Impact of sex, age and raising place on puppies’ aptitude test results

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Choosing a puppy, future owners ask questions on the dog’s sex, age and breed. The aim of this study was to determine if puppies’ sex, age and the place where they were raised had an impact on puppy aptitude test results. The study was based on puppies from breeding places from Poland, the Czech Republic, Germany and Slovakia, registered in the FCI (Federation Cynologique Internationale). In total, 259 German Shepherd puppies were examined, including 124 males and 135 females in the age of 6 to 9 weeks. As a research method, the modified PAT test was used. The $\chi^2$ independence test was used. The analysis of variance (ANOVA) was employed and essential differences between averages were verified by the application of Duncan test. While analyzing sex effect, statistically insignificant differences were observed but females reached better results in the puppy test than males. When observing age impact on the modified PAT test results, the best results were reached by the age group of 7-8 weeks. It was observed that the place of raising puppies had an impact on the puppy aptitude test. Statistically significant differences were recorded between the puppies at different age and raised in different places. The best results were obtained by the oldest puppies raised in breeders’ houses and moved to a kennel at the age of 5 weeks; the worst results were obtained by the youngest puppies raised in kennel from their birth. When comparing the effect of age and sex on the modified PAT test results, statistically significant differences were not found.

KEY WORDS: puppies / behaviour / modified PAT Test / age / sex

Dog’s behaviour and the possibility of its shaping during the puppy age, is very important, because dog is an animal living in the closest neighborhood of a man, often sharing a small space with him in an apartment. Among all animals that accompany a man, dogs show the greatest attachment to their owners by giving him noticeable mental and social advantages [10]. Tests can help in choosing a puppy; however, their credibility depends on their proper performing, as well as the experience and knowledge of person who interprets recorded results. When deciding on having a dog, a responsible future owner asks many questions on a breed, sex, age, and temperament of a chosen puppy. Answering them before the animal purchase would help preventing from a disappointment.
Most of puppy buyers have no plans on a role dog should play and they cannot verbalize it even if a responsible breeder wants to help in choosing the appropriate animal. Therefore, problems arise among dog owners who cannot cope with various forms of their animal’s behaviour, which could be avoided by choosing, e.g. less independent puppy from a litter. One should realize that at present, a dog became an animal living in a home for its owner’s pleasure, it has to be his company, and rarely makes works that is consistent to a given breed performance.

The research aimed at verifying whether puppy’s sex, age, and rising place affect the puppies’ aptitude tests results.

Material and methods

The study material consisted of puppies from breeding places registered in Polish Kennel Club as well as kennel organizations in the Czech Republic, Germany, and Slovakia being members of FCI (Federation Cynologique Internationale). In total, 259 German Shepherd puppies, including 124 males and 135 females at the age from 6 to 9 weeks were examined.

The study method was based on modified PAT test (Puppy Aptitude Test), which, in its new version, made possible to carry out the statistical analysis [2]. The PAT tests included social attraction and domination tests, as well as tests revealing inborn predispositions for fetching and cooperating with a man. Each tested behavior was scored from 1 to 6 points, where 6 stood for desirable, while 1 meant the unwanted dog’s behavior in its future training. Depending on total score reached in modified PAT test, some ranges describing a puppy’s behaviour from bad to very good, were divided as follows:

- 1-21 points – unsatisfactory,
- 22-30 points – satisfactory,
- 31-39 points – good,
- 40-48 points – very good.

The influence of age on reached test results and scores was subject to analysis. Mean results of modified PAT test for both sexes, maximum and minimum PAT results, as well as standard deviation, were calculated.

Not all puppies at exactly the same age were examined, thus the impact of age on reached PAT test result and achieved scores, as well as age influence on achieved scores depending on sex, could be analyzed. Puppies were divided into three age groups:

- I group – between 6 and 7 weeks (92 puppies, including 48 males and 44 females);
- II group – between 7 and 8 weeks (96 puppies, including 41 males and 55 females);
- III group – between 8 and 9 weeks (71 puppies, including 35 males and 36 females).

Average results of modified PAT test for three age groups, maximum and minimum PAT result, as well as standard deviation, were calculated.

The place of puppies’ raise was the environmental factor under consideration. Puppies were raised: in breeder’s house – 31 puppies (including 16 males and 15 females); in a kennel within a farm – 165 puppies (including 78 males and 87 females);
the third group was composed of puppies that were born in a breeder’s house, but at the age of 4-5 weeks were transferred to a kennel – 63 puppies (including 30 males and 33 females).

The $\chi^2$ independence test was used to verify whether the raising place had any influence on PAT test results. The hypothesis $H_0$ on an independence of the raising place on aptitude tests results for puppies was put.

Multiple variance analysis was applied to examine the dependencies between puppies’ sex, age, and raising ways; whereas the significance of differences between the mean values was verified, using Duncan test. All statistical processing was performed with a help of Statistica software.

**Results and discussion**

Results from modified PAT test related to 124 examined puppy males and 135 females are presented in Figure 1.

Analysis of sex effects revealed that puppy females achieved more very good scores than males that obtained more good scores. Mean values of PAT test results for males and females did not significantly differ and were ranked at similar level ($\bar{x}$=34.31 points for males, $\bar{x}$=34.78 points for females), at slightly higher variability within puppy males group (SD=6.72).
Scott and Fuller reported that males dominated over females in competition situations at the age of 8 weeks [4]. Wilsson and Sundgren observed considerable differences between different sex individual animals when performing the behavioral test on 8-week-old puppies [8]. Females were more active, independent, and curious for new objects than males. All puppies in above experiments were kept at the same conditions till the testing unlike animals in present experiment.

Puppies at the age 6-9 weeks get raised very quickly. When the influence of the age on modified PAT test results was observed, it was found that group II (7-8 weeks) achieved the largest number of very good scores, while the youngest puppies obtained the majority of good scores (Figure 2).

Comparison of average scores achieved by puppies from three observed age groups did not reveal statistically significant differences.

The $\chi^2$ independence test application made the $H_0$ hypothesis was rejected to the advantage of dependent variable hypothesis $H_1$. It was found that the place of puppies' raising had the impact on the results they achieved in modified PAT test. Analysis of mean results from modified PAT test for males and females depending on puppies' raising place revealed the best scores for puppy females that were raised at home and were transferred to the kennel at the age of 4-5 weeks. Puppies raised in kennels...
achieved the worst results and the differences were statistically significant at P<0.05 (Table 1).

Table 1 – Tabela 1
Average modified PAT results (pts) in maintenance and sex groups
Średnie wyniki testu (pkt.) dla różnych grup utrzymania i płci

<table>
<thead>
<tr>
<th>Sex/Maintenance - Pleć/Utrzymanie</th>
<th>Males</th>
<th>Females</th>
<th>Males</th>
<th>Females</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>house / dom</td>
<td>pieski</td>
<td>suczki</td>
<td>pieski</td>
<td>suczki</td>
<td>pieski</td>
<td>suczki</td>
</tr>
<tr>
<td>kennel</td>
<td>kojec</td>
<td>kojec</td>
<td>kojec</td>
<td>kojec</td>
<td>kojec</td>
<td>kojec</td>
</tr>
<tr>
<td>n</td>
<td>16</td>
<td>15</td>
<td>78</td>
<td>87</td>
<td>30</td>
<td>33</td>
</tr>
<tr>
<td>x</td>
<td>36.00</td>
<td>35.73</td>
<td>33.31</td>
<td>33.67</td>
<td>36.00</td>
<td>37.27</td>
</tr>
<tr>
<td>SD</td>
<td>5.73</td>
<td>5.28</td>
<td>6.91</td>
<td>6.46</td>
<td>6.36</td>
<td>4.92</td>
</tr>
<tr>
<td>min.- max.</td>
<td>23-45</td>
<td>24-41</td>
<td>17-45</td>
<td>20-46</td>
<td>20-46</td>
<td>29-45</td>
</tr>
</tbody>
</table>

To mark the differences in table, the following rule has been applied:
designation in lower case concerns significance at P<0.05 and means differences are significant;
differing data was put together according to a-b scheme
Dla oznaczenia różnic w tabeli przyjęto następującą zasadę:
oznaczenie małymi literami dotyczy istotności dla P<0.05 i oznacza różnice istotne;
dane różniące się między sobą oznaczono wg schematu: a-b

Experiments carried out by Seksel et al. indicated that all analysis referring to the
sex effects appeared to be insignificant, while puppy males and females did not differ
in their reactions to stimuli during the tests [5]. Those results were opposite to findings
from the studies by Hart and Hart [3] who suggested that puppy females were easier to
train than males, whereas Wright and Nesselrote [9] reported that puppy males were
more often found to manifest aggressive behaviour.

The effects of puppies’ age and their raising conditions on average PAT test results
were also analyzed (Table 2). Statistically highly significant differences in average
results from modified PAT test between the oldest puppies (8-9 weeks) raised at home
and transferred to a kennel at 5 weeks of age (the best scores) vs. the youngest puppies’
group (6-7 weeks) raised in kennel only (the worst scores).

Analysis of sex and age impact on puppies’ aptitude test revealed that results
reached by males and females within separated age groups were similar (Table 3).

Any statistically significant differences between puppies’ sex and age vs. mean
aptitude test scores, were not recorded. The largest oscillations of average results
occurred in male group at 8-9 weeks of age.

Experiments performed by Wilsson and Sundgren did not confirm that the age of
tested puppies had any influence on majority tests’ results [8]. However, highly signi-
ficant age impact was observed at females in the contact test (time spent by a puppy
### Table 2 – Tabela 2
Average modified PAT results (pts) in age and maintenance groups
Średnie wyniki testu (pkt.) dla grup wiekowych i grup utrzymania

<table>
<thead>
<tr>
<th>Maintenance/Utrzymanie</th>
<th>Age (weeks)</th>
<th>n</th>
<th>x</th>
<th>SD</th>
<th>Min. – Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>House/Dom</td>
<td>6-7</td>
<td>31</td>
<td>35.88</td>
<td>5.43</td>
<td>23 – 45</td>
</tr>
<tr>
<td>Kennel</td>
<td>6-7</td>
<td>51</td>
<td>32.60*</td>
<td>5.92</td>
<td>20 – 46</td>
</tr>
<tr>
<td>Kojec</td>
<td>7-8</td>
<td>52</td>
<td>33.40</td>
<td>6.51</td>
<td>19 – 44</td>
</tr>
<tr>
<td>8-9</td>
<td>62</td>
<td></td>
<td>34.15</td>
<td>7.36</td>
<td>17 – 46</td>
</tr>
<tr>
<td>House/Kennel/Dom/Kojec</td>
<td>6-7</td>
<td>10</td>
<td>32.80*</td>
<td>4.38</td>
<td>23 – 40</td>
</tr>
<tr>
<td>7-8</td>
<td>44</td>
<td></td>
<td>37.29</td>
<td>5.93</td>
<td>20 – 46</td>
</tr>
<tr>
<td>8-9</td>
<td>9</td>
<td></td>
<td>38.11**</td>
<td>3.02</td>
<td>34 – 43</td>
</tr>
<tr>
<td>Total – Razem</td>
<td></td>
<td>259</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To mark the differences in table, the following rule has been applied:
designation in lower case concerns significance at P≤0.05 and means differences are significant;
designation in capitals concerns significance at P≤0.01 and means differences are highly significant;
differing data was put together according to a-b scheme

Dla oznaczenia różnic w tabeli przyjęto następującą zasadę:
oznaczenie małymi literami dotyczy istotności dla P≤0.05 i oznacza różnice istotne;
oznaczenie dużymi literami dotyczy istotności dla P≤0.01 i oznacza różnice wysoko istotne;
dane różniące się między sobą oznaczono wg schematu: a-b

### Table 3 – Tabela 3
Average modified PAT results (pts) in age and sex groups
Średnie wyniki testu (pkt.) dla grup wiekowych i płci

<table>
<thead>
<tr>
<th>Sex/Płeć</th>
<th>Age (weeks)</th>
<th>n</th>
<th>x</th>
<th>SD</th>
<th>Min. – Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>6-7</td>
<td>48</td>
<td>33.17</td>
<td>5.87</td>
<td>20 – 45</td>
</tr>
<tr>
<td>Pieski</td>
<td>7-8</td>
<td>41</td>
<td>34.63</td>
<td>7.14</td>
<td>18 – 46</td>
</tr>
<tr>
<td>8-9</td>
<td>35</td>
<td></td>
<td>35.49</td>
<td>7.23</td>
<td>17 – 45</td>
</tr>
<tr>
<td>Females</td>
<td>6-7</td>
<td>44</td>
<td>34.52</td>
<td>5.63</td>
<td>23 – 46</td>
</tr>
<tr>
<td>Suczki</td>
<td>7-8</td>
<td>55</td>
<td>35.60</td>
<td>6.04</td>
<td>20 – 45</td>
</tr>
<tr>
<td>8-9</td>
<td>36</td>
<td></td>
<td>33.83</td>
<td>6.92</td>
<td>20 – 46</td>
</tr>
<tr>
<td>Total – Razem</td>
<td></td>
<td>259</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The fact that age of tested animal was crucial at females unlike at males, indicates different behavioural changes associated with their pubescence. Despite of that, the above authors suggested that tests using puppies should be performed at older age when their behaviour was more adult. Earlier, Goddard and Beilharz drew similar conclusions when assessing guide dogs for blind people in Australia [1].
Study carried out by Slabbert and Odendaal proved that three tests appeared to be the most efficient in predicting: willingness to retrieve at 8 weeks of life and aggression tests at 6 and 9 months of age [6].

Present study refers only to German Shepherd dogs. Other authors observed differences in behaviour of various breed puppies during particular tests; hence, those differences should be taken into account at puppies' assessment. The example of breed differences can be the experiment conducted by Wilsson and Sundgren, in which German Shepherd and Labrador Retriever dogs [7]. However, the experiment was concluded that the same behavioural test may be applied to choose different types of service dogs, even different breeds.

It should be stated that no statistically significant difference between puppies’ sex and aptitude test results was recorded in performed examination. Puppies’ age had neither considerable influence on results from modified PAT test, although older puppies reached slightly better scores, which is consistent with other authors’ observations. Statistically highly significant differences were found when comparing the age groups raised under different conditions. The oldest puppies raised at breeder’s home till the 5 weeks of life then transferred to the pen, achieved the best results, while the youngest ones that were kept only in pen since their birth – the worst ones.

REFERENCES