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Short communication

Affiliative behaviour of related and unrelated pairs of cats in catteries: a preliminary report

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Abstract

Social ties between free-ranging cats are largely confined to related females, yet multicat households often contain unrelated cats. We have investigated whether unrelated pairs of cats from the same household are less affiliative towards one another than pairs of littermates, by observing their behaviour while confined in catteries. We found that littermates spent more time in physical contact with one another, groomed one another more often, and were more likely to feed close to one another than unrelated cats. The most likely explanation for this difference is that ties are established between individual cats during the socialisation period (3–8 weeks), and persist throughout life if the cats continue to live together.

Keywords: Cat; Kinship; Social behaviour; Socialisation; Spacing behaviour

1. Introduction

Although traditionally thought of as solitary animals, free-ranging cats are now known to be capable of living in social groups, based on co-operative behaviour between related females (see Kerby and Macdonald, 1988, for review) although co-operative associations between unrelated cats may also develop (Laundré, 1977; Macdonald et al., 1987). A substantial proportion of cats live in multi-cat households, and the behaviour of such cats towards their owners is not identical to that of single cats (Mertens, 1991). Within a multi-cat household, individual cats may or may not be related, and may have been acquired together or separately; the composition of these owner-selected groups,

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therefore, varies from those which approximate to groups formed spontaneously by free-ranging cats (e.g., female littermates; mother and daughter) to those unlikely to have been formed without human intervention (e.g., several adult males). The widespread practice of neutering may assist in keeping unrelated adult cats together, since neutered males tend to behave less aggressively than entire males (Hart and Barrett, 1973; Brown and Bradshaw, 1996).

We describe here a preliminary study which examines the differences in social behaviour between pairs of littermates and unrelated pairs of cats. In order to standardise the conditions under which each pair was observed, and to eliminate the immediate effects of the behaviour of the owner, we observed these pairs while they were boarded in catteries.

2. Subjects and methods

The subjects were 25 pairs of neutered cross-breed cats, each pair having lived in the same household for at least one year prior to the study. All were in good health when observed. Fourteen of the pairs consisted of littermates (they may have been siblings or half-siblings, since multiple paternity is possible in cats); five were male/male pairs, five were male/female and four were female/female. All were reported by their owners to have lived together since birth. The remaining 11 pairs consisted of unrelated individuals; seven male/male pairs, two male/female and two female/female. Sex ratios were similar in the two groups (Fisher's exact test, $P = 0.24$). The younger member of each unrelated pair had lived with the older since it was four months old, and usually earlier. The mean age of the littermate pairs was 3.6 ± 2.7 years (mean $\pm$ S.E.); the unrelated cats were slightly but not significantly older at 5.1 ± 3.1 years (t-test, $P = 0.18$). The age of the youngest cat in each pair was 3.6 ± 0.7 years (littermates) and 4.1 ± 1.0 (unrelated), which is not significantly different (t-test, $P > 0.50$). Three of the unrelated pairs (two male/male, one female/female) were the same age and had lived together since they were less than three months old; the average age difference within the unrelated pairs was 1.8 ± 1.6 years.

The study was carried out during August and September at three catteries in Gloucestershire, UK. Seven related and 5 unrelated pairs of cats were studied at one boarding establishment, 4 and 4 respectively at another, and 3 and 2 at a Cats Protection League shelter. Pens varied in area from 1.6 to 2.2 m^2, and were approximately 1.8 m high. The layout of the pens differed slightly between sites, but all were equipped with a litter tray, one or two sleeping boxes, and a raised platform large enough to be occupied by both cats simultaneously.

The pairs were observed over a period of about five days, starting when they had been in the cattery for at least 72 h. The interactive behaviour of each pair was recorded continuously during twelve periods of 10 min each, spread over the working day of the cattery, and at least three different days. The distance between the two cats in each pair was recorded at hourly intervals, 30 times for each pair. Observations were made from approximately 1 m outside each pen; the observer (SLH) remained stationary and silent throughout each 10-min period.

3. Results

All of the littermate pairs were recorded as being in physical contact with one another at one or more of the hourly scans, whereas six out of the eleven unrelated pairs were never recorded as in contact. The extent of contact varied from the two cats sleeping curled round one another (probably less frequent than normal due to warm weather), to minimal contact with a paw or tail. Taking just the pairs of cats that were recorded as in contact at least once, the proportion of scans in contact was lower for the unrelated cats than for the littermates (Table 1). The unrelated cats were, therefore, both less likely to rest in contact with one another, and if they did rest in contact, spent proportionally less time doing so than did the littermates.

Within the unrelated cats, sex and age difference within the pair appeared not to affect whether a pair was seen in contact. Four of the six pairs never in contact were male/male, one was male/female and one female/female, similar proportions to the sample as a whole. Of the three pairs of unrelated cats that were the same age and had lived together since they were kittens, only one was recorded as in contact. The average age difference for pairs never in contact (1.17 ± 0.40) was similar (t-test, $P = 0.21$) to the difference for pairs observed in contact at least once (2.60 ± 0.91). Within the littermates, the proportion of scans in contact was unrelated to the sex or absolute age of the cats. There was a weak negative correlation ($r = -0.507$, $P = 0.06$) between the age of the cats in the pair and the proportion of scans in contact, i.e., the older cats tended to rest out of contact with one another.

The unrelated cats tended to feed separately, either one at a time if only one bowl of food was available, or from different bowls if two were available and were well-spaced. All but one of the littermate pairs either ate from the same bowl, or from adjacent bowls (Table 1).

Interactive behaviour tended to be infrequent, presumably because the cats were already very familiar with one another. Aggressive behaviour was confined to a single cuff by one male of an unrelated male/male pair; this and two other unrelated male/male pairs occasionally appeared to avoid potential confrontations by one cat moving away from the other.

Table 1
Differences in behaviour between the unrelated and littermate pairs of cats

	Unrelated	Littermate	Statistical test
No. of pairs	11	14	
No. in contact[a]	5	14	Fisher exact test $P < 0.01$
Median % of scans in contact[b]	18	46	Mann–Whitney test $P < 0.02$
No. eating together	4	13	Fisher exact test $P < 0.01$
No. grooming each other	0	6	Fisher exact test $P < 0.02$
No. rubbing on each other	1	6	Fisher exact test $P < 0.10$

[a] Number of pairs ever observed in physical contact on one or more of 8–12 scans at least one hour apart.
[b] Pairs never in contact (all unrelated) were not included in the calculation of the median % of scans in contact.

Almost half the littermate pairs groomed one another (3 male/female pairs, 3 male/male pairs), but none of the unrelated pairs did so, even those which rested in contact (Table 1). Only one of the unrelated cats was observed to rub on its partner (this pair was also observed in contact in 5/30 scans), but head-rubs or flank-rubs were exchanged between six of the littermate pairs (Table 1).

4. Discussion

Overall, the results indicate that the littermates were much more sociable than the unrelated pairs, on all the measures taken. We have found similar though less clear-cut trends in a comparison of five littermate pairs and six unrelated pairs, based on a questionnaire completed by owners in Hampshire (Hall, 1995). The unexpectedly large differences in behaviour observed in the cattery situation may be partly an effect of the confinement of the animals to a smaller area than they were accustomed to. Cats are known to be stressed by confinement (McCune, 1992), and it is possible that their social ties are affected differently by stress, with littermates becoming more affiliative, and unrelated pairs less affiliative.

The mechanism whereby cats regulate their affiliation towards other cats living in the same household cannot be deduced from this study alone. There were essentially three differences between the two experimental groups; the littermates were the same age, were related, and had lived together since birth, while none of the unrelated pairs had been established until the younger member was at least 7 weeks old, and also the majority were not the same age. Therefore the results could possibly be explained on the basis of true kin recognition (Grafen, 1990), phenotype matching, as found in some other species with matriarchal social structures (Holmes and Sherman, 1982), association during the first few weeks of life (Holmes and Sherman, 1983) or simple age difference. The latter explanation seems unlikely, given that patterns of affiliative interaction in free-ranging cats tend to be most frequent between mothers and their daughters (Kerby and Macdonald, 1988). Familiarity per se cannot explain the differences in behaviour, since the ages of the younger members of each pair were similar in the two groups, and the unrelated pairs had been established when the younger member was a kitten (approximately 8–16 weeks). The most likely explanation is that social ties are first established earlier than this, during the socialisation period (3–8 weeks; McCune et al., 1995), and are then reinforced throughout life if the individuals (littermates or mother–offspring) remain together. Of the three unrelated pairs that had been introduced to one another during or soon after the socialisation period, one was in contact in 5 out of thirty scans, and was the only unrelated pair to rub on each other. However, the other two were never observed in contact. A larger sample would be required to test the hypothesis that unrelated kittens behave as if they were related, if they are introduced to one another during the socialisation period. The possibility that cats may also be able to make finer distinctions than this, for example between full- and half-siblings within the same litter, as in ground squirrels (*Spermophilus* spp.; Holmes and Sherman, 1982) also remains to be investigated.

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