

Title	A need for greater inclusivity and diversity in scent detection dog research: a reply to Lazarowski et al. and Byosiere et al
Authors	Troisi, Camille A.;Mills, Daniel S.;Wilkinson, Anna;Zulch, Helen E.
Publication date	2019
Original Citation	Troisi, C. A., Mills, D. S., Wilkinson, A. and Zulch, H. E. (2019) 'A Need for Greater Inclusivity and Diversity in Scent Detection Dog Research: A Reply to Lazarowski et al. and Byosiere et al', Comparative Cognition & Behavior Reviews, 14, pp. 87-89. doi: 10.3819/ccbr.2019.140010
Type of publication	Article (peer-reviewed)
Link to publisher's version	<a href="http://comparative-cognition-and-behavior-reviews.org/2019/volume-14-pp-87-89/">http://comparative-cognition-and-behavior-reviews.org/2019/volume-14-pp-87-89/</a> - 10.3819/ccbr.2019.140010
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Download date	2023-05-31 05:23:20
Item downloaded from	<a href="http://hdl.handle.net/10468/7732">http://hdl.handle.net/10468/7732</a>

# COMPARATIVE COGNITION & BEHAVIOR REVIEWS

## A Need for Greater Inclusivity and Diversity in Scent Detection Dog Research: A Reply to Lazarowski et al. and Byosiere et al.

**Camille A. Troisi, Daniel S. Mills, Anna Wilkinson, and Helen E. Zulch**

*School of Life Sciences, University of Lincoln*

In this response to the commentaries, we highlight the relevance of our approach to different challenges faced by working dogs and those working with them. We agree with Byosiere, Feng, and Rutter (2019) that sourcing dogs from nontraditional routes would be beneficial and highlight the importance of using our approach to realize the potential of these animals. Further, Lazarowski, Waggoner, and Katz (2019) highlight the importance of different cultural approaches to training; again, we believe that this, in combination with our suggested approach, is likely to be fruitful. Finally, we agree with the commentaries that it is essential to further investigate the mechanisms underlying performance to fully understand the factors that influence success in working dogs. Better understanding the factors that are important in shaping success in the field will be an essential step to reliably deploying more successful working dogs.

*Keywords: human animal interactions, welfare, working dog*

Byosiere, Feng, and Rutter (2019) and Lazarowski, Waggoner, and Katz (2019) expand the scope of our review (Troisi, Mills, Wilkinson, & Zulch, 2019) in two important but different directions.

In their commentary, Byosiere et al. (2019) highlight how working dogs can be sourced from the community, including shelters, and we fully support this initiative. Indeed, we believe our review increases the potential to take advantage of nonconventional methods for preparing and deploying scent detection dogs. As pointed out by Byosiere et al., these alternative sources have the potential to address a range of possible welfare concerns associated with the traditional kennel-rearing environment, though it should be noted that this is

not necessarily the case. To reliably realize the potential of animals from these alternative environments, it will be essential to recognize and act upon the points raised in our review. Increased variability in the form of both the handler and the dog need not be a problem and may provide a broader basis on which to select dogs for different forms of scent detection work and new opportunities. In some environments dogs must work and remain relatively close to the handler, but in others there may be advantages to having the dogs more closely integrated into the workplace should the environment allow it. For example, there is a growing, though largely qualitative, literature to support the benefits of dogs in the workplace (Barker, Knisely, Barker, Cobb,

& Schubert, 2012; Colarelli, McDonald, Christensen, & Honts, 2017; Cunha, Rego, & Munro, 2018; Hall, Wright, McCune, Zulch, & Mills, 2017; Norling & Keeling, 2010; Perrine & Wells, 2006; Wells & Perrine, 2001). Accordingly, there may be much to be gained by organizations currently deploying explosive detection dog teams to protect their staff, from considering more fully integrating dogs into the workplace. However, to do this successfully, these animals will need a complex social skill set that will allow them to operate efficiently, with appropriate welfare, and to ensure that the full advantages of the approach are realized. In this case, a wider base for recruitment may need to be considered alongside the development of appropriate “Life Skills” (Zulch & Mills, 2012). Comparing the performance of dogs sourced nonconventionally to those from more traditional routes in a range of work environments is critical to gain deeper insight into how the general physical and social environment of the dog interacts with the intrinsic predispositions of the individual to influence their working success. This is a critical area for future research, and we hope that our review, by articulating the range of potential factors of importance, will facilitate better controlled studies.

In relation to this, the point raised by Lazarowski et al. (2019) concerning the role of different cultural approaches to training and implementing scent detection dogs is important. This can affect not only the type of work that dogs are used for but also success and suitability in particular environments. There is currently an important gap in our knowledge relating to the impact of cultural differences on both how working dogs are used in different areas of the world and how this impacts on the development of the human–animal relationship and subsequent performance in different contexts. The factors we describe in our review will aid our ability to identify individual characteristics that increase the probability of a dog being successful for scent detection work and thus allow for increased variation in the developmental management and housing of working dogs without compromising performance (and potentially enhancing it).

We also agree with Lazarowski et al. (2019) that we need to go beyond an applied “performance”-based approach and develop a better understanding of the

underlying mechanisms that drive success in working dogs. To this end, as they point out, combining physiological, behavioral, and psychological measures is important. We believe that there is undoubtedly a wider role for the methods used in computational biology to help us more precisely elucidate the key factors underlying this complex system. This need not be limited to the identification of important neurophysiological signatures detected through fMRI highlighted by Lazarowski et al.

There is currently very limited evidence of clear genetic predictors of successful scent detection dogs. Breed seems to be a poor predictor of traits such as impulsivity (Fadel et al., 2016), and there appears to be a lack of large-breed differences on guide dog success (Goddard & Beilharz, 1983). This may reflect both the lack of breed homogeneity and the complexity of epigenetic influences, which we are only beginning to appreciate. Considering these points, it is not surprising that puppy tests have provided mixed results (Goddard & Beilharz, 1986; Slabbert & Odendaal, 1999; Svobodová, Vápeník, Pinc, & Bartoš, 2008); with Goddard and Beilharz (1983) finding only moderate heritability of clearly important and biologically based traits like fearfulness, with little heritability for other traits associated with the characteristics that result in rejecting scent detection dogs.

It is clear that the field of working dogs is an area of growing concern and importance, given emerging threats. Although our current understanding may be imprecise, it already indicates a wide range of potentially important factors that may serve as excellent models for improving our understanding of the complexities of mammalian development.

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**Author Note:** Daniel S. Mills, School of Life Sciences, University of Lincoln, Lincoln, LN6 7DL, United Kingdom.

Correspondence concerning this article should be addressed to Daniel S. Mills at dmills@lincoln.ac.uk.

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