

## SUPREME COURT'S TREATMENT OF DRUG DETECTION DOGS DOESN'T PASS THE SNIFF TEST

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*The current Supreme Court approach to the nuances involved in drug detection dogs is fundamentally flawed. The Supreme Court has allowed, on the evidentiary front, the introduction of unscientific evidence into law enforcement practices, which allows officers to disregard traditional Fourth Amendment protections. As Justice Souter stated in Illinois v. Caballes, “[T]he sniff alert does not necessarily signal hidden contraband, and opening the container or enclosed space whose emanations the dog has sensed will not necessarily reveal contraband or any other evidence of crime.”*

*The Courts classification of drug detection dogs in Caballes as sui generis is unsubstantiated. The Court in Caballes also determined that a dog sniff alone was sufficient to establish probable cause for a physical search inside a vehicle. The Court should revise this treatment and consider alternative proposals. Additionally the Court’s reliance in Florida v. Harris on blanket terms such as “bona fide organization” and “training program” illustrates the Justices’ incomprehension of the complexities involved in such a process. Finally, the Court in Harris inappropriately dismissed the very real financial incentive law enforcement has to maintain detection dogs that over-alert.*

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## INTRODUCTION

Canines are fascinating animals capable of a wide array of jobs and tasks. Law enforcement has utilized the skills of canines as far back as the fourteenth century.<sup>1</sup> Detection dogs have become a particularly prevalent law enforcement tool because of their effectiveness in detecting illegal substances.<sup>2</sup> Because of historical use and societal acceptance, detection dogs have been given a substantial amount of deference in regard to their reliability.<sup>3</sup> However the training methods used and the various studies on canine detection bring into question the validity of this deference. Currently, there are no required national standards for certifying a dog as a drug detection dog.<sup>4</sup> Each company that engages in training dogs can set their own standards and certify according to those standards.<sup>5</sup> In fact, anybody can start a training company tomorrow and certify drug detection dogs.<sup>6</sup> Because of this variability in training standards, there are some drug detection dogs in the field that are not reliably accurate or adequately trained.

Inadequately trained dogs can lead to false alerts, which can compromise the Fourth Amendment protections afforded to citizens. The Supreme Court stated in *Illinois v. Caballes* that a dog's search was outside the

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1. *History of the Police Dog*, DYFED-POWYS POLICE, <http://www.dyfed-powys.police.uk/en/what-we-do/dog-section/history-of-the-police-dog>.

2. Andrew E. Taslitz, *Does the Cold Nose Know? The Unscientific Myth of the Dog Scent Lineup*, 42 HASTINGS L.J. 15, 23 (1990).

3. *United States v. Place*, 462 U.S. 696 (1983) (Courts characterization of dog sniffs as *sui generis*); Rym Momtaz, *Report Casts Doubt on Effectiveness of Bomb-Sniffing Dogs*, ABC NEWS, <http://abcnews.go.com/Blotter/report-casts-doubt-effectiveness-bomb-sniffing-dogs/story?id=18376823> (TSA has spent millions on detection dogs without ever studying their effectiveness.).

4. Interview with Rick Farley, Owner of Alabama Canine Law Enforcement Officer's Training Center in Northport, AL (September 11, 2014) [hereinafter Farley Interview]; Leslie A. Shoebottom, *Off the Fourth Amendment Leash?: Law Enforcement Incentives to Use Unreliable Drug-Detection Dogs*, 14 LOY. J. PUB. INT. L. 251, 253 (2012); see Leslie A. Shoebottom, *Has the Fourth Amendment Gone to the Dogs?: Unreasonable Expansion of Canine Sniff Doctrine to Include Sniffs of the Home*, 88 OR. L. REV. 829, 836 (2009); see also JOHN J. EMSMINGER, POLICE AND MILITARY DOGS 121–22 (2012).

5. See *supra* text accompanying note 4.

6. See *supra* text accompanying note 4.

traditional protections of the Fourth Amendment.<sup>7</sup> The current Supreme Court approach places too much reliance on the accuracy of drug detection dogs and the incentives law enforcement has to keep accurate canines. This article attempts to elaborate on Justice Souter's dissent in *Caballes*: "The infallible dog . . . is a creature of legal fiction."<sup>8</sup>

Part I provides an overview of the Supreme Court jurisprudence concerning drug detection dogs and how the Court currently determines their reliability. Part II describes how detection dogs are trained, how dogs indicate to the presence of contraband during a search, and why some conventional training is problematic. Part III explores studies concerning two highly controversial aspects of drug detection work. Part IV discusses problems with current law enforcement record keeping of detection dogs and the catchall "residual odor" defense. Part V investigates the claim by the Supreme Court in *Florida v. Harris* that law enforcement has no incentive to maintain inaccurate drug detection dogs. Part VI proposes a model for the Supreme Court's "bona fide organization" training program and explores an alternative standard in calculating probable cause for drug detection dogs. Part VII looks ahead to possible problems with current drug detection programs in light of the growing legalization of marijuana movement.

## I. SUPREME COURT JURISPRUDENCE

### A. Search in the Context of the Fourth Amendment

The Fourth Amendment provides individuals with the right to be "secure in their persons, houses, papers, and effects, against unreasonable searches and seizures."<sup>9</sup> The landmark Supreme Court decision in *Katz v. United States* recognized that the Fourth Amendment protects "people and not places."<sup>10</sup> The Court held that the warrantless wiretapping of a public

7. See *infra* text accompanying note 45.

8. *Illinois v. Caballes*, 543 U.S. 405, 411 (2005) (Souter, J., dissenting); regardless of a dog's error rates and sometimes inadequate training, the assistance provided by these animals is invaluable to law enforcement. See Farley Interview, *supra* note 4.

9. U.S. CONST. amend. IX.

10. *Katz v. United States*, 389 U.S. 347, 351 (1967).

phone booth constituted an unreasonable search in violation of the Fourth Amendment.<sup>11</sup> “[A] Fourth Amendment search occurs when the government violates a subjective expectation of privacy that society recognizes as reasonable.”<sup>12</sup> The Court will determine if the protections of the Fourth Amendment apply to a particular search by using the expectation of privacy analysis from Judge Harlan’s concurrence.<sup>13</sup>

Additionally, for much of the Fourth Amendment’s history, it has been understood to protect persons and houses from government trespass, and the decision in *Katz* did not renounce this principle, but rather expanded it.<sup>14</sup> As recently as 2012, the Court restated the “physical intrusion” theory in *United States v. Jones*.<sup>15</sup> The Court held that the placement of a GPS-tracking device on a vehicle to monitor its movements was a Fourth Amendment search.<sup>16</sup> Where “[t]he Government obtains information by physically intruding on a constitutionally protected area, such a search has undoubtedly occurred.”<sup>17</sup> Similarly, in *United States v. Bond*, the Supreme Court held that a “law enforcement officer’s physical manipulation of a bus passenger’s carry-on luggage violated the Fourth Amendment’s proscription against unreasonable searches.”<sup>18</sup>

To combat invasions of privacy by the government, the Court fashioned the “exclusionary rule,” which provides that all evidence obtained in violation of the Fourth Amendment will be inadmissible.<sup>19</sup> The exclusionary rule “compel[s] respect for the [Fourth Amendment] in the only effective way available—by removing the incentive to disregard it.”<sup>20</sup>

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11. *Katz*, 389 U.S. at 351–52.

12. *Katz*, 389 U.S. at 361 (Harlan, J., concurring); see also *California v. Ciraolo*, 476 U.S. 207, 211 (1986).

13. Ali Mirsaidi, *The Prying Nose: Florida v. Jardines and Warrantless Dog-Sniff Tests on Private Property*, 8 DUKE J. CONST. L. & PUB. POL’Y SIDEBAR 105, 107 (2013).

14. *United States v. Jones*, 132 S. Ct. 945, 950 (2012).

15. *Id.* at 949.

16. *Id.*

17. *Id.* at 950 n.3.

18. *Bond*, 529 U.S. 334, 338–39, (2000) (“When a bus passenger places a bag in an overhead bin, he expects that other passengers or bus employees may move it for one reason or another. . . . He does not expect that other passengers or bus employees will, as a matter of course, feel the bag in an exploratory manner.”).

19. See *Mapp v. Ohio*, 367 U.S. 643 (1966).

20. *Id.* at 656 (quoting *Elkins v. United States*, 364 U.S. 206, 247 (1960)).

## B. Warrantless Searches

The Fourth Amendment additionally provides that “no warrant shall issue, but upon probable cause. . . .”<sup>21</sup> The Supreme Court has allowed exceptions to the warrant requirement by allowing warrantless searches if law enforcement obtains sufficient probable cause.<sup>22</sup> The test to determine if officers have enough proof to establish probable cause cannot be reduced to a “precise definition or qualification.”<sup>23</sup> In *Illinois v. Gates*, the Court noted that “[f]inely tuned standards such as proof beyond a reasonable doubt by preponderance of the evidence . . . have no place in the [probable cause] decision.”<sup>24</sup> Under the decision in *Gates*, probable cause is determined by a common sense review of the “totality of the circumstances.”<sup>25</sup>

The Supreme Court has also recognized an exception to the warrant requirement for an automobile search.<sup>26</sup> “Police officers—who have legitimately stopped an automobile and who have probable cause to believe that contraband is concealed somewhere within it—may conduct a warrantless search of the vehicle that is as thorough as a magistrate could authorize by warrant.”<sup>27</sup> The automobile exception has been justified based on its mobility and public nature.<sup>28</sup>

## C. Dog Sniff is *Sui Generis*

In 1977, the Supreme Court first mentioned the worth of canine detection in *United States v. Chadwick*.<sup>29</sup> A trained detection canine alerted to the presence of marijuana in a double-padded footlocker.<sup>30</sup> The Court held

21. U.S. CONST. amend. IX.

22. See *California v. Acevedo*, 500 U.S. 565, 569–70 (1991); see also *United States v. Ross*, 456 U.S. 798, 807–08 (1982); *Chambers v. Maroney*, 399 U.S. 42, 48 (1970); *Carroll v. United States*, 267 U.S. 132, 158–59 (1925).

23. *Maryland v. Pringle*, 540 U.S. 366, 371 (2003).

24. *Gates*, 462 U.S. 213, 235 (1983).

25. *Id.* at 238.

26. See, e.g., *Ross*, 456 U.S. at 800 (vehicle search based on probable cause may extend to every part of the vehicle and its contents).

27. *Id.*

28. Shauna S. Brennan, *The Automobile Inventory Search Exception: The Supreme Court Disregards Fourth Amendment Rights in Colorado v. Bertine—the States Must Protect the Motorist*, 62 NOTRE DAME L. REV. 366, 367 (1987).

29. *Chadwick*, 433 U.S. 1 (1977), *abrogated by California v. Acevedo*, 500 U.S. 565 (1991).

30. *Id.* at 4.

it would be unreasonable for an officer to conduct a warrantless search, although both the majority and the dissent mentioned that the dog's positive alert would have been sufficient probable cause to obtain a warrant.<sup>31</sup>

In *United States v. Place*,<sup>32</sup> the Supreme Court noted that a dog sniff of a passenger's luggage at the airport did not constitute a search within the meaning of the Fourth Amendment.<sup>33</sup> Justice O'Connor, writing for the majority of the court, stated that the "canine sniff is *sui generis*" and therefore did not constitute a search.<sup>34</sup> The Court reasoned that the unique nature of the sniff test only disclosed limited information (the presence of contraband) and was less intrusive than traditional physical searches.<sup>35</sup> In *Indianapolis v. Edmond*,<sup>36</sup> the Court noted that walking a detection dog around the perimeter of the vehicle at a drug interdiction checkpoint did not constitute a search because it disclosed only the presence of contraband.<sup>37</sup>

In 2005, the Court reiterated the language from *Place*, that a dog sniff is *sui generis*.<sup>38</sup> In *Illionis v. Caballes*, law enforcement used a trained narcotics dog to sniff the exterior of a vehicle during a lawful traffic stop without any suspicion of drug activity.<sup>39</sup> The dog alerted to the presence of contraband, and marijuana was recovered during a subsequent search of the vehicle.<sup>40</sup> The Court found the search was reasonable based on the length of time it took for the dog to arrive on the scene.<sup>41</sup>

Justice Stevens, drafting for the majority, emphasized that the sniff test could only detect contraband.<sup>42</sup> The Court relied on the holding of *United*

31. *Id.* at 15; *id.* at 22 (Blackmun, J. dissenting).

32. *Place*, 462 U.S. 696 (1983).

33. *Id.* at 707.

34. *Id.* (Throughout I refer to *sui generis* as the Court meant it: that a dog's sniff test is not a search within the context of the Fourth Amendment.); BLACK'S LAW DICTIONARY 1572 (9th ed. 2009) (*Sui generis* is Latin for "of its own kind" and means to be unique or peculiar.).

35. *Place*, 462 U.S. at 707; *see also* *United States v. Sharp*, 689 F.3d 616, 617 (6th Cir. 2012), cert. denied, 133 S. Ct. 777 (2012) (held that a detection dog that jumps into the interior of a automobile to conduct a sniff test is not a search).

36. *Edmond*, 531 U.S. 32 (2000).

37. *Id.* at 40.

38. *Caballes*, 543 U.S. at 409 (citing *Place*, 543 U.S. at 707).

39. *Id.* at 406–07.

40. *Id.*

41. *Id.* at 408.

42. *Id.* at 408–09 (The sniff test "was performed on the exterior of respondent's car while he was lawfully seized for a traffic violation. Any intrusion on respondent's privacy expectations do not rise to the level of a constitutionally cognizable infringement.").

*States v. Jacobson*,<sup>43</sup> which stated a chemical test performed on cocaine was not a search because the test alerted the officers only to the presence of contraband.<sup>44</sup> “[G]overnment conduct that only reveals the possession of contraband ‘compromises no legitimate privacy interest,’” and thus, “not a search subject to the Fourth Amendment.”<sup>45</sup> The Court did not put much credence in Justice Souter’s argument that the dog sniff did not have the same certainty associated with it as with the chemical test in *Jacobson*.<sup>46</sup> *Caballes*, however, does not suggest that the automobile exception to the warrant requirement lowers the threshold of proof required.<sup>47</sup> Rather, *Cabellas* relied on the trial court’s determination that “the dog sniff was sufficiently reliable to establish probable cause to conduct a full-blown search of the trunk.”<sup>48</sup>

Justice Souter challenged the unsupported framework on which the *Place* and *Caballes* decisions were based.<sup>49</sup> In his dissent, Justice Souter argued that the accuracy of the drug detection dog was a myth and should be treated as any other search.<sup>50</sup> “The infallible dog, however, is a creature of legal fiction. . . . [Detection dogs’] supposed infallibility is belied by judicial opinions describing well-trained animals sniffing and alerting with less than perfect accuracy. . . .”<sup>51</sup> “Once the dog’s fallibility is recognized, however, that ends the justification claimed in *Place* for treating the sniff as *sui generis* under the Fourth Amendment. . . .”<sup>52</sup>

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43. *Jacobson*, 466 U.S. 109, 122–23 (1984).

44. *Caballes*, 543 U.S. at 409.

45. *Id.* at 408 (quoting *Jacobson*, 466 U.S. at 123) (The Court held that the canine sniff was not a search despite arguments made by the respondent that errors on the dog’s behalf undermine the assumption that canine sniff tests only indicate the presence of contraband. The Court was unconvinced because the record of the lower court was devoid of this issue.)

46. *Id.* at 415–16 (Souter, J., dissenting).

47. Richard E. Myers II, *Detector Dogs and Probable Cause*, 14 GEO. MASON L. REV. 1, 10 (2006).

48. *Cabellas*, 543 U.S. at 409.

49. *Id.* at 411 (Souter, J., dissenting) (Justice Souter opposed the framework that “[T]he sniff can only reveal the presence of items devoid of any legal use, the sniff ‘does not implicate legitimate privacy interests’ and is not to be treated as a search.”).

50. *Id.* at 411–14 (Souter, J., dissenting).

51. *Id.* at 411–12 (“[w]hether owing to errors by their handlers, the limitations of the dogs themselves, or even the pervasive contamination of currency by cocaine”).

52. *Id.* at 412–13 (“[T]he sniff alert does not necessarily signal hidden contraband, and opening the container or enclosed space whose emanations the dog has sensed will not necessarily reveal contraband or any other evidence of crime.”).

#### D. *Florida v. Harris*

The Supreme Court addressed the standard for determining reliability of the detector dog used in *Florida v. Harris*.<sup>53</sup> Officer William Wheatley pulled over Clayton Harris because his truck had an expired license plate.<sup>54</sup> After Officer Wheatley noticed a beer can in plain sight, he asked Harris for consent to search the vehicle, which Harris refused.<sup>55</sup> Officer Wheatley then deployed his drug detection dog to conduct a sniff test on the exterior of the vehicle.<sup>56</sup> The dog alerted at the front driver's side door, leading Wheatley to believe he had sufficient probable cause to now search the interior of the vehicle.<sup>57</sup> The officer's interior search did not reveal the presence of any substances the dog was trained to detect.<sup>58</sup> Instead the officer discovered ingredients for producing methamphetamine.<sup>59</sup> Harris was subsequently arrested and posted bail.<sup>60</sup>

Two months after the initial arrest, Harris was again pulled over by Officer Wheatley, this time for a broken taillight.<sup>61</sup> And once again, the detector dog alerted at the driver's side door.<sup>62</sup> However, this time the officer did not recover anything illegal.<sup>63</sup> Harris brought a motion to suppress, challenging the reliability of the dog sniff's ability to establish probable cause.<sup>64</sup> The trial court denied the motion to suppress the evidence and found that Wheatley did have probable cause for the interior search.<sup>65</sup>

The Florida Supreme Court reversed, holding that Wheatley did not have sufficient probable cause to search Harris's vehicle.<sup>66</sup> “[W]hen a dog

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53. *Harris*, 133 S. Ct. 1050 (2013).

54. *Id.* at 1053.

55. *Id.* at 1053–54.

56. *Id.*

57. *Id.* at 1054.

58. *Id.*

59. *Id.* (“[The search] reveal[ed] 200 loose pseudoephedrine pills, 8,000 matches, a bottle of hydrochloric acid, two containers of antifreeze, and a coffee filter full of iodine crystals—all ingredients for making methamphetamine.”).

60. *Id.*

61. *Id.*

62. *Id.*

63. *Id.*

64. *Id.*

65. *Id.*

66. *Harris v. State*, 71 So. 3d 756 (Fla. 2011), *as revised on denial of reh'g* (Sept. 22, 2011), *rev'd*, 133 S. Ct. 1050 (2013) and *opinion withdrawn*, 123 So. 3d 1144 (Fla. 2013).

alerts,” the court wrote, “the fact that the dog has been trained and certified is simply not enough to establish probable cause.”<sup>67</sup> The court stressed the need for “evidence of the dog’s performance history,” including records showing “how often the dog has alerted in the field without illegal contraband having been found.”<sup>68</sup> The Court explained that the State needed to produce more evidence of the canine’s reliability.<sup>69</sup> To demonstrate a dog’s reliability:

[T]he State must present . . . the dog’s training and certification records, an explanation of the meaning of the particular training and certification, field performance records (including any unverified alerts), and evidence concerning the experience and training of the officer handling the dog, as well as any other objective evidence known to the officer about the dog’s reliability.<sup>70</sup>

The Court further explained, “given the level of sensitivity that many dogs possess, it is possible that if the person being searched had attended a party where other people were using drugs, the dog might alert because of the residue on clothing fabric.”<sup>71</sup> The Court also dismissed the State’s argument “that records of field performance are meaningless because dogs do not distinguish between residual odors and drugs that are present and, thus, alerts in the field without contraband having been found are merely unverified alerts, not false alerts.”<sup>72</sup> The Court noted, if this were true, it would “raise[] its own set of concerns as it relates to a probable cause determination of whether the dog’s alert indicates a fair probability that there are drugs presently inside the vehicle.”<sup>73</sup>

Justice Elena Kagan, writing for a unanimous Supreme Court, reversed.<sup>74</sup> The Court articulated the probable cause standard for drug

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67. *Id.* at 767.

68. *Id.* at 769 (“The State argues that records of field performance are meaningless because dogs do not distinguish between residual odors and drugs that are present and, thus, alerts in the field without contraband having been found are merely unverified alerts, not false alerts. This assertion, if correct, raises its own set of concerns as it relates to a probable cause determination of whether the dog’s alert indicates a fair probability that there are drugs presently inside the vehicle.”).

69. *Id.*

70. *Id.* at 775.

71. *Id.* at 769 (quoting Myers, *supra* note 47, at 4–5).

72. *Harris*, 71 So.3d at 769.

73. *Id.*

74. *Harris*, 133 S. Ct. at 1057.

detection dog alerts as when the totality of the circumstances, “viewed through the lens of common sense, would make a reasonably prudent person think that a search would reveal contraband or evidence of a crime.”<sup>75</sup> The Court went on to state that a court may *presume* that a dog’s alert provides probable cause to search under certain circumstances, such as when the canine is certified by a “bona fide” organization or “has recently and successfully completed a training program.”<sup>76</sup> The Court, however, stated that a defendant could rebut this presumption by challenging a dog’s reliability.<sup>77</sup>

The Court rejected the Florida Supreme Court’s requirement of “a strict evidentiary checklist, whose every item the State must tick off” in determining a drug dog’s reliability and considering a dog’s field performance record as the standard in determining reliability.<sup>78</sup> The Court highlighted the practical difficulties in relying on field performance records, stating:

If a dog on patrol fails to alert to a car containing drugs, the mistake usually will go undetected because the officer will not initiate a search. Field data thus may not capture a dog’s false negatives. Conversely (and more relevant here), if the dog alerts to a car in which the officer finds no narcotics, the dog may not have made a mistake at all. The dog may have detected substances that were too well hidden or present in quantities too small for the officer to locate. Or the dog may have smelled the residual odor of drugs previously in the vehicle or on the driver’s person. Field data thus may markedly overstate a dog’s real false positives.<sup>79</sup>

Additionally, the Court rejected any argument that police had any incentive to use anything less than an accurate drug detection dog.<sup>80</sup> Surprisingly, the Court made no mention that a dog’s sniff test was not

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75. *Id.* at 1058.

76. *Id.* at 1057 (“[E]vidence of a dog’s satisfactory performance in a certification or training program can itself provide sufficient reason to trust [the dog’s] alert.”).

77. *Id.* at 1057 (These include cross-examining the canine officer about the field history of the drug-detection dog, contesting the adequacy of the canine training program, and questioning the drug-detection dog’s performance during the case at hand. If a defendant successfully challenges the dog’s reliability, the evidence could be suppressed under the exclusionary rule.).

78. *Id.* at 1056.

79. *Id.* at 1056–57; *see infra* Part IV (problems with relying on controlled setting records for determining a drug detection dog’s accuracy).

80. *Id.* at 1057.

a search within the context of the Fourth Amendment, as they had in previous sniff test cases.<sup>81</sup> The Court stated, “a probable-cause hearing focusing on a dog’s alert should proceed much like any other,” under a totality of the circumstance approach.<sup>82</sup>

## II. DETECTION DOGS’ TRAINING ANALYZED

### A. General Training

Detection dogs are an essential resource for law enforcement because of their exceptional capacity to identify particular odor molecules.<sup>83</sup> Research studying dogs’ capacity to identify particular smells has discovered that some dogs are able to detect odor molecules in the air at a concentration of 500 parts per trillion.<sup>84</sup> As many dog owners are aware, a smart and motivated dog can be trained to do just about anything.<sup>85</sup>

Rick Farley has been training canine dogs for law enforcement since 1992 at the Alabama Canine Law Enforcement Officers Training Center (ACLEOTC) in Northport, AL.<sup>86</sup> The ACLEOTC trains canine units for the United States Border Patrol, the Department of Energy, and Alabama State Troopers, among others.<sup>87</sup> Police departments contract Mr. Farley to procure<sup>88</sup> drug detection dogs and train the dogs and the department’s officers to handle them.<sup>89</sup>

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81. *See id.*

82. *Id.* at 1058.

83. Farley Interview, *supra* note 4.

84. J.M. Johnston, *Canine Detection Capabilities: Operational Implications of Recent R&D Findings*, Institute for Biological Detection Systems, AUBURN UNIVERSITY, I (1999); *see also* Myers, *supra* note 47, at 3.

85. Farley Interview, *supra* note 4.

86. Farley Interview, *supra* note 4 (Mr. Farley is regarded by many as one of the best dog trainers in Alabama. Mr. Farley is the owner of the Alabama Canine Law Enforcement Officer’s Training Center (ACLEOTC).).

87. ALABAMA CANINE LAW ENFORCEMENT OFFICER’S TRAINING CENTER, <http://www.alcanine.com/>.

88. Farley Interview, *supra* note 4. (They obtain the dogs (usually the Malanois breed) themselves, for the law enforcement personnel. Mr. Farley believes in importing dogs from different parts of Europe because there is a larger numbers of dogs that are capable of becoming working dogs. Mr. Farley explained that Europe’s breeding industry for canine dogs is superior to the United States because of the prevalence of dog sports.)

89. *Id.*

Trainers begin by finding a dog with the requisite “drive” or motivation to hunt for toys.<sup>90</sup> Trainers condition the dogs to give particular responses when they detect their favorite toys.<sup>91</sup> Once the favorite toy has been established, the trainer will coat the toy with the contraband odor molecules.<sup>92</sup> During the training, the dogs are rewarded when they correctly give the conditioned response in the presence of the substance that emits the specific odor molecules.<sup>93</sup> This is essentially how dogs are trained to detect contraband.

As the Appendix to this Article illustrates, a dog will use its cone (the area within which the dog can detect odor molecules) to pick up any contraband (reward) odor molecules.<sup>94</sup> Once the dog picks up the particular odor molecule, it will sweep back and forth until it can pinpoint the highest concentration of the odor molecules.<sup>95</sup> Mr. Farley described this as the strategy used playing the game “Battleship.”<sup>96</sup> This becomes particularly relevant when you consider environmental factors and variables in a search, such as wind current, air pressure, and temperature.<sup>97</sup> For example, the higher the temperature, the more dispersed the odor molecules become and the more likely the dog will be able to detect the sources’ odor molecules.<sup>98</sup>

## B. Concerns with Current Dog Detection Training

As Mr. Farley made clear, not all dogs or trainers are created equal.<sup>99</sup> Mr. Farley stated that he is aware of several training facilities that “put

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90. *Id.* (Specifically, Mr. Farley looks for dogs with the ability to pick up air scents, and that retrieve and vanquish. In other words, he is looking for a dog whose sole motivation is to hunt and retrieve a toy for its handler. The drive is particularly important, because the dog doesn’t even know that it is looking for the toy. Rather its subconscious has been taught to be concerned only with where the toy is. This ability allows the dog to hunt for contraband in a variety of environments without being distracted.)

91. *Id.*

92. *Id.*

93. *Id.*

94. Farley Interview, *supra* note 4.

95. *Id.*

96. *Id.* (A player will guess in a certain area until they get a hit and then concentrate their search in that area.)

97. *Id.*

98. *Id.*

99. *Id.*

dogs out on the streets, that have no business being there.”<sup>100</sup> This can result from inadequate dog training, inadequate dog selection, or inadequate handler training.<sup>101</sup> For instance, in *United States v. Ebersole*, a trainer was convicted of wire fraud for using undertrained dogs and handlers.<sup>102</sup> Without a national standard or at least a statement of guidance from the Department of Justice, there is no objective way to determine if a training facility or certification program is actually producing “street-ready” drug detection dogs,<sup>103</sup> although the Supreme Court is willing to presume that dogs certified by “bona fide organizations” and training facilities are reliable.<sup>104</sup>

Generally, alerts have been classified as passive or aggressive.<sup>105</sup> Dogs trained to alert to odor molecules aggressively will attempt to contact the scent source.<sup>106</sup> Dogs attempting to contact the scent source do so more through instinct than through conditioned training.<sup>107</sup> A coveted trait by trainers is the dogs’ ability to adapt.<sup>108</sup> Mr. Farley explained that he seeks out dogs that are able to encounter any area and perform a search.<sup>109</sup> For example, some dogs that encounter a slick tiled surface will not walk on the surface because they instinctively believe it to be slippery ice.<sup>110</sup> However, the desired trait of adaptability has the potential to compromise the canine’s training, causing a canine to do different things in the field than they would normally do in a controlled training facility.<sup>111</sup>

Additionally, there should be a concern that detector dogs will associate other odor molecules with the items they were trained to detect.<sup>112</sup> In most

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100. *Id.*; see also Stephanie Taylor, *Tuscaloosa K9 Camp owner denies animal cruelty charges*, THE TUSCALOOSA NEWS, (October 31, 2013), <http://www.tuscaloosaneews.com/article/20131031/NEWS/131039980>.

101. Farley Interview, *supra* note 4.

102. *United States v. Ebersole*, 411 F.3d 517, 521 (4th Cir. 2005).

103. Farley Interview, *supra* note 4.

104. *Infra* Part III (for a more detailed discussion of fallacy of Supreme Court’s reliance).

105. Robert C. Byrd, *An Examination of the Training and Reliability of the Narcotics Detection Dog*, 85 KY. L.J. 405, 410–15 (1997).

106. Farley Interview, *supra* note 4.

107. *Id.* (Instinctual habits include digging and scratching, which are what they would naturally do in the wild to dig and hunt for animals underground.)

108. *Id.*

109. *Id.*

110. *Id.*

111. Myers, *supra* note 47, at 4, n.16.

112. *Id.* at 4.

training and certification programs, canines are conditioned to alert to a non-contraband substance coated with the drug odor molecules,<sup>113</sup> which have vapor pressure that is easier to detect.<sup>114</sup> For instance, canines that are conditioned to detect cocaine do not alert to the actual cocaine substance.<sup>115</sup> Instead, the dog is trained to alert to a chemical byproduct in cocaine known as methyl benzoate.<sup>116</sup> “[C]ases that appear to adopt the methyl benzoate theory of dog sniff drug detection do not discuss the fact that methyl benzoate is a common chemical used in multiple consumer products—solvents, insecticides, perfumes, etc.”<sup>117</sup> These chemical components are not themselves illegal and can be found in legal products, thus leading to searches of non-contraband items.<sup>118</sup>

Some have responded to this criticism, specifically canines detecting methyl benzoate to uncover cocaine. Mark E. Smith, a sergeant in the Houston Police Department with six years’ experience as a narcotics dog handler, disagrees that the training methods used cause canines to alert to innocent odors.<sup>119</sup> Sergeant Smith contends that the claim that detection dogs inappropriately alert to perfume when detecting cocaine is unfounded, because the three handlers that Sergeant Smith interviewed (for his article defending detection canines) had never reported any false alerts involving perfume.<sup>120</sup> Putting the obvious bias and self-interest aside,<sup>121</sup> the Sergeant

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113. See Nat’l Inst. Of Justice, U.S. Dep’t Of Justice, *Guide for the Selection of Drug Detectors for Law Enforcement Applications*, 21 (2000), <https://www.ncjrs.gov/pdffiles1/nij/183260.pdf>. (Ultra pure forms of heroin and cocaine are almost non-detectable.)

114. *Id.* at 50 (Vapor pressure is “the quantity of drug vapor (usually expressed in concentration) of a particular drug compound that exists above the compound in air at equilibrium under a specified set of conditions.”); Taylor Phipps, *Probable Cause on a Leash*, 23 B.U. PUB. INT. L.J. 57, 66 (2014).

115. See *United States v. Funds in Amount of Thirty Thousand Six Hundred Seventy Dollars*, 403 F.3d 448, 458 (7th Cir. 2005).

116. *Id.*; Phipps, *supra* note 114, at 66.

117. *Jacobson v. \$55,900 in U.S. Currency*, 728 N.W.2d 510, 534 (Minn. 2007).

118. Lewis R. Katz & Aaron P. Golembiewski, *Curbing the Dog: Extending the Protection of the Fourth Amendment to Police Drug Dogs*, 85 NEB. L. REV. 735, 754 (2007) (finding that the odor dogs alert to for heroin is also commonly found in vinegar, pickles, and glue, and that the odor dogs alert to in marijuana is commonly found in “hemp products, and fir and juniper trees”).

119. Mark E. Smith, *Going to the Dogs: Evaluating the Proper Standard for Narcotic Detector Dog Searches of Private Residences*, 46 HOUS. L. REV. 103, 122 (2009).

120. *Id.*

121. See *infra* Part V.

points to a single experiment conducted in 2002 as further evidence that dogs do not improperly alert to perfume.<sup>122</sup> In this study, the report found “that methyl benzoate, rather than the cocaine itself, is responsible for alerting drug detector dogs.”<sup>123</sup> The report went on to state that the perfume samples tested did not appear to have enough methyl benzoate to alert a narcotics dog.<sup>124</sup> It should be noted, though, that the study was restricted to only ten perfume samples and did not establish that all perfumes do not contain the requisite amount of methyl benzoate to alert a detector dog.<sup>125</sup>

For example, in *Horton v. Goose Creek*, drug detection dogs were deployed to search a school, resulting in the dogs alerting to two students.<sup>126</sup> Upon a full search of the student’s belongings, the only item recovered was a bottle of perfume that likely contained methyl benzoate, a byproduct of cocaine.<sup>127</sup> Similarly, the odor in heroin that alerts a detection dog is acetic acid, a common substance used in pickles and some glues.<sup>128</sup> A dog could also alert to substances such as air fresheners or plastic bags, because the dog associates those smells with the reward it receives when it indicates.<sup>129</sup> The detector dog is rewarded when it alerts to certain odor molecules, and if one substance exists (a plastic bag) the dog will alert thinking that it is alerting to one of the odor molecules for which it will be rewarded.<sup>130</sup> Again this evidence is not to suggest that canines are not capable of being conditioned to detect illicit substances. Rather it should illuminate how complicated dog detection reliability is to determine and how flawed the Supreme Court’s current *laissez faire* treatment is in practice.<sup>131</sup>

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122. Smith, *supra* note 119, at 123.

123. Kenneth G. Furton et al., *Identification of Odor Signature Chemicals in Cocaine Using Solid-Phase Microextraction-Gas Chromatography and Detector-Dog Response to Isolated Compounds Spiked on U.S. Paper Currency*, 40 J. CHROMATOGRAPHIC SCI. 147, 154 (2002).

124. *Id.* at 154–55.

125. *Id.*

126. See *Horton v. Goose Creek Indep. Sch. Dist.*, 690 F.2d 470 (5th Cir. 1982); Phipps, *supra* note 114, at 67.

127. *Horton*, 690 F.2d at 474.

128. Katz & Golembiewski, *supra* note 118, at 755.

129. *Id.*

130. *Id.*

131. The many variables involved in the training process show the problems with the presumption of reliability for canines that are certified by a “bona fide” organization or “ha[ve] recently and successfully completed a training program.” These baseless criteria should not objectively determine probable cause. Additionally, the treatment of detection

### III. STUDIES ON DETECTION DOGS' RELIABILITY

#### A. Bayes' Theorem as Applied to Detection Dog's Accuracy Rates

Dogs are not precise indicators of whether contraband exists, such that they could achieve perfectly consistent results.<sup>132</sup> Law enforcement personnel, who have claimed 100 percent accuracy, have explained instances of false alerts as the dog responding to residual odor.<sup>133</sup> For example, in *United States v. Warren*, the handler claimed an accuracy rate of 100 percent.<sup>134</sup> The evidence showed that when the dog alerted to a container without contraband, the handler would not record it as a "false positive," but instead claimed "the dog must have smelled the residual odor of drugs, which must have been present at some time in the past."<sup>135</sup> Because of these inconsistent results, some training and certification programs allow a certain degree of error in certifying a dog, since there is no national uniform standard.<sup>136</sup> The U.S. Court of Appeals for the Seventh Circuit has suggested that a narcotic detection dog alerting correctly 62 percent of the time was enough to establish probable cause.<sup>137</sup> "These disparities demonstrate that simply characterizing a dog as 'trained' and 'certified' imparts scant information about what the dog has been conditioned to do or not to do, or how successfully."<sup>138</sup>

The Court in *Harris* dismissed the relevance of field performance recordkeeping in favor of controlled testing environments.<sup>139</sup> One issue with controlled testing environments is that because there are no uniform guidelines for training or certification programs, some will always place contraband in every testing situation.<sup>140</sup> However, not every traffic stop or

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dogs as *sui generis* and outside the purview of the Fourth Amendment because they only detect illicit substances should also be questioned.

132. *Matheson v. State*, 870 So. 2d 8, 14 (Fla. Dist. Ct. App. 2003).

133. Jeff Weiner, *Police K-9's and the Constitution: What Every Lawyer and Judge Should Know*, CHAMPION (April 2012): 22, 23.

134. *See United States v. Warren*, 997 F. Supp. 1188 (E.D. Wis. 1998).

135. *Id.* at 1192.

136. *Id.* ("Whereas the Customs Service will certify only dogs who achieve and maintain a perfect record, [the] certification program [in this case] accepted a seventy percent proficiency.").

137. *See United States v. Limares*, 269 F.3d 794, 798 (7th Cir. 2001).

138. *Matheson*, 870 So. 2d at 14.

139. *Harris*, 133 S. Ct. at 1057.

140. Myers, *supra* note 47, at 34.

instance in the field will have contraband present. So even a canine that has an excellent controlled setting record will generate a significant amount of false positives when in the field.<sup>141</sup>

Richard Myers published a widely cited article applying Bayes' Theorem,<sup>142</sup> which suggested that the accuracy rates of detection dogs are a misconception of reliability.<sup>143</sup> Courts are under the assumption that a 95 percent accuracy rate equates to a 95 percent success rate in uncovering contraband.<sup>144</sup> Bayes' Theorem exposes the myth of these accuracy rates as a necessary indicator of reliability.<sup>145</sup> In his article, Myers concluded that a 90 percent accurate detector dog would actually result in recovery of narcotics only 16 percent of the time.<sup>146</sup>

For instance, assume training, certification, and field performance records indicate that a particular drug detection dog alerts 98 percent of the time when contraband is present.<sup>147</sup> The dog has a false alert rate of 2 percent, meaning that the dog alerts to the presence of contraband when it is *not* present 2 percent of the time. Also assume that 0.5 percent of the population has narcotics in their possession. The equation is applied as follows:

If the dog sniffs 10,000 people, 50 (10,000 x 0.005) will possess drugs. Out of these 50, the dog will correctly alert to 49 (50 x 0.98). Of the remaining 9,950 people that do not possess drugs, the dog will falsely alert to 2 percent of this group, resulting in 199 (9950 x 0.02) false detections. Out of this population of 10,000, the dog has positively alerted to 248 people, 49 of

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141. *Id.* at 13–15.

142. Bayes' Theorem is a formula used in the scientific community to evaluate conditional probabilities. See Stephen E. Fienberg & Mark J. Schervish, *The Relevance of Bayesian Inference for the Presentation of Statistical Evidence and for Legal Decisionmaking*, 66 B.U. L. REV. 771, 774 (1986); Phipps, *supra* note 114, at 83 n.82 ("Bayes' Theorem:  $P(\text{true positive accuracy rate}) \times *P(\text{population has illegal substances}) / P(\text{true positive accuracy rate}) \times *P(\text{population has illegal substances}) + P(\text{false positive rate}) \times *P(\text{population does not have illegal substances}) = \text{Probability drugs are discovered when dog alerts}$ ).

143. Myers, *supra* note 47, at 13.

144. *Id.*

145. *Id.*; see Michael O. Finkelstein & William B. Fairley, *A Bayesian Approach to Identification Evidence*, 83 HARV. L. REV. 489 (1970).

146. Myers, *supra* note 47, at 13–15.

147. Or stated differently, an accuracy rate of 98%. See Robert C. Bird, *An Examination of the Training and Reliability of the Narcotics Detection Dog*, 85 KY. L.J. 405, 428 (1997).

which are correct detections and 199 are false alerts. Thus, the probability that an individual actually possesses cocaine based on this dog is 49 out of 248, a detection rate of less than 20 percent.<sup>148</sup>

Several commenters have mentioned that the results produced under Bayes' Theorem might be overstated when the detection takes place in an area infested with a higher rate of narcotics<sup>149</sup>—a valid point that does mitigate the results slightly, but not to the extent that other authors believe.<sup>150</sup> For example, if an officer spots a car that commonly possesses narcotics (such as a typical cartel vehicle), the probability that the occupant has contraband could shoot up to as high as 5 percent. Construing the numbers in a manner most favorable to law enforcement—5 percent of the population possessing contraband and 98 percent accuracy rate of the dog—still has a detection rate of only 72 percent.<sup>151</sup> Thus, the inflated canine alert rates used by courts are not an objective measure of the effectiveness of a particular drug detection dog.<sup>152</sup>

False alerts, when recorded accurately,<sup>153</sup> are much higher than many in the public would anticipate. *The Chicago Tribune* conducted a study from 2007 to 2009 analyzing data collected by the Illinois Department of Transportation related to drug detection dog searches.<sup>154</sup> The McHenry County Sherriff's department recorded the highest number of alerts with 103.<sup>155</sup> Out of the 103 searches where drug detection dogs' alerts obtained probable

148. *Id.* at 428.

149. Smith, *supra* note 119, at 124; Myers, *supra* note 47, at 15.

150. Phipps, *supra* note 114, at 68.

151. 10,000 people x 5% = 500 holding contraband. Out of the 500, the dog would alert to 490. Of the remaining 9500 people that do not possess drugs, the dog will falsely alert to 2% of this group, resulting in 190 (9500 x 0.02) false detections. Out of this population of 10,000, the dog has positively alerted to 680 people, 490 of which are correct detections and 190 are false alerts. Thus, the probability that an individual actually possesses cocaine based on this dog is 490 out of 680, a detection rate of 72%.

152. Courts continue to use this flawed statistic as a measurement for reliability. See *Limares*, 269 F.3d at 798; Joseph L. Gastwirth, *The Need to Carefully Interpret the Statistics Reporting the Accuracy of A Narcotics Detection Dog: Application to South Dakota v. Nguyen, State of Florida v. Harris and Similar Cases*, 53 JURIMETRICS J. 415 (2013) (another excellent resource on the probability of a detector dogs success rates).

153. See *infra* Part IV.

154. See Dan Hinkel & Joe Mahr, *Tribune analysis: Drug-sniffing dogs in traffic stops often wrong*, CHI. TRIB., Jan. 6, 2011, at C1, [http://articles.chicagotribune.com/2011-01-06/news/ct-met-canine-officers-20110105\\_1\\_drug-sniffing-dogs-alex-rothacker-drug-dog](http://articles.chicagotribune.com/2011-01-06/news/ct-met-canine-officers-20110105_1_drug-sniffing-dogs-alex-rothacker-drug-dog).

155. *Id.*

cause to search the vehicle, drugs or paraphernalia were found only 32 percent of the time.<sup>156</sup>

## B. Handler Cueing

Dogs will alert to a substance because they believe their handler will reward them.<sup>157</sup> This most basic principle of drug detection training is maybe the most problematic, since a dog handler can use subtle cues to induce a dog to alert, often times unintentionally.<sup>158</sup> Courts have recognized handler cueing even when the contraband is not present.<sup>159</sup> The D.C. Circuit Court stated, “less than scrupulously neutral procedures, which create at least the possibility of unconscious ‘cueing,’ may well jeopardize the reliability of dog sniffs.”<sup>160</sup>

A University of California–Davis Study on handler cueing calls into question that dog alerts are generally reliable.<sup>161</sup> The study included eighteen dog-and-handler teams, all of which had been certified by a law enforcement agency.<sup>162</sup> Over the span of two days, eighteen trained and certified drug detection canines and their handlers took part in a prepared experiment to study the influence of handler bias on narcotics detection dogs’ performance.<sup>163</sup> On average, the handlers had approximately five years of scent detection experience, and the dogs had three years’ experience.<sup>164</sup> Testers told the human handlers that the areas containing the odors the canines were trained to detect were marked by a red piece of paper.<sup>165</sup> There were actually no scents that the dogs were trained to detect in any of the areas.<sup>166</sup> The

156. *Id.*

157. Farley Interview, *supra* note 4.

158. *See* State v. Nguyen, 811 N.E.2d 1180, 1195 n.109 (Oh. Ct. App. 2004) (“Handler cues are conscious or unconscious signals given from the handler that can lead a detection dog to where a handler thinks drugs are located.”); *see also* Jorge G. Aristotelidis, *Trained Canines at the U.S.-Mexico Border Region: A Review of Current Fifth Circuit Law and a Call for Change*, 5 SCHOLAR 227, 239–40 (2003); *see also* Myers, *supra* note 47; *see infra* Part V.

159. United States v. Trayer, 898 F.2d 805, 809 (D.C. Cir. 1990).

160. *Id.*

161. *See* Lisa Lit et al., Handler Beliefs Affect Scent Dog Detection Outcomes, 14 ANIMAL COGNITION 387 (2011) [hereinafter U.C. Davis Study].

162. *Id.* at 388–89.

163. *Id.* at 389–90.

164. *Id.* at 389, tbl. I.

165. *Id.* at 389–90.

166. *Id.* at 388.

search areas were all conducted inside a church to reduce the probability of any leftover residual odor or microscopic trace amounts of the substance.<sup>167</sup> So any alerts would be false alerts, and zero alerts would be considered a perfect score.<sup>168</sup>

Each team completed two five-minute searches in each of the four search areas.<sup>169</sup> The study had some alarming results. The correct response rate was only 15 percent (21 clean runs), and the error rate was 85 percent (123 runs).<sup>170</sup> Out of the 144 searches, 123 had at least one unwarranted positive alert.<sup>171</sup> Only one dog of the eighteen trained drug detection dogs did not falsely alert.<sup>172</sup>

The most important finding of the study was that the dogs were twice as likely to alert in an area marked by a red piece of paper than in a different area with no paper.<sup>173</sup> The majority of the handlers subconsciously cued their dogs to alert, although three handlers admitted to intentionally prompting the dog to alert.<sup>174</sup> The researchers concluded that the large number of false alerts confirmed their hypothesis that handler beliefs influenced the reliability of trained drug detection dogs.<sup>175</sup> As the lead researcher Lisa Lit stated, “It isn’t just about how sensitive a dog’s nose is or how well-trained a dog is. There are cognitive factors affecting the interaction between a dog and a handler that can impact the dog’s performance.”<sup>176</sup>

The researchers attributed this result to the Clever Hans effect.<sup>177</sup> The Clever Hans effect is a theory that animals have the ability to read subtle cues of their human handlers.<sup>178</sup> The reliance of some dogs on human cues

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167. *Id.* at 389.

168. *Id.*

169. *Id.*

170. *Id.* at 390.

171. *Id.*

172. *Id.* at 390, fig. 1, team 6.

173. *Id.* at 393.

174. *Id.* at 392.

175. *Id.* at 391, 394.

176. Lisa Lit, *Explosive- and drug-sniffing dogs’ performance is affected by their handlers’ beliefs*, UC DAVIS HEALTH SYSTEM, Feb. 23, 2011, [http://www.ucdmc.ucdavis.edu/welcome/features/2010-2011/02/20110223\\_drug\\_dogs.html](http://www.ucdmc.ucdavis.edu/welcome/features/2010-2011/02/20110223_drug_dogs.html).

177. U.C. Davis Study, *supra* note 161, at 392.

178. *Id.* at 387–88 (“For scent detection dog handlers, beliefs that scent is present might result in either sufficient inadvertent postural and facial cues so that dogs will respond

has been shown to override olfactory or visual cues indicating the location of food.<sup>179</sup> For instance, in an experiment about 50 percent of dogs would go to a bowl with no food indicated by a human pointing rather than to a bowl that the dog had seen and smelled food.<sup>180</sup> Cueing need not be verbal and can be conveyed with very subtle (and often times unintentional) movement.<sup>181</sup> Critics of the Clever Hans theory as applied to detection dogs have dismissed the theory, stating that the factual record in the field is not well developed.<sup>182</sup> However, even critics of this research suggest that if Lisa Lit's conclusions and research in the U.C. Davis study prove factual, it could dismantle law enforcement canine detection programs.<sup>183</sup>

The Clever Hans effect in the context of a sniff test is particularly alarming in light of the racial disparities in drug arrests.<sup>184</sup> For example, in a Chicago Tribune study,<sup>185</sup> researchers found that “only 44 percent of those alerts by the dogs led to the discovery of drugs or paraphernalia. For Hispanic drivers, the success rate was just 27 percent.”<sup>186</sup> As one author noted, “Essentially, . . . the dogs are serving as a warrant on a leash to allow law enforcement to conduct searches when they see fit and for reasons that do not establish probable cause, such as race.”<sup>187</sup> Even more alarming and

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regardless of the absence of scent, beliefs that dogs are providing their trained alert response or simply beliefs that alerts should be called regardless of dog behavior.”); BERNT SPIEGEL, *THE UPPER HALF OF THE MOTORCYCLE—ON THE UNITY OF RIDER AND MACHINE*, 105 (Meredith Hassal trans., Whitehorse Press 2010) (1998); Weiner, *supra* note 133.

179. U.C. Davis Study, *supra* note 161, at 388.

180. *Id.*

181. Weiner, *supra* note 133. Such manipulation can take the form of:

Slightly manipulating a leash, moving hands in a certain way, blocking a dog's path, holding the dog at a sniff site longer than normal (even a second or two), making certain sounds or saying words, a change in the handler's breathing pattern or tone of voice, even looking at a dog a certain way, making “facial expressions,” or reaching for a particular object (such as an edible treat, ball, tug toy, or other inducement) will typically elicit a response that can easily be labeled an alert. (Weiner, *id.* at 27)

182. Jane Bambauer, *Defending the Dog*, 91 OR. L. REV. 1203, 1207 (2013).

183. *Id.* (“[R]esearch may in time uncover unacceptable levels of handler bias that warrant the wholesale dismantling of canine programs.”). This is another reason why law enforcement has a vested interest and incentive to maintain the status quo treatment of detection dogs.

184. See Hinkel & Mahr, *supra* note 154.

185. *Id.*

186. *Id.*

187. Phipps, *supra* note 114, at 74.

disappointing is the fact that the Supreme Court was supplied with the U.C. Davis study before promulgating their standard for determining reliability of detector dogs in *Harris*.<sup>188</sup> Yet the Court still continues to dig their collective heads in the sand concerning the reliability of drug detection dogs.

#### IV. RECORDKEEPING OF DRUG DETECTION DOGS

The way law enforcement maintains accuracy records of their detection dogs is to track every instance in which a dog alerts.<sup>189</sup> However, law enforcement is often guilty of manipulating these numbers to increase their accuracy rates.<sup>190</sup> Some handlers do not record a false positive alert unless an arrest is made.<sup>191</sup> Missed alerts are also not recorded in instances when the dog fails to alert to contraband which is discovered upon a subsequent unrelated search.<sup>192</sup> Field records are important, though, as they are the only way to measure a drug detection dog's reliability in the actual deployment circumstance.<sup>193</sup>

For instance, in *Florida v. Harris*, the handler acknowledged that he only maintained records of alerts resulting in arrests.<sup>194</sup> Further, “[the handler] testified that he does not keep records of [the dog]’s alerts in the field when no contraband is found; he documents only the [dog]’s successes.”<sup>195</sup>

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188. Brief for The National Association of Criminal Defense Lawyers, et al., as of Amici Curiae Supporting Respondents, *Florida v. Harris*, 133 S. Ct. 1050 (2013) (No. 11-817), 2012 WL 3875241; Brief for Institute for Justice, et al., as of Amici Curiae Supporting Respondents, *Florida v. Harris*, 133 S. Ct. 1050 (2013) (No. 11-817), 2012 WL 3836938.

189. Bird, *supra* note 147, at 423–24 (the amount of true positives versus false positives would be the accuracy rate for the dog); see also Military Police, Dep’t of the Army Pamphlet 190-12, Military Working Dog Program (1993), [http://armypubs.army.mil/epubs/pdf/p190\\_12.pdf](http://armypubs.army.mil/epubs/pdf/p190_12.pdf).

190. Bird, *supra* note 147, at 424–25.

191. See, e.g., *Harris*, 133 S. Ct. at 1054.

192. See Bird, *supra* note 147, at 427.

193. For me the best example would be if a basketball player claimed 100% free-throw accuracy in practice. Not only would you be relying on the integrity of the basketball player to keep an accurate record, but you would also be measuring in a circumstance that is irrelevant. Would a basketball coach be interested in how many free-throws were made in practice or in the circumstance the player would be used, an actual game?

194. See *Harris*, 133 S. Ct. at 1054.

195. *Harris*, 71 So. 3d at 761.

When the dog in *Harris* made false alerts on two occasions, the handler claimed the dog's false alerts were due to residual odor on the door handle of the vehicle.<sup>196</sup>

### A. Residual Odor

Justice Kagan, like many drug detection dog proponents, argues that field records are not as accurate because false alerts result from residual odor.<sup>197</sup> The residual odor theory has become a blanket defense for handlers. "If no drugs are found, [the handler] does not record a false positive alert, but notes that the dog must have smelled the residual odor of drugs which must have been present at some time in the past. Thus, [the detector dog] is credited with 100 percent accuracy by [the handler]."<sup>198</sup> So, a handler would record any false positives as a true alert even though there was no contraband found and no arrest made.<sup>199</sup> This concern was addressed by the Florida Supreme Court, but was unanimously rejected by the United States Supreme Court Justices.<sup>200</sup>

It is not illegal to possess residual odor of a narcotic, but it does allow police to search any areas in which this residue resides. One study suggests that approximately 90 percent of paper currency in the United States has trace amounts of narcotics residue.<sup>201</sup> In some cities, like Salt Lake City, only 77 percent of the bills tested positive for cocaine, whereas Beijing and Tokyo had a mere 20 percent positive.<sup>202</sup> Detroit, Boston, Orlando, Miami, and Los Angeles all had an alarming 100 percent of their paper currency test

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196. *Harris*, 133 S. Ct. at 1054 (The canine did not detect any contraband it was trained to detect.).

197. *Id.* at 1056–57 ("the dog may have smelled the residual odor of drugs previously in the vehicle or on the driver's person").

198. *See Warren*, 997 F. Supp. at 1199.

199. *Id.*

200. *See Harris*, 133 S. Ct. at 1056; *Harris*, 71 So. 3d at 769 (The Florida Supreme Court noted, if field records are inaccurate due to the existence of potential residual odor, it would "raise[] its own set of concerns as it relates to a probable cause determination of whether the dog's alert indicates a fair probability that there are drugs presently inside the vehicle.").

201. Madison Park, *90 Percent of U.S. Bills Carry Traces of Cocaine*, CNN, Aug. 14, 2009, <http://www.cnn.com/2009/HEALTH/08/14/cocaine.traces.money/>; Weiner, *supra* note 133, at 28.

202. Park, *supra* note 201.

positive for cocaine.<sup>203</sup> Because of the prevalence of this residue, it should be concerning that detection dogs are actually alerting to narcotics and not the residue that lives all around us. For instance, bank tellers could be at a heightened risk to have drug residue on their clothing and therefore susceptible to a search that would otherwise not be permitted.<sup>204</sup>

Consequently, the heightened scent detection of a dog might be too strong for determining if contraband is actually present. However, this logic has not been reached by some courts, which still believe that alerting to contraband that is no longer present is a sign of the dog's reliability.<sup>205</sup> "[A] trained drug dog has the ability to detect the presence of drugs . . . as long as 72 hours prior to the alert . . . [which] serves to strengthen the argument that the dog has a superior sense of smell on which to rely to support a finding of probable cause."<sup>206</sup>

## V. INCENTIVES

In *Florida v. Harris*, the Justices questioned the incentive for law enforcement to have inaccurate detection dogs.<sup>207</sup> "After all, law enforcement units have their own strong incentive to use effective training and certification programs, because only accurate drug-detection dogs enable officers to locate contraband without incurring unnecessary risks or wasting limited time and resources."<sup>208</sup> One major incentive is that law enforcement agencies can alleviate their department's budget with civil forfeitures. Civil forfeiture is a proceeding in which the government seizes cash and other property based on a connection to a drug crime.<sup>209</sup> Cash and property may

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203. *Id.*

204. *Id.* ("Although the contaminated bills do not affect health, . . . they could cause in a false positive drug test if a person, such as a law enforcement officer or banker, handles contaminated currency repeatedly.")

205. *See* *State v. Cabral*, 859 A.2d 285, 300 (2004).

206. *Id.*

207. *Harris*, 133 S. Ct. at 1057.

208. *Id.* Obviously the Justices have never had any interactions with a small-town police force with more time on their hands than crime to deter.

209. *See, e.g.*, 21 U.S.C. § 881(a)(6) (forfeiture of funds that were "furnished or intended to be furnished . . . in exchange for a controlled substance, . . . proceeds traceable to such an exchange, and all moneys . . . used or intended to be used to facilitate [a drug crime]").

be seized upon a mere showing of probable cause, and the owner of such property has the burden of proving it was derived from a legal source.<sup>210</sup> Most state statutes and federal law allow law enforcement agencies to retain most, if not all, of the seized funds.<sup>211</sup> For instance, although the State of Alabama is not required to publicly record the amounts of their civil forfeitures, the State has received at least \$40 million in equitable sharing proceeds from federal authorities between 2000 and 2008.<sup>212</sup>

In an era of budgetary concerns, forfeited assets can completely fund local detection dog programs,<sup>213</sup> so the detection dog teams could be essentially financing their own detection budgets. This perverse financial incentive to police for profit has allowed overzealous law enforcement officers to target large-priced assets in order to grow their department's resources and sometimes for even more ambitious enterprises.<sup>214</sup> Even more alarming, given information on currency contamination,<sup>215</sup> is that some officers use

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210. See, e.g., *United States v. \$22,474.00 in U.S. Currency*, 246 F.3d 1212, 1215 & 1217 (9th Cir. 2010); Shoebottom, *Off the Fourth Amendment Leash?*, *supra* note 4, at 264.

211. See generally Marian R. Williams, Jefferson E. Holcomb, Tomislav V. Kovandzic, & Scott Bullock, POLICING FOR PROFIT: THE ABUSE OF CIVIL ASSET FORFEITURE (Institute for Justice, March 2010) at 18, [http://www.ij.org/images/pdf\\_folder/other\\_pubs/assetforfeituretoemail.pdf](http://www.ij.org/images/pdf_folder/other_pubs/assetforfeituretoemail.pdf) [hereinafter POLICING FOR PROFIT] (“[In] 42 states, at least 50 percent [forfeiture revenue] goes to law enforcement, and in 26 states, it is 100 percent.”).

212. POLICING FOR PROFIT, *supra* note 211, at 46 (This number merely represents assets from federal authorities and not from the state itself, thus the 40 million figure is likely the tip of the iceberg.).

213. See also Michael Smothers, *A nose for contraband; Drug money proves a windfall for area police*, PEKIN DAILY TIMES, Sep. 29, 2012, at A1 (noting that forfeiture proceeds “paid for a new police [drug-detection] dog worth \$8000”); POLICING FOR PROFIT, *supra* note 211, at 12 (many law enforcement budgets now rely on civil forfeiture); see Shoebottom, *Off the Fourth Amendment Leash?*, *supra* note 4, at 264; see Stephen Dethrage, *Drug task force in Tuscaloosa seized 90 pounds of marijuana, \$2 million in drugs and cash last year*, AL.COM (Jan. 8, 2015), [http://www.al.com/news/tuscaloosa/index.ssf/2015/01/drug\\_task\\_force\\_in\\_tuscaloosa.html#incart\\_river](http://www.al.com/news/tuscaloosa/index.ssf/2015/01/drug_task_force_in_tuscaloosa.html#incart_river).

214. POLICING FOR PROFIT, *supra* note 211, at 46, 43–104 (reporting the percentage of revenue that government retains under applicable civil forfeiture statutes); see Shoebottom, *Off the Fourth Amendment Leash?*, *supra* note 4, at 264; see Laura Sullivan, *Police Can Seize and Sell Assets Even When the Owner Broke No Law*, NPR (Nov. 10, 2014), <http://www.npr.org/blogs/thetwo-way/2014/11/10/363102433/police-can-seize-and-sell-assets-even-when-the-owner-broke-no-law> (Harry S. Connelly, the city attorney of Las Cruces, NM, tells a room of state officials, “We could be czars. . . . We could own the city. We could be in the real estate business.”).

215. See *supra* Part IV.

a drug detection dog to perform a sniff test on suspicious currency to determine if there is a drug connection to the money.<sup>216</sup> This procedure seems unconscionable considering that some cities may have 100 percent of their currency tainted with cocaine.<sup>217</sup>

The Court must rely on the integrity of interested officers to not exploit sniff tests to provide revenue to their departments. For instance, officers in 2008 stopped Chris Hunt for speeding on a Georgia interstate.<sup>218</sup> The officers searched the vehicle and recovered \$5,581 in cash.<sup>219</sup> The officers then deployed a drug detection dog on the currency, and the canine subsequently alerted to the presence of contraband on that currency.<sup>220</sup> Since the dog alerted, the currency was seized although Mr. Hunt was never charged with a crime.<sup>221</sup>

The Court in *Harris* stated that law enforcement have their own incentive not to waste resources on an inaccurate dog.<sup>222</sup> If a police department maintains their resources through civil forfeiture, they would have a large incentive not to have dogs that *under-alert* on contraband. Conversely, it would create an incentive for police to have dogs that *over-alert* to legal substances in order to create the opportunity to supplement their budget. The direct financial interest in the cash or property seized from drug arrests makes it difficult to understand why the Justices would put so much reliance on law enforcement to keep accurate and reliable detection dogs. The incentives available for law enforcement deserve tighter and more uniform requirements for training and certification programs.

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216. *See, e.g.*, *United States v. Funds in the Amount of Thirty Thousand Six Hundred Seventy Dollars* (\$30,670.00), 403 F.3d 448, 460-62 (7th Cir. 2005) (court found that the drug detection dog at issue was sufficiently reliable to establish probable cause on the basis of the dog's ordinary drug detection training, even though the dog had not been trained to alert to currency that had recently been in contact with illegal drugs); *see e.g.*, *Jones v. United States Drug Enforcement Admin.*, 819 F. Supp. 698, 719-21 (M.D. Tenn. 1993) (officers seized currency on the basis of a positive canine alert to the currency); *see Shoebottom, Off the Fourth Amendment Leash?*, *supra* note 4, at 264.

217. *Park, supra* note 201.

218. *POLICING FOR PROFIT, supra* note 211, at 36.

219. *Id.*

220. *Id.*

221. *Id.*

222. *Harris*, 133 S. Ct. at 1057.

## VI. NEW STANDARDS

### A. National Certification and Training Standard is Needed

During a discussion with Rick Farley, the head trainer at ACLEOTC, one theme that came up over and over again was integrity.<sup>223</sup> “It really all comes down to the integrity of the training facility and the individual handlers involved.”<sup>224</sup> In *Harris*, Justice Kagan outlined criteria that would meet the requisite level of reliability to reach probable cause. Courts may presume reliability when the dog has been certified by a “bona fide”<sup>225</sup> organization or “has recently and successfully completed a training program.”<sup>226</sup> However the Court provides no criteria for what might encompass a bona fide organization or training program.<sup>227</sup> As Mr. Farley stated, “in the United States you can rent a book on dog training and start a dog training business the next day. You can start dog training, and you are just as legally qualified as I am.”<sup>228</sup>

Without any guidance from the Supreme Court on what a “bona fide organization” should entail, law enforcement could choose to model programs after the U.S. Customs Service program.<sup>229</sup> This program puts both the dogs and handlers through a twelve-week program.<sup>230</sup> The certification process is so rigorous that only half the dogs complete the training.<sup>231</sup> The Custom Service dogs are trained to disregard distractions,<sup>232</sup> most notably residual odors.<sup>233</sup> To be certified a dog and handler team must complete an exam with various contraband substances in different environments with no false alerts and no missed drugs.<sup>234</sup> If the dog and handler team erroneously

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223. Farley Interview, *supra* note 4.

224. *Id.*

225. Bona fide, BLACK'S LAW DICTIONARY (9th ed. 2009) (means “[m]ade in good faith; without fraud or deceit. 2. Sincere; genuine.”).

226. *Harris*, 133 S. Ct. at 1057. (“[E]vidence of a dog’s satisfactory performance in a certification or training program can itself provide sufficient reason to trust [the dog’s] alert.”).

227. *Id.*

228. Farley Interview, *supra* note 4.

229. *Harris*, 133 S. Ct. at 1057; see Bird, *supra* note 147, at 414.

230. See Bird, *supra* note 147, at 414.

231. *Id.*

232. Such as food, legal drugs, and residual scents.

233. See Bird, *supra* note 147, at 414.

234. *Id.*

alerts, they must go through corrective training with a chance to re-take the exam one more time.<sup>235</sup> If the dog and handler team fails the second attempt, then the dog is permanently discharged.<sup>236</sup>

It seems clear that any uniform national standards promulgated should at least include training exercises that hide the contraband from the dog *and the handler*. As the U.C. Davis Study illustrates, otherwise the dog is likely to pick up on the handler's expectation and alert.<sup>237</sup> Mr. Farley described training programs that inform the handlers where the contraband samples have been hidden as "worthless."<sup>238</sup> "You aren't just training the dog, you are also training the handler. When the dog alerts to contraband and the handler was unaware of its existence, the confidence between the dog and handler team increases."<sup>239</sup> Thus, every drug detection dog should go through testing in which all locations have no contraband present.<sup>240</sup> The dog is then conditioned to know that not every search will uncover contraband.<sup>241</sup>

## B. Probable Cause Determination

Whereas judges do not know if probable cause requires 40, 50, or 51 percent likelihood that a crime is or will be committed,<sup>242</sup> the results of some of the aforementioned studies should make a reasonable person question the validity of relying on canines as a sole determinant of probable cause.<sup>243</sup> Richard Myers argues that dog alert should not rise to a level of probable cause, but rather should be used with reasonable suspicion to obtain the requisite probable cause to enter into someone's vehicle.<sup>244</sup>

Myers suggests a standard using the drug detection sniff test plus an officer's reasonable suspicion to reach the requisite threshold of probable

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235. *Id.*

236. *Id.* at 415.

237. Myers, *supra* note 47, at 34.

238. Farley Interview, *supra* note 4.

239. *Id.*

240. Myers, *supra* note 47, at 34.

241. *Id.*

242. Erica Goldberg, *Getting Beyond Intuition in the Probable Cause Inquiry*, 17 LEWIS & CLARK L. REV. 789, 793 (2013); *United States v. Donnelly*, 475 F.3d 946, 955 (8th Cir. 2007) (error rate of close to 50%, but probable cause still established).

243. Myers, *supra* note 47, at 35.

244. *Id.* (Law enforcement does it all the time in the Terry-stop context.).

cause.<sup>245</sup> If an educated and experienced officer can use his or her instincts to determine articulable facts for reasonable suspicion, the probability that narcotics are in the car is high, Myers proposes as much as 30 percent.<sup>246</sup> Under that circumstance, the probability of contraband presence is much higher and would thus raise the accuracy of the drug detection dog.<sup>247</sup> Applying Bayes' Theorem to Myers' probable cause determination (30% probability and 90% accuracy rate for the detection dog) would result in 79 percent probability that contraband is present.<sup>248</sup> Reasonable suspicion coupled with a detection dog's alert would be a more appropriate threshold for determining probable cause. Under this probable cause determination, the underlying probable cause obtained in *Illinois v. Caballes* would have been insufficient.<sup>249</sup>

## VII. MOVING FORWARD

Compounding the aforementioned problems in canine drug detection is the new legalization of marijuana movement among the states.<sup>250</sup> Should drug detection dogs be used at all in the State of Washington now, since presumably they were once rewarded and conditioned to alert to marijuana, a now legal substance in Washington? Larry Myers, an associate professor and veterinarian who often testifies as an expert on drug detection dogs, believes "defense attorneys are going to have a blast in Washington [State]." Defense attorneys might now attempt to discredit a detection dog if they have formerly been conditioned to detect marijuana. Some have suggested re-training the dogs to no longer alert to the presence of marijuana.<sup>251</sup> It is unclear how effective re-training a drug detection dog would be, but it would certainly be an expensive measure to re-train every drug

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245. *Id.*

246. *Id.* at 17.

247. *Id.*

248. *Id.*

249. *Caballes*, 543 U.S. at 409.

250. *Legalize-marijuana movement gains "significant" wins*, CBS NEWS (Nov. 5, 2014, 2:43 PM), <http://www.cbsnews.com/news/2014-midterm-elections-marijuana-okd-in-alaska-oregon-washington-dc/>.

251. Jane J. Lee, *Detection Dogs: Learning to Pass the Sniff Test*, NATIONAL GEOGRAPHIC (Apr. 7, 2013), <http://news.nationalgeographic.com/news/2013/04/130407/detection-dogs-learning-to-pass-the-sniff-test/>.

detection dog in the State.<sup>252</sup> And if a drug detection dog is not re-trained, it could alert to the presence of marijuana (a now legal substance), leading to a physical search when the police did not have the proper basis for such search.<sup>253</sup>

If a regular drug detection dog's reliability should be questioned, then a re-trained dog should be looked at with even more skepticism. These issues will only be exacerbated in the years to come if more states continue to legalize marijuana or a common medical derivative, CBD.<sup>254</sup> The Supreme Court's reliance on "bona fide organizations" to train these animals without defining what standards should be used makes evolving issues like these more complex. The Justices are not dog experts, but their unfamiliarity with the practices involved should not be an excuse to blindly accept the training results from facilities that produce subpar drug detection dogs. When a drug detection dog alerts to the presence of contraband, the likelihood of a crime being committed is much lower than the Justices assume. One can only hope that the Justices revisit a drug detection dog case and move further away (as they did in *Harris*) from their classification of a canine as *sui generis*.<sup>255</sup>

## CONCLUSION

The current Supreme Court approach to the nuances involved in drug detection dogs is fundamentally flawed. The Supreme Court has allowed, on the evidentiary front, the introduction of unscientific evidence into law enforcement practices, which allows officers to disregard traditional Fourth

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252. *Id.*

253. *Id.*

254. Kyle Whitmire, *Gov. Bentley signs Carly's Law to legalize marijuana-derived CBD oil prescriptions*, AL.COM, (Apr. 01, 2014, 5:25 PM), [http://blog.al.com/wire/2014/04/gov\\_bentley\\_signs\\_carlys\\_law\\_t.html](http://blog.al.com/wire/2014/04/gov_bentley_signs_carlys_law_t.html) (CBD has no psychoactive ingredients and is devoid of any THC.). As of mid-2015, 23 states and the District of Columbia have laws legalizing marijuana in some form, including recreational use in four states and D.C. See *State Marijuana Laws Map*, GOVERNING (n.d.), <http://www.governing.com/gov-data/state-marijuana-laws-map-medical-recreational.html>.

255. The Justices did not mention the term *sui generis* in their latest opinion on drug detection dogs in *Harris*, 133 S. Ct. 1050.

Amendment protections. As Justice Souter stated in *Cabellas*, “[T]he sniff alert does not necessarily signal hidden contraband, and opening the container or enclosed space whose emanations the dog has sensed will not necessarily reveal contraband or any other evidence of crime.”<sup>256</sup>

The Court’s classification of drug detection dogs in *Place* and *Caballes* as *sui generis* is unsubstantiated. As the studies demonstrate, a dog’s alert does not reveal contraband 100 percent of the time, and it may alert to legal substances.<sup>257</sup> The Court in *Caballes* also determined that a dog sniff alone was sufficient to establish probable cause for a physical search inside a vehicle. The Court should revise this treatment and consider Mr. Myers’ proposal for a dog sniff to be coupled with an officer’s reasonable suspicion to obtain the requisite level of probable cause for a search. Additionally the Court’s reliance in *Harris* on blanket terms such as “bona fide organization” and “training program” illustrates the Justices’ incomprehension of the complexities involved in such a process.<sup>258</sup> Finally, the Court in *Harris* inappropriately dismissed the very real financial incentive law enforcement has to maintain detection dogs that over-alert.

The Court or the Department of Justice should promulgate a set of national uniform standards to promote confidence in the effectuation of our laws, as well as bolster the accuracy of drug detection. The burden should not be on citizens to prove that a detection dog is reliable, but instead on law enforcement who have the resources for making such a determination through accurate record keeping in the field. Therefore, the Court should revisit its classification of drug detection dogs as *sui generis* and implement more objective national standards for detection dogs beyond the presumption of reliability in *Harris*.

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256. *Caballes*, 543 U.S. at 412–13.

257. *Id.* at 408 (The Court reasoned that a drug detection dog’s sniff was not a search within the meaning of the Fourth Amendment because it only revealed illegal conduct. The studies show that dogs alert to the presence of legal substances for various reasons and thus should not be granted such deference by the Court.)

258. The problems with training methods, handler manipulation, flawed recording measures, and perverse financial incentives all demonstrate the fallacy of the Court’s current treatment of drug detection searches and their reliability.

## APPENDIX



This figure<sup>259</sup> is a graphic design artist's rendering of Mr. Rick Farley's illustration of how a dog detects contraband odors.<sup>260</sup> The *source* represents the origin of the contraband odor molecules.<sup>261</sup> The gray circles represent the location of contraband odor molecules.<sup>262</sup> The odor molecules are more concentrated closer to the source and more dispersed farther away.<sup>263</sup> The gray area represents the dog's *scent cone*, the area within which the dog can detect odor molecules.<sup>264</sup> First a dog sweeps its nose back and forth in order to detect any odor molecules.<sup>265</sup> Once it detects contraband odor molecules, the dog will sweep back and forth as it detects higher and higher

259. Blake Maddox, a close friend and talented graphic design artist, generously produced this image of Mr. Farley's illustration.

260. Farley Interview, *supra* note 4.

261. *Id.*

262. *Id.*

263. *Id.*

264. *Id.*

265. *Id.*

concentrations.<sup>266</sup> The dog is then able to zero-in on the *source*, and alerts once it encounters the highest concentration of odor molecules.<sup>267</sup> The dog pinpoints the *source* of the odor molecules in a similar way to how you would play the game “Battleship”<sup>268</sup>: Once the dog detects a contraband odor molecule (or a battleship hit), it will circle that area until it picks up another molecule.<sup>269</sup> The dog is then able to pinpoint the exact location of the source based on the concentration levels of the odor molecules it detected (hits on the battleship).<sup>270</sup>

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266. *Id.*

267. *Id.*

268. *Id.*

269. *Id.*

270. *Id.*