 20% for aggression to people.
New et al., 2000	Data were obtained from a mail survey in 1995–1996 of a representative sample of 3,434 current dog owners who were members of a national consumer panel in the USA. Specific behaviors were included in the survey, and owners were asked how frequently (from four frequency options) their dog had exhibited them in the past month. For any frequency of occurrence of various behaviors (above "rarely/never") the prevalence was ~45% for being too noisy, ~29% for damage to property, ~48% for hyperactivity, ~22% for house soiling, ~29% for aggression to other animals (growl/snarl/snap/attempt to bite), ~12% for fighting or attacking other animals, ~17% for aggression towards people (up to and including attempts to bite), ~31% for escaping the house or yard, and 4.5% for biting a person
Guy et al., 2001	A one-page survey was completed by 3,226 clients in 20 veterinary clinics across three eastern Canadian provinces. Owners were asked three closed yes/no questions regarding aggressive behavior (growling at members of the household; growling or snapping when food, toys, or other objects are taken by someone; biting members of the household). Forty-one percent of the dogs were reported by their owners to have growled at a member of the household, 20.6% were reported to have growled or snapped at a person when they tried to take food, toys or other objects, and 15.6% were reported to have ever bitten a member of the household (even if believed it happened by accident).
Kobelt et al., 2003	A random sample of 203 registered dog owners in Melbourne, Australia were given a questionnaire via phone. The survey contained questions about the frequency of 19 different behaviors. The most commonly reported behaviors from the survey list (at a frequency of "always," "often," or "sometimes") was overexcitement (63%), followed by jumping up on people (56%), rushing at people/dogs (38%), and excessive barking (32%).
Blackwell et al., 2008	A convenience sample of 192 owners walking their dog or leaving a veterinary clinic in three areas of the United Kingdom completed a questionnaire that included frequency of 36 specific behaviors and, if the owner reported that behavior, a follow up question on whether the owner considered that behavior to be problematic. Only 3 dogs were reported to not show any of the behaviors surveyed. The most commonly reported behaviors surveyed were jumping up at owners (78%), pawing or demanding attention (75%), excitable with visitors (74%), and pulling on the lead (69%). Most (76%) owners considered at least one behavior to be a problem. The behaviors described most frequently as being problematic among owners whose dogs expressed them were aggression towards family members, house soiling, and destruction.
Casey et al., 2014	Data from a variety of convenience samples (e.g., distributing questionnaires at dog shows, other unspecified events that the authors thought dog owners were likely to frequent, and veterinary practices) was gathered in the United Kingdom from May 2007–August 2009, with about 25% of the questionnaires returned by mail (3,897 total). Specific questions were asked about aggressive behavior towards familiar and unfamiliar people, as well as fear / hiding behavior with people, with yes/no answers. The authors defined aggression as barking, lunging, growling, or biting. Owners reported extremely low levels of aggression compared with other studies, e.g., ~3% of respondents reported aggression toward family members and ~7% reported aggression towards unfamiliar people entering the house. This, together with the low response rate, suggests a self-selection bias.
Scott et al., 2018	A convenience sample of 107 people who had recently adopted a dog from a single shelter in South Australia were surveyed via phone between June 2015–August 2016. Respondents were contacted between 5-75 days post-adoption. Owners were asked if they were experiencing any undesirable behaviors with their dog (yes/no), how satisfied they were with their pet overall, and how satisfied they were their pets' behavior. Almost all respondents indicated being either very satisfied (n = 90) or satisfied (n = 12) with their dog. Responses were similar with respect to satisfaction with behavior (very satisfied: n = 69, satisfied: n = 28), despite the fact that 57 (53.3%) owners reported experiencing behaviors such as pulling on leash, scratching/chewing furniture, inappropriate elimination, and barking/vocalizing. Response rates were not specified, so response bias remains a concern.
Dinwoodie et al., 2019	Responses of 2,480 dog owners in 16 countries (mostly USA) were obtained via an open-access Internet survey that was made available for 90 days. Respondents were recruited through various media platforms. However, to attempt to address response bias, responses from owners who indicated that their dog's behavior being problematic was the reason for their participation were excluded from the study. The prevalence of owner-reported behavioral incompatibilities among the 4,114 dogs was 85%. A median of 2 behaviors/dog were reported (range, 0-12).
Yamada et al., 2019	Participants were recruited in February 2018 from subscribers to an online magazine published by a pet products retailer in Japan. The 2,050 online responders indicated the frequency of 25 different behaviors by their dog in the past three months, as well as how troubled they were by each behavior. Eighty-six percent of the participants answered that they were "moderately troubled" or "very troubled" by at least one of the listed behaviors. Of the queried behaviors, "barking at noises inside the house" and "barking at unfamiliar visitors" were the most frequently reported, as well as the behaviors deemed most troubling.
Lord et al., 2020	People who were part of the self-selected 'Generation Pup' longitudinal study cohort in the United Kingdom and Republic of Ireland were surveyed (online or via paper) about whether or not they found any of their dog's behavior(s) to be problematic, as well as the frequency of specific behaviors in their dogs when they were 6 (n = 965) and 9 months of age (n = 784). Participating owners reported that approximately one-third of dogs (31.3% of 6 months; 35.2% of 9 months) showed behaviors that they found problematic (most commonly reported: jumping on people, pulling on leash, recall issues, excessive or inappropriate barking, etc.). However, many owners reported their dogs exhibiting the same behaviors without deeming them problematic (e.g.: 79.7% of those who responded at 9 months reported leash pulling, and only 5.2% of total respondents listed leash pulling when asked to describe their dog's problematic behavior).
Didehban et al., 2020	Owners visiting a single University veterinary hospital in Iran completed a closed-end questionnaire to assess the prevalence of 13 different behavioral incompatibilities. 345/401 (86%) dogs were noted as displaying one of these 13 behaviors. The behaviors that were reported to be most common were excessive activity (38.7%), fearfulness (27.9%), destructiveness (27.2%) and aggression toward unfamiliar people (23.7).

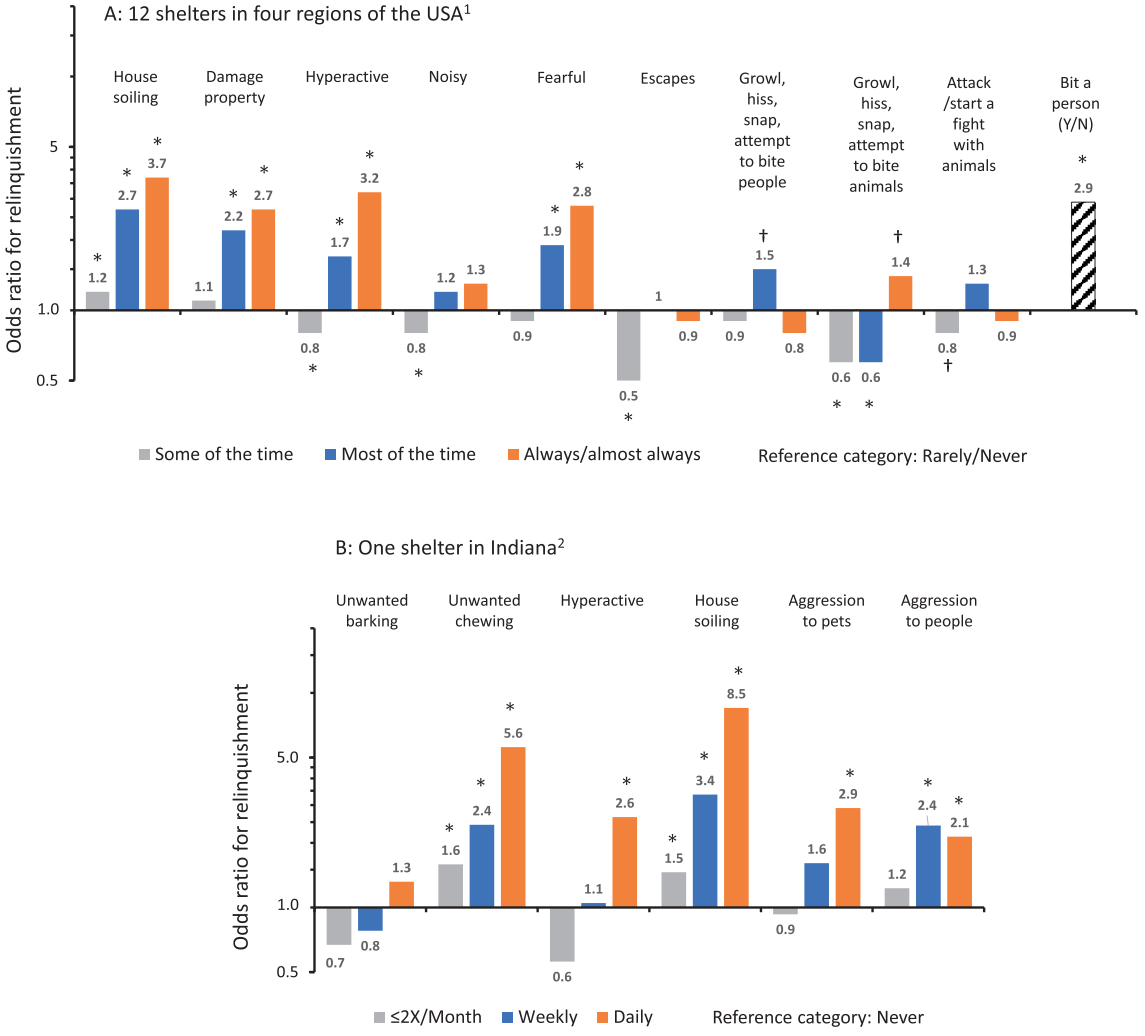

Figure 1. Behavioral risk factors for relinquishment of owned dogs to animal shelters in two epidemiological studies
* $P<0.05$; †listed as $P<0.05$, but upper or lower limit of the 95% confidence interval for the odds ratio is 1.00.
1: From New et al., 2000. Table 3.
2: From Patronek et al., 1996. Table 2. After multivariate logistic regression and collapsing the reference and comparison categories, the only behavior variable that remained statistically significant as "Daily" or "Weekly" inappropriate elimination (OR, 2.3, 95% CI: 1.2–4.4) versus inappropriate elimination observed "Never" or "Occasionally".

house, damaging things in or outside the home, being overly-active, being too noisy, escaping from yard, showing fear, growling/hissing/snapping/attempting to bite people or other animals, attacking or starting a fight with other animals), for the month immediately prior (for controls) and the month prior to relinquishment (for cases). Whether the dog had bitten a person was scored dichotomously (Yes/No) as an additional variable.

The results of the NCPPSP risk factor study indicated that only one of the surveyed behaviors, soiling in the home, was associated with a statistically significantly increased risk of relinquishment at any frequency of reported occurrence (i.e., "always/almost always", "most of the time", or "some of the time")(odds ratio (OR), 3.7, [95% CI:2.7–4.9], OR, 2.7 [95% CI: 2.1–3.2], OR, 1.2 [95% CI: 1.1–1.4]) (Figure 1A). Showing fear behavior, being hyperactive, and damaging things were all associated with a significantly increased risk when observed "always/almost always" or "most of the time" (fear: OR, 2.8, [95% CI: 2.0–4.0] and OR, 1.9, [95% CI: 1.5–2.5], respectively; hyperactive: OR, 3.2 [95% CI: 2.6–3.9] and OR, 1.7 [95% CI: 1.5–2.1], respectively; damages things: OR, 2.7 [95% CI: 2.0–3.5] and OR, 2.2 [95% CI: 1.7–2.8], respectively. By contrast, escaping from the yard or being too noisy "some of the time" was associated with a decreased risk of relinquishment (OR, 0.5 [95% CI: 0.4–0.6] and OR, 0.8 [95% CI: 0.7–0.9] for escaping and being noisy, respectively) (New et al., 2000).

The results for three aggression variables in the NCPPSP study were somewhat contradictory with respect to reported frequency of the behaviors and whether they increased or decreased risk of relinquishment. For example, aggression to people (i.e., growling, hissing, snapping or attempting to bite) was not statistically significant when observed "always/almost always" or "some of the time", but when reported to occur "most of the time", a frequency between "always" and "some of the time", the authors described it as statistically significant (OR, 1.5 [95% CI: 1.0–2.1]). By comparison, more relinquished dogs (246/2020; 12.2%) than dogs living in households (154/3418; 4.5%) were reported as actually having bitten a person, with a statistically significant increased risk of relinquishment (OR, 2.9 [95% CI: 2.4–3.6]). Aggression to other animals also measured by frequency of growling, hissing, snapping, or attempting to bite was associated with a statistically significantly increased risk when observed "always/almost always" (OR, 1.4 [95%

CI: 1.0–2.0], but was associated with a significantly decreased risk when observed either "most of the time" (OR, 0.6 [95% CI: 0.4–0.8]) or "some of the time" (OR, 0.6 [95% CI: 0.5–0.7]). When aggression to animals was assessed by frequency of attacking/starting a fight, observing this behavior "always/almost always" or "most of the time" was not associated with a significantly increased risk of relinquishment, and when observed "some of the time", was associated with a significantly decreased risk (OR, 0.8 [95% CI: 0.7v1.0]) (New et al., 2000). It should be noted that several confidence intervals listed above as statistically significant included the null value of 1.0, suggesting that those p-values just barely met the threshold of $P<0.05$.

Patronek et al. (1996) also used a case-control study to examine risk factors for relinquishment to a single shelter in Indiana between June 1994 and February 1995. The researchers did not ask owners about reasons for relinquishment, but simply whether the dogs expressed the behaviors of interest, so that those could be compared with reports from owned dogs not being relinquished. With respect to behavior, they tabulated the frequencies ("never", "≤2 times per month", "weekly" or "daily") of six specific behavioral incompatibilities (unwanted barking, unwanted chewing, hyperactivity, inappropriate elimination, aggression toward other pets, aggression toward people) during the previous 3 months from telephone interviews of 285 (75%) owners who had relinquished their dog. Those responses were compared with the frequencies of the same behaviors among a random digit dial telephone sample of 748 households in the community who owned a dog at the time of the interviews (December 1994), which was conducted by a commercial survey company. In their univariate analysis, the only behaviors that were associated with increased odds of relinquishment at all frequencies above "never" were unwanted chewing and inappropriate elimination; these risk factors also had the largest odds ratio compared to dogs never exhibiting those behaviors (Figure 1B). By comparison, dogs who exhibited aggression to people either "daily" (OR, 2.1 [95% CI: 1.3–3.7]) or "weekly" (OR, 2.4 [95% CI: 1.4–4.0]) were at approximately twice the risk of relinquishment as dogs who never exhibited that behavior. Dogs who exhibited aggression to other pets "daily" were also at increased risk compared to those who never did that (OR, 2.9 [95% CI: 1.6–5.4]). Unwanted barking at any frequency was not associated with statistically significant increased risk. Importantly, these results changed in their multivariate analysis. However, in order to better align the number of variables with the number of observations in the multivariate analysis, the frequency of the behavior variables was collapsed into just two, rather than 4, categories. Once potential confounding factors such as dog characteristics, household characteristics, owner expectations, frequency of veterinary visits, and participation in dog training classes were adjusted for in a multivariate analysis, the only behavior that remained associated with a statistically significantly increased risk of relinquishment was "daily" or "weekly" inappropriate elimination (compared to "never" or "≤2 times per month") (OR, 2.3 [95% CI: 1.2–4.4]. This was a markedly reduced odds ratio, compared to the univariate odds ratio calculated using the same collapsed categories (OR, 4.9 [95% CI: 3.4–6.9].

The third risk factor study compared reports from 168 owners approaching a municipal shelter in a low socioeconomic area of Los Angeles from June – September 2014, to relinquish a dog with the responses from 125 current owners using low-cost spay-neuter services in the same community (Dolan et al., 2015). The only behavioral factor specifically tested was whether the owner "agreed," "strongly agreed," or was "neutral" about whether their dog behaved as they had expected. Using the "neutral" response as the reference category, neither of the other responses were associated with a statistically significant difference in risk of owner pursuing relinquishment. Relinquishing owners were offered surrender-prevention resources, but how many ultimately still chose to relinquish their dog was not reported.

From a policy perspective, risk factor studies should provide more useful information to shelters than studies tabulating reasons. However, they are also not without limitations. Only one (New et al., 2000) studied shelters in multiple regions of the USA. Both of the other two studies were conducted at single shelters, limiting their generalizability to other communities (Patronek et al., 1996; Dolan et al., 2015); furthermore, one of those did not explore behavior in any depth (Dolan et al., 2015). Despite the potential utility of the "relinquishment-as-disease" epidemiological approach, the few existing studies are too limited to provide any sort of definitive answer about the relationship of behavior (causal, confounder or effect modifier) of behavior in the decision to relinquish a pet dog. Perhaps most relevant from a shelter perspective is that the behavioral incompatibilities having the most consistency (i.e., being statistically significant at any frequency) and having the largest odds ratios in the 2 comprehensive risk factor studies were inappropriate elimination/house soiling and unwanted chewing/destructive behavior (Patronek et al., 1996; New et al., 2000). Neither of these behaviors are amenable to identification, much less modification, in a shelter environment and to a large extent are completely normal, albeit undesirable, canine behaviors, especially in younger dogs. Indeed, having to defecate for a prolonged period of time in a kennel may actually make the former behavior worse.

Conclusion

As Stone has emphasized, "*What we choose to measure signals what we think is important and frames how we think about the problem*" (Stone, 2020, p. 133). Here, we show how years of data collection and reporting, begun with the best of intentions in shelters to address an important social and animal welfare problem, may have contributed to a belief that shelter dogs in general are substantively different from owned dogs with respect to the range, frequency, and intensity of various behavioral incompatibilities. Investigators' decisions to lump these various reasons together, resulting in a single large, and in some ways artificial, category has likely reinforced the perception that behavioral incompatibilities are a major reason for relinquishment. The behavioral reactions of some dogs to the stress of the shelter environment during their stay, where they may well express behaviors they did not engage in in their previous home, or conversely, fail to express desirable behaviors they did previously engage in in their previous home, undoubtedly helps further reinforce these beliefs among shelter staff. Collectively, these beliefs and experiences may not be optimal for dogs or shelters, particularly from a capacity-for-care perspective. The consequences may include restrictive adoption policies that may result in euthanasia (for the dog in question or for other dogs due to lack of space), as well as dedication of excessive time and energy at the shelter level to apply battery tests in an attempt to draw some conclusion about behavior in a future home.

Although there is certainly truth to the idea that behavior plays a role in relinquishment, and for some dogs, a determining role, we conclude that the published research does not provide compelling support for the notion that the general population of relinquished dogs in shelters are there because of relationship-breaking behavioral incompatibilities in their prior home. It is important, however to be mindful of a limitation of the existing data from both owned and relinquished populations – namely, that just because they appear to show "absence of evidence" it would be inappropriate to conclude that there is conclusive "evidence of absence".

For example, it is possible that the types of problems being reported as tolerated in the home are not comparable in frequency and/or severity to those same problems reported as reasons for relinquishment. Without an in-depth interview of owners and/or in-home evaluation of the dogs' actual behaviors by a qualified behaviorist, that question is likely impossible to definitively answer. The closest data we have to that are from the two risk factor studies where identical questions were asked of both sets of owners (Patronek et al, 1996; New et al, 2000), and in those cases at least, the results do not suggest compelling differences across the board. To some extent, the question itself may be moot because the effect of behavior does not occur in a vacuum, but on a background of a host of owner-related factors, needs, and expectations. Again, only one risk-factor study attempted to control for some of these other factors using a multivariate analysis, and the effect in that case was to decrease the odds ratio for inappropriate elimination (daily or weekly versus occasionally or never) from 4.9 to 2.3, suggesting that over half the odds of relinquishment for that behavior were accounted for by other factors measured (Patronek et al., 1996).

Another challenge when reviewing this literature is avoiding a false equivalence between an owner mentioning that a particular behavior in a particular situation is undesirable and whether the actual behavior represents a pathology or a normal canine behavior that is an annoyance, albeit sometimes a serious one. Across all of the studies, behavioral definitions and measures of behavioral intensity, if included at all, varied widely, so even when the same behavior labels are used, it is not usually possible to know whether the actions reported are actually the same or are owners' perceptions of what the labels represent. This in turn, gives no indication of which or at what point these behaviors could satisfy a general consensus, if such existed, as outside the normal range, and thus constitute candidates for "rehabilitation," which must carry the implication of pathology. The impracticality of such a determination is one reason we employ the term "behavioral incompatibility," rather than "problem," as this body of literature does not lend itself to a diagnostic approach to behavior, but is rather a compilation of owner reports of behaviors that concern them. Indeed, by virtue of our choice of title ("Saving Normal…."), we deliberately draw a parallel to the book with that name by Dr. Allen Frances, the chair of the committee that developed the Diagnostic and Statistical Manual 4 (DSM-40 for use in human psychology and psychiatry. Dr. Frances later became a leading critic of the subsequent revision, DSM-5, due to his belief that the updated version went too far in assigning psychological diagnoses and, as a result, pathologizing and medicalizing human behavior that was perfectly normal (Frances, 2013).

To be clear, we are not saying that there are no dogs in shelters who express or have previously expressed behaviors that make them unsuitable for placement in human households, any more than we would claim that such dogs are not already living in our communities. However, we do believe that existing data suggests the prevalence of significant behavioral incompatibilities may be greatly overestimated for shelter dogs in general, and therefore potentially translated into policies and practices that may not be aligned with the population in a given shelter. Unfortunately, there are simply no data comparing the consistency of reporting of behavior in the relinquishing home, in the shelter, and in the adoptive home for the same individual dogs to know for sure which behaviors merit attempts at modification, for how long, and to what end. For dogs who enter shelters as strays, behavior in the prior home would not be available unless reclaimed by the owner. From a population-perspective, it is worth remembering that although behavioral incompatibilities are frequently mentioned as a reason for return from adoption, that number appears to represent $<10\%$ of all adopted dogs (Wells & Hepper, 2000; Mondelli et al., 2004; Diesel et al., 2008).

As noted in a major guidelines document for shelter operations, there is always a need to balance the welfare of the population with that of individual dogs (Newbury et al, 2010). Resources are constrained to varying degrees in most shelters, and time devoted to one purpose may mean sacrificing effort in another area. An example here would be a shelter unable to admit a dog, or having to euthanize a dog because there was insufficient kennel space if there were dogs being kept in the shelter unnecessarily. In terms of counterpoint, from the individual dog perspective, it is fair to wonder whether failure to adequately address a particular behavior prior to adoption could result in decreased welfare in the adoptive home. One example might be a dog being tied out in the yard continuously due to undesirable behavior in the home, if in fact, the dog's behavior is the motivator driving such a husbandry choice on the part of the owner.

Going forward, we would do well to be mindful that data on the behavior of owned dogs reinforces what we already know from our experience in daily life as dog owners, caregivers, or friends of dog owners – that dogs live successfully in homes without having "perfect" behavior. Perhaps the solution is to "not sweat the small stuff" in cases where that is proving unduly burdensome and adopt a more tailored approach to behavioral programs. The trend to a foster-centric model of sheltering offers a valuable opportunity to better understand how the behavior of dogs in a home setting corresponds to that in a shelter, should that information be deemed helpful to support dogs' social competence as effectively as possible when they are between homes. Additionally, several studies have reported that some owners relinquishing their dog indicated that certain kinds of assistance or information might have helped prevent relinquishment (Weiss et al., 2014; Dolan et al., 2015), highlighting the potential value of community resources to support pet owners. Indeed, a growing number of shelters and animal welfare professionals are now showing that implementing community-based interventions is practical in the real-world setting (see https://www.humananimalsupportservices.org/). Such programs offer a novel vision for the future in which shelter-based interventions are de-emphasized.

Authors' contributions

The idea for this article was conceived by G.J.P and J.B. All authors contributed to the framing of the paper, writing and review, and approved this submission.

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Ethical considerations

Not required

Conflict of interest

G.J.P. and E.A. are independent paid consultants to the National Canine Research Council, a subsidiary of Animal Farm Foundation. J.B. is an employee of the National Canine Research Council.

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