

An Empirical Study of Some Astrological Factors in Relation to Dog Behaviour Differences by Statistical Analysis and Compared with Human Characteristics

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Abstract—A survey of 500 pedigree dogs was carried out in the Paris region. For each dog, six behavioural traits were determined and ten of their astrological traits were retained. A statistical interpretation of the possible relationships between the two sets of traits was performed based on permutation tests. Two strong associations were detected between the angular positions of Jupiter and the Sun, and the extraversion dominant trait. There were indications of other associations. These associations have a remarkable resemblance to the standard associations usually proposed in "human" astrology.

Keywords: behaviour—dogs and humans —permutation test—astrology—survey

Introduction

For an empirical study, the dog is an appropriate subject for the investigation of possible relationships between birth time and the position of sky elements of the solar system. The precise aim of this study is to see if behavioural differences, attributable to these, appear in two-month-old dogs. There are of course differences between animals and humans but it seems reasonable to describe a dog's behaviour with the usual descriptions employed by breeders even if these seem anthropomorphic. There is also a recognizable proximity of psychological relationships between dogs and humans compared with other animals (e.g. the cat, the rabbit or the snake).

The first position of the Sun in its ecliptic course, and at the same time, positions of the Moon and planets, the rising (Ascendant) and setting (Descendant) points, the highest (Mid Heaven) and lowest (Nadir) points within the 24 hours of a day were defined. This applied one of the classical tools of astrology, according to which a sky element situated in one of the four described points (= "Angular", \pm or -10°) is particularly important in determining behaviour. It must be emphasized here that, so far, almost no scientific confirmation has been sought for this. Other classical tools of astrology, such as signs of the zodiac related to the seasons, are impossible to investigate due to the

irregular fertility of females during the year (most births take place in spring and autumn).

The results obtained for dogs are then compared with those classically described in human astrology.

Methods

Organisation of the survey

A population of 500 pedigree dogs was identified by one of the researchers (S.F.B.). Pedigree dogs were used because breeders are always particularly attentive to the conditions of birth, given the potential value of the pups. Thus, when a female begins to give birth, a breeder will stay patiently by the mother day and night, ready to take the pups, note the time, individual colours and so on. When they sell the young dogs they need very precise information to answer the buyer's questions. Purchasers frequently want to know the time of birth, the order of births in the litter (was my dog first, second, or last? and so on . . .), how the pup behaved in its first few days and weeks of life. As the pups must live with their mother and cannot be sold until they are two months old, their behaviour is very well documented over this period. Every breeder of pedigree dogs keeps a very precise diary, where all this information is carefully entered for each animal, the individuals being identified either by colour differences (zones, patches, spots and so on) or in the case of uniform coloration, by means of a cropped area of the coat. (The official book, called "LOF" in France, records pedigrees and births.)

It was decided to use different breeds of pedigree dogs to prevent any bias linked to a given breed. They were: Bearded Collie, Belgian Shepherd, King Charles Spaniel, Chihuahua, Coton of Tulear, French Bulldog, German Shepherd, Labrador, Lhasa Apso, Malinois, Poodle, Sharpei, Shitzu, Tibetan Spaniel, and Yorkshire Terrier. Geographically, the kennels were all in the Paris area to ensure easy contact with the breeders.

The breeders who agreed to participate have no special knowledge of, or interest in, astrology. Over a period of five years, a total of 100 litters were investigated, from two to eight pups in each, for a total of 500 pups. Twelve breeders participated (see acknowledgments).

Recorded traits

For behavioural traits, data from the breeders were used. They noted all behavioural characteristics in detail during the two first months of the pups' lives. The breeders' notes were freely written in ordinary language. Information collected for the experiment was summarized according to Pr. Eysenck's method (1975) by expressing behaviour under "Extraversion" and "Neuroticism", giving six well defined items. They are detailed in Table 1 and the transcription

TABLE 1
Description of the Six Behaviour Traits: Codings and Associated Distributions for the 500 Dogs

Behaviour trait	Coding	Presence (+)	Absence (-)
Extraversion active	EA	237	263
Extraversion dominant	ED	120	380
Extraversion reserved	ER	137	363
Neuroticism affective	NA	194	306
Neuroticism nervous	NN	43	457
Neuroticism steady	NS	182	318

from the free description is given in the Appendix. The different items are scattered over the entire range of births in the litters. There are many personality theories and various systems of behavioural description; we have chosen Eysenck's method as most appropriate to classify the very detailed observations of breeders because of its simplicity and non-subjectivity. For example, a dominant dog and a dominant human demonstrate the same characteristics – except, of course, for the absence of those involving speech. Whereas one can describe a dominant human as being a "powerful speaker" or being able to "capture his audience's ear" etc., these qualities would hardly be adaptable to a canine subject (without changing the meaning).

Numerous methods exist for the study of personality. Eysenck's was chosen for this study largely because of the arguments of its creator, summarised as follows: "To find out the laws according to which this may happen, and to isolate the major dimensions along which we can classify people, seems to me a fundamental and critically important part of psychology [...]. These three major dimensions (P–E–N = psychoticism, extraversion, neuroticism) emerge from practically any large-scale analysis of traits published in the literature" (Eysenck, 1990).

The most important element is the group of behaviours attributed to each major trait derived from the PEN and these are easily recognised in the descriptions given by the breeders. The six major traits retained for this study are thus not just abstract characteristics but the result of pragmatic observations (see Appendix).

Insofar as the question of ascribing human traits to animals is concerned, the issue was addressed by Eysenck himself for whom this transposition was not only valid but an objective criterion: "... another criterion for the acceptability of major dimensions of personality, namely that they should be apparent not only in humans, but also in animals ..." (Eysenck, 1990). McFarland (1990) makes the same point.

Finally, the age of the dogs, two months at final evaluation, was considered satisfactory on the one hand because of the difference between the lifespan of dogs and of humans, and on the other because all breeders agree that behavioural structures of pups are formed very early in the context of the social group consisting of the bitch and her litter.

TABLE 2
Codings for the Ten Planets and Distributions of the 500 Dogs^a

Astrological Trait	Coding	Angular (+)	None (-)
<i>Sun</i>	Su	107	393
<i>Moon</i>	Mo	106	394
<i>Mercury</i>	Me	110	390
<i>Venus</i>	Ve	88	412
<i>Mars</i>	Ma	113	387
<i>Jupiter</i>	Ju	109	391
<i>Saturn</i>	Sa	93	407
<i>Uranus</i>	Ur	109	391
<i>Neptune</i>	Ne	99	401
<i>Pluto</i>	Pl	105	395

Note: Angular (+) = rising, setting, upper and lower culminations of the sky elements.

For astrological traits, the following ten sky elements were considered: Sun, Moon and eight planets of the solar system (Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto). All are usually defined as "Planets" in traditional astrology.

As described above in the introduction, the unique astrological criterion applied is the "angular" position of the sky elements, that is, rising, setting and highest and lowest points at the place and time of the birth. As the earth rotates, each element rises, sets and reaches its highest and lowest point every 24 hours either in the visible sky or, in the case of the lowest point, sometimes in that part of the sky which is invisible. The whelping of a bitch is always a slow process and the intervals between the birth of successive pups can vary between 15 minutes and two hours. This factor makes dogs particularly appropriate for this study.

The distribution of the 500 dogs is given in Table 2 (program "Astrosc" from Aureas, 30, rue Cardinal Lemoine, 75005 PARIS France).

Statistical Analysis

The objective was to explore possible links between behavioural traits and astrological traits. Rather than use sophisticated multivariate approaches such as correspondence factorial analysis, which are not always easily interpreted and from which it is not appropriate to draw inferences, it was decided to practice simple and well-known non-parametric tests for each of the 60 behaviour traits in planet traits combinations.

As an example, let us consider the 2×2 frequency table associated with Jupiter (Ju) and extraversion dominant (ED) which is a sub-table of Table 3. 44 pups are (Ju+,ED+), 65 are (Ju+,ED-), 76 are (Ju-,ED+) and the majority of them, 315, are (Ju-,ED-). To assess the degree of association between the two traits, we used the proportion of the ED+ dogs positive for the planet. That is $44/120 = 0.367$. It is worth mentioning that given the total margins of the table (109,

TABLE 3
 Joint Distributions of the Dogs for Each Combination of Astrological Traits (in Rows)
 and Behaviour Traits (in Columns)"

	EA+	EA-	ED+	ED-	ER+	ER-	NA+	NA-	NN+	NN-	NS+	NS-
Su+	56	51	42	65	24	83	43	64	7	100	42	65
Su-	181	212	78	315	113	280	151	242	36	357	140	253
Mo+	48	58	21	85	35	71	33	73	10	96	39	67
Mo-	189	205	99	295	102	292	161	233	33	361	143	251
Me+	50	60	35	75	25	85	47	63	9	101	37	73
Me-	187	203	85	305	112	278	147	243	34	356	145	245
Ve+	43	45	18	70	27	61	39	49	8	80	29	59
Ve-	194	218	102	310	110	302	155	257	35	377	153	259
Ma+	52	61	31	82	29	84	48	65	5	108	44	69
Ma-	185	202	89	298	108	279	146	241	38	349	138	249
Ju+	58	51	44	65	20	89	48	61	8	101	38	71
Ju-	179	212	76	315	117	274	146	245	35	356	144	247
Sa+	38	55	26	67	24	69	29	64	12	81	38	55
Sa-	199	208	94	313	113	294	165	242	31	376	144	263
Ur+	53	56	23	86	30	79	46	63	8	101	37	72
Ur-	184	207	97	294	107	284	148	243	35	356	145	246
Ne+	47	52	26	73	25	74	47	52	7	92	37	62
Ne-	190	211	94	307	112	289	147	254	36	365	145	256
Pl+	55	50	20	85	33	72	41	64	12	93	32	73
Pl-	182	213	100	295	104	291	153	242	31	364	150	245

Note: Each 2 X 2 sub-table comprises all 500 dogs. The two most significant sub-tables are in bold.

391, 120, 380) this statistic is equivalent to all scores one can imagine to measure the link between the two traits (one degree of freedom is involved). For instance, the odds of the behavioural trait among the Ju- dogs ($761315 = 0.241$) can be expressed as $(120[1 - 0.367]) / (391 - 120 [1 - 0.367])$.

For the same reason, the Chi-square statistics of independence can be expressed as a function of this proportion, so our permutation test is equivalent to the Chi-square test. The advantage of the proportion is that the type of association (positive = high proportion; negative = low proportion) is preserved.

Once a proportion has been computed, the existence of a significant association between the two traits must be tested. To this end the classical procedure of permutation tests (Good, 2004) was used. The principle is simple: under the null hypothesis of no effect a large number of similar samples of data (having the same margins) are simulated. For each of them the proportion is computed, providing an empirical distribution where no effect is present. This must be done for a sufficient number of simulations, say N, with respect to the level of the test, say α , one wants to perform. Finally the observed proportion is compared to this distribution, and if it is outside the ($\alpha/2$ quantile, $[1 - \alpha/2]$ quantile) interval, then the effect is declared significant.

To perform the random permutations, the elementary data set can be seen as a matrix of 500 rows by two columns, where rows correspond to dogs and columns to the two traits. A (1,1) row means that the corresponding dog is

positive for both traits; a (0,1) row means that the corresponding dog is negative for Ju trait but positive for ED trait; and so on. The number of (1,1) rows is 44, the number of (0,1) rows is 76, and so on. If there is no link between the two columns, we can permute without consequence the first column giving rise to different numbers of (1,1), (0,1), (1,0), (0,0) dogs but keeping 120 ED+ dogs, 380 ED- dogs, 109 Ju+ dogs and 391 Ju- dogs. A new proportion can be calculated and stored. This is done N times.

Another point deserves some consideration: the level α at which the tests were performed. The traditional level is 5%: $\alpha = 0.05$. However in the present case, 60 tests were carried out on the same set of data. If this level were used and no links existed between any of the pairs of traits, we would nevertheless expect to see about three ($=0.05 \times 60$) significant tests. To avoid this inconvenience, the 5% level was used globally, dividing it by 60 (using $\alpha/2 = 0.0004$) according to a majoration known as Bonferroni inequality. This resulted in a substantial decrease in the probability of stating significant effects, that is, producing a very conservative procedure. The less stringent correction proposed by Benjamin & Hochberg (1995) was also used. To obtain sufficient precision for such extreme quantiles, $N = 1,000,001$ permutations was chosen. In this case the number of values greater or less than the target quantile of $\alpha/2 = 0.0004$ is 400 simulated values. This is the traditional statistical theory. P-values were computed for each test, giving the significance for every level. If the P-value is 0.02, then the corresponding test is significant for greater levels (e.g. 5%), and not significant for lower levels (e.g. 1%).

It is worth noticing that a possible litter effect is not taken into account, and could bias the planet effect under study. But due to the fact that whelping takes several hours, pups belonging to a same litter have different planetary positions, and the consequence of neglecting such an effect is attenuation of the planet effect.

Using this approach, two planets were found to have an effect on the same trait of behaviour. It was therefore decided to examine the possible interactive effect of the planets. To this end, the planet1 \times planet2 \times behaviour trait table ($2 \times 2 \times 2$) was considered as a 4×2 table, with four rows associating the combination of planets and two columns for the behaviour trait.

This provided a Chi-square of independence with three degrees of freedom that was further broken down, nesting the two planets' effects according to the two possibilities.

Results

The distribution of the dogs over all combinations of behaviour trait and astrological trait is given in Table 3. The main results of the statistical tests are proposed in Table 4 and for trait ED in Figure 1. For the global level of $\alpha = 0.05$, Hochberg's correction and Bonferroni correction gave identical results: two significant tests out of the 60. These are the associations between ED and Jupiter

TABLE 4
 Indications for Each Behaviour Trait Detected by Statistical Analysis and Classical Signification
 Attributed in Traditional Astrology for Humans^a

Behaviour trait	Associated planet (with P-values of significance)	Traditional interpretation for humans
EA (active)	Jupiter in excess (-, 0.069) Saturn in deficit (-, 0.099)	Active, extravert, sociable, charismatic Not reserved, not introvert
ED (dominant)	Jupiter in excess (***, 0.000) Sun in excess (***, 0.00002) Mercury in excess (*, 0.012) Pluto in deficit (-, 0.112)	Active, extravert, sociable, charismatic Strong personality Communicative ?, various interpretations
ER (reserved)	Jupiter in deficit (*, 0.009) Sun in deficit (-, 0.12) Moon in excess (-, 0.059)	Non-dominant, non-charismatic Non-sociable, weak personality Sensitivity
NA (affective)	Moon in deficit (*, 0.042) Neptune in excess (*, 0.019)	Insensitive, Dreamy
NN (nervous)	Saturn in deficit (-, 0.059) Mars in deficit (*, 0.047) Saturn in excess (*, 0.038)	Unthinking Lacking in force Introvert
NS (stable)	Pl in deficit (-, 0.095)	?, various interpretations

Note: Effects are indicated as follows: planet effects detected (***) ; strongly suggested (*); and suggested (-). By detected, we mean that it is considered significant at 0.0002; by strongly suggested, that it is considered significant at 10%; and by suggested, that it is considered the strongest effect among the ten planets, or almost 10% significant.

and between ED and the Sun and they are amazingly strong. The drastic level we used for the Bonferroni test was far from exceeded. It is striking that not one of the 1000001 proportions computed for Jupiter was greater than the observed value. Some other much less impressive associations are suggested and these are shown in Table 4.

Concerning the effect of Jupiter and the Sun on the same behaviour trait (ED), possible interaction was analysed in the $(2 \times 2) \times 2$ table (Table 5). No additional effect was found among dogs positive for both Jupiter and the Sun. Both planets have a strong effect but it does not appear to be cumulative.

Discussion and Conclusions

This empirical study demonstrates that some relationships exist between the moment of birth of dogs characterized by the "angular" positions (e.g. rising, setting and upper/inferior culminations) of astrological planets, and independently assessed behaviour traits. They appear particularly strong in the case of dominant dogs influenced by the Sun, Jupiter and, to a lesser extent, Mercury.

The effects must be compared with one of the tools of classical human astrology concerning the relationship described (Fuzeau-Braesch 2004; Lewis 2003) for births with the Sun and Jupiter in these "angular" positions. Humans in this category are generally described as charismatic, dominant, strong, sociable and influential in a group. This is obviously comparable with the canine

ED (120 1380 +/- dogs) and 1000001 simulations

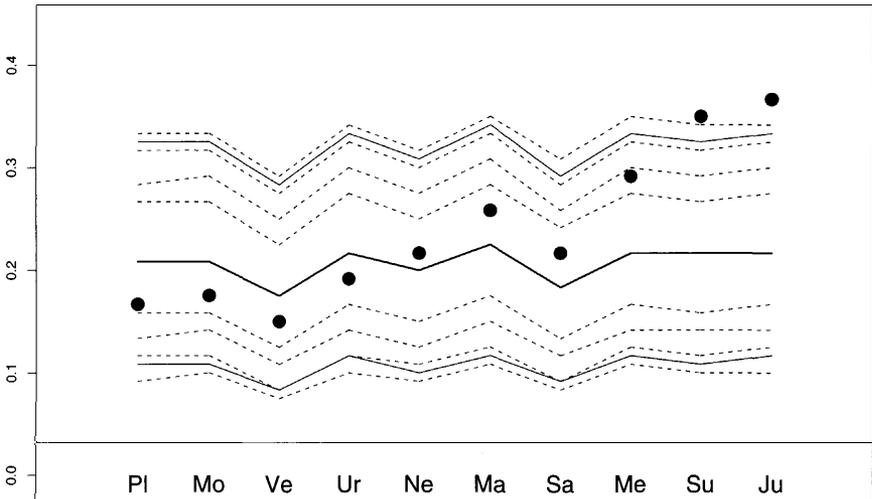


Fig. 1. For the ED behaviour trait, the proportion of positive dogs for each of the ten planets is displayed (dots). The lines show the empirical distribution computed by the permutation tests: the (heavy) solid line is the median, the dashed lines are respectively, from bottom to top, the quantiles 0.0001, 0.0004 (solid), 0.001, 0.01, 0.05, 0.95, 0.99, 0.999, 0.9996 (solid), 0.9999. Planets have been ordered according to their P-values.

equivalent where the corresponding pup holds a dominant position among its peers during its two first months of life. It is always the first to eat and this is accepted by the entire group, and it will push the others away with impunity to get the attention of human attendants or just to move around, breeders report. This parallel is remarkable and can not be due to chance.

Other effects are no more than suggestions; probably a larger sample of dogs would be necessary to detect them statistically with greater confidence. Nevertheless, there are striking similarities with traditional human astrology indicated in Table 4. Notable among them are those concerning the Sun, the Moon, Mercury, Mars, Jupiter, Saturn and Neptune. A "nervous" (NN) dog is often born with Saturn in an "angular" position, which may result in a tendency to

TABLE 5
Distribution of the 500 Dogs According to Jupiter, the Sun and the Extraversion Dominant Trait

	ED+	ED-
Ju+ and Su+	10	12
Ju+ and Su-	34	53
Ju- and Su+	32	53
Ju- and Su-	44	262

introversion. A lack of Mars can be a weakening influence and this, too, can result in a sensitive and timid animal.

The results for the "reserved" (ER) animals must also be considered here: they show Jupiter and the Sun in deficit: they are non-dominant, non-sociable, sensitive with the Moon in excess, which is also remarkably similar to classical interpretations for humans. An ambiguity must also be noted in the "affectionate" (NA) case. This term is always used by breeders for dogs which like being picked up and are happy to be handled: this is difficult to interpret. No convincing results have been obtained for "stable" (NS).

It may be underlined that the results are all the more convincing in that the tools we applied (description of behaviour, classical astrology) are not commonly in use for dogs.

The similarity between observations of dogs and human astrological descriptions can only be explained by the existence of a physical causal effect, so far unknown. Dogs seem to react in a very similar way to that which would be predicted by one of the classical astrological rules for humans, the "angular" sky elements. This eliminates the argument frequently advanced to "explain" this astrological tool; the fact that the human mother, knowing the birth chart of her children, influences her child in the "right" direction. Clearly no such cultural factor can occur in dogs. It is also difficult to evoke a factor of hereditary nature. For such a factor to be effective, all pups of a given letter should be borne under the same planet position, which is not the case due to the duration of whelping. Indeed, pups coming from the same litter have different behaviours and different sky positions.

Thus it must be supposed that a causal physical influence exists. It is worth recalling here various studies on the reception of waves emanating from sky elements, particularly the Sun and Jupiter. It is well known that in short wave radio, for example, receivers must be retuned at the rising, the culmination and the setting of the Sun, this being a result of the ionosphere acting as a plasma (Soloviev, 1998). Jupiter has also been much studied for its own waves which reach the Earth in spite of its magnetic environment (Rogers, 1995; Rosolen et al., 2002). Planetary magnetospheres of the various elements of the solar system are now a subject of new and vigorous research with spacecraft observation. They are very dynamic objects (Blanc et al., 2005) and it is not inconceivable that the time may be ripe to consider interdisciplinary work between astrophysics and astrology.

These observations in dogs must be followed up by much further similar research, in the search for more insight into the veracity and the limits of astrology. This is all the more necessary as so very few studies of the subject, anywhere in the world, have been so far recognized as scientific (Dean & Mather, 1977), with the exception of those of Gauquelin (1973, 1982) on angular planets and professions.

In future, studies may also concern the cognitive sciences linked to the organization of behavioural differentiation of individuals.

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APPENDIX

List of words used by the breeders (translated terms with original French terms) to describe the behaviour of pups, and how the words were associated with the six behaviour traits in the study.

ACTIVE (**actif**)

- Active – actif
- Bold – audacieux
- Rascally – coquin
- Daring – culotté
- Curious – curieux
- Clever – débrouillard
- Bright – dégourdi
- Impudent – effronté
- Wide-awake – éveillé
- Expressive – expressif
- Frisky – exubérant

Go-getter – fonçeur
 Cheerful – gai
 Noisy – gueularde
 Playful – joueur
 Crafty – malin
 Responsive – réactif
 Animated – remuant
 Spontaneous – spontané
 Lively – vivant
 Roguish – voyou
 Vivacious – vif

DOMINANT (dominant)

Aggressive – agressif
 Belligerent – bagarreur
 Strong character – caractère fort
 Boss of the litter – chef de la portée
 Determined – décidé
 Dominant – dominant
 Shameless – effronté
 Strong – fort
 Greedy – gourmand
 Eats well – mange bien
 Snappy – mordant
 Doesn't give in – ne ckde pas
 Gets what he wants – obtient ce qu'il veut
 Afraid of nothing – peur de rien
 Knows what he wants – sait ce qu'il veut
 Happy everywhere – se plait partout
 Beguiling – séducteur
 Sociable – sociable

RESERVED (réservé)

Aloof – à l'écart
 A little silly – bêta
 Always give in – ckde toujours
 Timorous – craintif
 Discreet – discret
 Distant – distant
 Dominated – dominé
 Sleepy – dormeur
 Not dominant – non dominant
 Unaggressive – pas agressif
 Unplayful – pas joueur
 Timid – réservé
 Self-effacing – s'écrase devant les autres
 Solitary – solitaire
 Touchy – susceptible
 Shy – timide

AFFECTIVE (affectueux)

Affectionate – affectueux

Likes petting – câlin

Confident – confiant

Gentle – doux

Tender – tendre

NERVOUS (nerveux)

Sensitive – sensible

Diffident – effacé

Impressionable – impressionnable

Nervous – nerveux

Easily frightened – peureux

Whiny – pleureur

Whimperer – pleurnichard

Wild – sauvage

Restless – agité

STAIID (stable)

Staid – stable

Compliant – adaptable

Pleasant – agréable

Friendly – aimable

Demonstrative – avenant

Cool-headed – bien dans sa tête

Relaxed – décontracté

Balanced – équilibré

Good character – heureux caractère

Independant – indépendant

Not dominant – non dominant

Not afraid – pas craintif

Calm – pas nerveux

Not shy – pas timide

Fits in anywhere – s'adapte à toute situation

Sedate – sage

Sure of himself – sur de lui

Quiet – tranquille

EDITORIAL COMMENTARY

The reviewers raised several points that readers should note.

First, are there any independent data to justify applying to dogs a scheme developed for humans? Any precedents? Moreover this scheme is only one among many that have been proposed—there is no mainstream consensus among astrologers.

Second: the classification of descriptors would have benefited from input from some disinterested outsiders, as a way of avoiding subjectivity. As it

stands, one wonders whether "dominant" really should subsume all of shameless, greedy, sociable, and happy.

Third: In trials of human astrology, some have suggested that one should not use young subjects because traits have not had enough time to be clearly expressed. Might not the same concern apply here? The subjects were 2-month-old puppies.