

Canines trained on pseudo-explosives could not reliably identify the genuine article

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When it comes to teaching dogs how to sniff out explosives, there's nothing quite like the real thing to make sure they're trained right. That's the message from William Kranz, Nicholas Strange and John Goodpaster of Indiana University-Purdue University Indianapolis (IUPUI) in the US, after finding that dogs that are trained with so-called "pseudo-explosives" could not reliably sniff out real explosives (and vice versa). Their findings are published online in Springer's journal *Analytical and Bioanalytical Chemistry*.

Genuine explosive materials are traditionally used to train dogs to detect explosives and to test their performance later on. However, challenges arising from the acquisition, storage, handling and transport of explosives have motivated the development of "pseudo-explosive" or "pseudo-scent" training aids. These products attempt to mimic the odor of real explosives, yet remain non-hazardous. The intent is that a canine trained on a pseudo-explosive would be able to detect its real-life analog, and vice versa.

Using randomized blind testing, Goodpaster's research group tested how well a group of seventeen dogs were able to locate three types of explosives and their pseudo-versions: single-base smokeless powder, 2,4,6-trinitrotoluene (commonly known as TNT), and a RDX-based plastic explosive (Composition C-4).

In general, the dogs trained on simulated explosives could sniff out the genuine article only 14 percent of the time. Similarly, dogs trained on

real explosives responded to pseudo-explosives only 16 percent of the time. In fact, on the whole, the animals only had a nose for the materials upon which they were trained. For example, dogs trained on real explosives were able to locate them 81 percent of the time. Dogs trained with the pseudo-explosive versions had a very similar success rate of 88 percent.

The failure of the dogs to be "cross-trained" does not mean that the pseudo-explosives contain the wrong ingredients. Goodpaster's group determined via chemical analysis that the volatile compounds given off by pseudo-explosives consist of various solvents, additives and common impurities that are present in authentic explosives.

Ultimately, Goodpaster's group states that "the exceptional sensitivity of the canine's nose and the impressionable nature of its temperament have made canines a valuable tool when it comes to sweeping for hidden bombs and explosives. However, dogs trained on pseudo-explosives performed poorly at detecting all but the pseudo-explosives they were trained on. Similarly, [dogs](#) trained on actual explosives performed poorly at detecting all but the actual explosives on which they were trained."

More information: Reference: Kranz, W.D.; Strange, N.A.; Goodpaster, J.V. (2014). "'Fooling fido'—chemical and behavioral studies of pseudo-explosive canine training aids," *Analytical and Bioanalytical Chemistry*. [DOI: 10.1007/s00216-014-8240-7](https://doi.org/10.1007/s00216-014-8240-7)

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