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Report on the reliability testing of the odor identification method performed by specially trained service dogs of the Police of the Czech Republic

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Introduction

Reliability testing of the odor identification method was carried out within the Ministry of the Interior grant No. VF20102015011. The Police of the Czech Republic's own testing of the dogs' abilities to identify individual odors of people took place between January and October 2013 in the premises of the Training Center PP ěR Plzeň, Bílá Hora. Originally, the dog tests were to be held at individual regional workplaces, where dog handlers and their dogs regularly exercise comparison of odors during real service performance. However, for organizational reasons, the management of the Department of Service Cynology and Hippology of the PP of the Czech Republic decided that the testing would take place within periodic testing of service dogs in the training center. Not so, however failed to test all dogs with the specified category of practical use. In some In some cases, handlers with dogs did not participate in the test due to alleged dog fatigue or data collection they failed by not respecting the conditions of the experiment, when the comparison of odors was carried out before the arrival of the experimenter, so it was not possible to verify which dog actually performed the comparison. In one case, the handlers opened the jars and manipulated them without the experimenter present with them. They then refused to take part in the test, saying it was unclear which scent trail was in which glass.

It is also necessary to mention the tense atmosphere that accompanied the entire experiment. Our the original assumption that handlers will participate in the experiment willingly to demonstrate functionality of the method, turned out to be flawed. Despite the undeniable simplicity of the comparison odor samples, some dog handlers understood the testing as a form of bullying and an experiment



eliminate the implementation of MPI within the Police of the Czech Republic. The testing also disrupted the cooperation of the implementation team of the Czech University of Life Sciences in Prague and individual regional workplaces MPI on further experiments. In most cases, it was possible to collect data only on dogs that are the property of the university. All this was possible despite the considerable efforts of the professional guarantor of the project, Ing. Jaroslav Slabé and RT CZU staff, to explain the purpose of the research to the dog handlers.

Material and methodology

From the beginning of the fulfillment of the conditions of the project, the employees of RT ŷZU pointed out the incorrectness of the way in which the MPI is currently implemented under the conditions of the Police of the Czech Republic. Especially for the fact that the handlers themselves line up the samples and are therefore in the position of the target sample informed in advance. This can then lead to both intentional and unintentional influencing dogs. However, the experiment itself was prepared to match the conditions under which the MPI is currently carried out. As in the case of the real thing service, each dog handler received two pairs of glasses, which he had to compare with the dog and determine, whether they contain the smell of the same person or not. The handler therefore knew the position of the target sample and only knew whether the dog should mark it or not. The chance that the dog will mark the correct glass right by chance, it was 50%.

Odors were collected in such a way as to exclude the possibility of unwanted influence or entanglement of dogs and that the conditions of performance of the service are imitated as much as possible, but in some way ideal form. That is, so that the dogs work with only one smell if possible and not with a mixture different smells, as is the case in most real crime cases.

Clean glasses with ARATEX® odor sorbents were prepared by the employees of VS PP Plzeň and then transported to the Center for Dog Behavior Research (CVCHP) at the CZU in Prague. Here they were stored and no one came into contact with them, except for persons authorized to carry out the collection odor samples. However, the persons assigned to provide OPS (scent footprint) did not come to contact with glasses intended for collection of PVO (person odor sample) and vice versa. These the persons, on the one hand, underwent training on the implementation of sampling in VS PP Plzeň, and on the other hand, they were instructed in detail by the head of the CVCHP in such a way that it is excluded during the sampling itself the possibility of a situation where a different smell could get into the compared pairs of glasses the smell of the experimental subject (with the exception of the person performing the sampling).



Two types of odor samples were always prepared for the needs of the experiment. For one thing so-called odor footprints (OPS), which imitated the collection of odor samples from the dolické object, and on the one hand odor samples of persons (PVO) that were taken from the body experimental subjects. The experimental subjects were persons unrelated to CVCHP. OPS samples were provided by persons who were not CVCHP personnel, persons who they received PVO, they were CVCHP workers.

OPS subscription

Surgical steel tubes were chosen as the objects simulating the dolické objects dimensions 10 x 2.5 cm supplied by Medin, as These tubes were 15 minutes cleaned in an ultrasonic cleaner in a bath with a strong detergent solution at a temperature of 70°C. After they were dried for 30 minutes at a temperature of 180°C in a hot air sterilizer. After removing the smell and sterilization were placed in mason jars with twist caps that were previously cleaned in the same way as metal odor carriers. Treatment of these tubes and glasses performed by an experimenter who did not come into contact with the glasses intended for sampling experimental samples. No one from the experimenters who then participated in the collection and provision of odor samples.

The experimenter (person designated to provide OPS) with the experimental subject (offender) met at a pre-arranged place (outside the CVCHP building), opened a glass with pipe and had the experimental subject remove the pipe from the glass. She then moved away from the place for a period of 5 minutes while the experimental subject held the tube in his palm. After 5 min. he placed the pipe on the floor or table and walked away. The experimenter then secured the OPS from the tube using standard approved procedures, with the ARATEX® sorbent attached to the pipe surface for 30 min. Standard practice involved the use of treated sterile tools, disposable nitrile gloves and disposable aluminum foil. At the time of manipulation with OPS, there were no other persons at the site or in its vicinity. The glass is secured The OPS was marked with a randomly selected code, stored in a disposable plastic bag and transported to CVCHP, where it was stored. A protocol was drawn up on the provision of OPS, in two copies. On one, only the code, the designation of the experimenter and the circumstances of the seizure were given. The full name and contact details of the experimental subject were also given on the second copy.



PVO subscription

PVO collection was carried out approximately one week after provision of OPS, in some cases after 2-3 days. This schedule was intended to simulate the situation when the offender is apprehended a short time after the crime was committed. People's odor samples (PVO) were collected experimentally subjects selected and trained CVCHP staff. The sampling took place either in the open space or in various rooms of the ŷZU. The collection was never carried out in a space where provision of OPS was underway. The same room was never used to collect two people. During apart from the experimental subject, only the experimenter was present at the PVO sampling site. None of the experimental subjects were related to the rooms where the sampling was carried out. The actual collection of PVO was carried out for 20 minutes by applying the ARATEX® sorbent to the torso of the experimental subject, in compliance with the standard procedures valid for the Police of the Czech Republic. Handling of the sorbent was carried out in nitrile gloves using treated and sterile instruments. The glasses with the sorbent were stored in plastic after the end of sampling bags and transported to CVCHP, where they were temporarily stored.

Comparing smells

About a week before the actual comparison of odors, the jars with the odor samples together with the protocols were transported to VS PP CR Plzeň. A pair of scent jars was prepared for each service dog. Each glass was marked with a code that made it clear whether it is OPS or PVO. Both pairs of glasses were marked with the same serial number and letter "A" or "B" to make it clear which pairs of glasses need to be compared. Pair glasses were chosen so that all three possible variants were equally represented results, i.e. both pairs could contain the odor of the same person, or only one pair did the odor of the same person and the other did not, and in the third case neither of the two pairs contained an odor the same person. The result of the comparison could therefore be agreement in both cases, agreement in one case or no match. The task of the VS PP CR was to ensure a sufficient number additional odors, as is the case when the actual case is compared. On the day of the comparison, an experimenter from RT CZU came to the VS PP CR. However, he did not come to did not come into contact with the samples or manipulate them. His job was only to verify that it was not multiple comparisons (multiple pairs of smells) performed by one dog or whether multiple dogs do not perform comparing one pair of samples. This experimenter did not know which jars contained them



the same smell and which not. The handler built the scent line himself and then walked the dog comparison of smells. Which smell would be used as a sniffer and which as a target was completely up to you handler. The actual odor comparison took place according to valid police regulations. The result was recorded by an employee of the training center and countersigned experimenter. The results were not handed over to the experimenter and were kept in VS PP ŷR Plzeň until the final evaluation.

The results

The evaluation of the results took place at the end of 2013 in the premises of OSKH PP CR. An employee of the VS PP of the CR unsealed the envelopes with the results and they were compared with the records of sampling and provision of odors. 22 dogs out of 27 participated in the testing. In one case, one of the jars opened during transport and in one case the dog marked the target sample during random interest test. In both cases, the dogs performed only one pair comparison glasses. In accordance with police regulations, the comparison was made so that the handler was informed of the position of both the target sample during and during the random interest test self comparison. The position of the glasses and thus of the target sample was random after the test points of interest changed three times by the handler. In accordance with police regulations, he had after termination self-comparison of each pair of glasses to determine whether they contain the same smell or not. Thus, a total of 40 comparisons of pairs of glasses were made. From that the dogs did comparison in 25 cases correctly, i.e. they identified pairs of glasses in the event that contained the same odor and did not match if they did not. In 15 cases he was the comparison result is incorrect. 7 dogs performed both comparisons correctly. Both comparisons performed incorrectly by 2 dogs. The rest of the dogs matched one pair correctly and the other incorrectly. At 8 cases, the dogs marked a match between jars that did not contain the same odor.

In the statistical evaluation of the reliability of the odor identification method, a calculation was used using Bernoulli probability (Bernoulli probability). It describes the frequency of occurrence of a random phenomenon in n independent trials in which the phenomenon still has the same probability. If the detected probability (significance level) is less than 0.05 ($P \leq 0.05$), then they are identification results considered to be statistically significantly different from chance (random identification).



In the reliability test, the dogs performed the comparison correctly in 25 cases out of 40 comparisons. OF the calculated probability of these results was $P=0.0366$, i.e. smaller than the chosen level significance 0.05 ($P\leq 0.05$). If the handler does not know the result of the comparison, but is familiar with the current position of the target sample in the row, then the probability that there would be a comparison done correctly by mere chance is ruled out.

Based on the results achieved, it can be stated that dogs are able to compare olfactory odor with target odor. The result could not be achieved by chance and method odor identification is in principle usable.

When verifying reliability, handlers were always presented with two odors for comparison. When implementing the scent identification method, when the handler is familiar with the location of the target sample in a row, the probability of randomly correctly identifying both odors is 0.25 a chance of correctly identifying one odor by chance 0.5. These achieved values cannot be considered statistically significant.

Discussion and conclusion

The results of the test show that dogs are basically able to perform odor comparison. However, the error rate is so high that the usability of this method, if it is performed after existing conditions, as a means of proof practically excludes. It is particularly alarming a relatively high number of identifications of those pairs of odor samples that are actually identical they did not contain odors. During the practical performance of the service, it is not excluded that the handler is informed about other circumstances of the case, e.g. whether the suspect confessed or against him there is other evidence. The handler can thus unknowingly influence the dog's performance, and this could also happen explain the relatively high number of false identifications. It is also important the fact that, with the exception of one single case, the dogs performed correctly in all cases the so-called test of random interest. This test consists in comparing a pair of smells whose the handler knows the match, while the dog has to cross the smell without interest, which will be compared to the target in the next row. The purpose is to find out whether this smell is not attractive to the dog in itself. Thus, the dogs were able to positively identify a pair of control odors in almost all cases and cross over odor tested for a random point of interest, the position of which the handler knew, but in 15 cases they were not capable of the same performance if the handler was not informed of the result in advance. This



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the knowledge clearly indicates that, at least in some cases, they are dogs
influenced by changes in the handler's behavior during scent identification.

Based on the above knowledge, we can only conclude that the reliability above
the mentioned method is insufficient under current conditions and its use during criminal proceedings
management cannot be recommended.