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# THE ETHOLOGY OF THE HUMAN-CAT RELATIONSHIP

D. C. TURNER

#### SUMMARY

Comparative behavioural observations were made in the home setting in order to analyze the ethology of the human-cat relationship. Factors postulated, and indeed, found to influence that relationship included marital status of the human (women living alone, with a partner or with a partner and children), housing conditions of the cat (indoor vs. outdoor access), number of cats kept (one vs. more than one), and to a very minor extent, pedigree of the cat (purebred vs. domestic mixture). Various measures of success at both the interactional, and the relationship level were examined and yielded the following results: 1) The more successful the person is in initiating interactions with the cat, the shorter, the total interaction time with the pet. 2) The higher the proportion of all successful intents to interact that were due to the cat, the more time spent interacting. 3) Willingness to comply with the partner's wishes to interact is positively correlated between the cat and the human over all pairs examined - which helps explain the widespread popularity of cats, as pets.

**KEY WORDS:** cats — owner — ethology — relationship — housing

#### INTRODUCTION

The human-pet relationship has gained the attention of scientists from other fields of interest than veterinary medicine in recent years, particularly that of ethologists (comparative behaviourists) and psychologists, even psychiatrists involved in pet-facilitated psychotherapy programmes. The ever increasing popularity of pet-keeping has, however, also led to an increasing number of cases where serious problems in the relationship can jeopardize its very existence. For a number

# DIE ETHOLOGIE DER MENSCH-KATZE-BEZIEHUNG

Vergleichende Verhaltensbeobachtungen wurden in Privathaushalten durchgeführt, um die Ethologie der Mensch-Katze-Beziehung zu analysieren. Parameter, die als Einflussgrössen postuliert - und festgestellt - wurden, schliessen die folgenden ein: Zivilstatus des Menschen (ob eine alleinstehende Frau, eine Frau mit Partner oder eine Frau mit Partner und Kindern); Wohnbedingung der Katze (Stubenkatze vs. Katze mit Auslauf); Anzahl gehaltene Katzen (eine vs. mehrere) und, obwohl selten signifikant, Reinrassigkeit der Katze (Mischling vs. Reinrassige). Verschiedene Erfolgsmasse wurden betrachtet - sowohl auf dem Niveau der sozialen Interaktionen als auch auf dem der Gesamtbeziehung -, mit den folgenden Ergebnissen: 1) Je erfolgreicher die Person beim Initieren von Interaktionen ist, desto kürzer die gesamte Interaktionszeit mit dem Heimtier. 2) Je grösser der Anteil der auf die Katze zurückzuführenden erfolgreichen Intentionen zu interagieren, desto mehr Interaktionszeit in der Beziehung. 3) Die «Bereitschaft auf die Interaktionswünsche des Partners einzugehen» ist bei allen Mensch-Katze-Paaren zwischen der Katze und der Frau positiv korreliert. Dies erklärt z. T. die Popularität der Katze als Heimtier.

SCHLÜSSELWÖRTER: Katzen — Besitzer — Ethologie — Beziehung — Haltung

of years now, I have been advising pet owners who consider their companions to show «behavioural disturbances» or «abnormal» behaviour.

After a veterinary consultation to ensure that no organic problem is indicated, one can usually assign the source of the problem to one of three broad categories: 1) a disregard of the animal's basic behavioural, or motivational needs; 2) false expections of the human towards the pet—either at the species level or that of the individual animal with its own character traits; and/or 3) inappropriate interactive behaviour between

the human and the pet - more often of the human, than of the animal.

Using the domestic cat and its relationship with humans as a model, my research over the years has attempted to clarify 1) the natural behaviour and needs of the animals (see e. g. *Turner* and *Mertens*, 1986; *Turner* and *Bateson*, 1988; *Turner*, 1988, 1989); 2) the expectations of the owners and their psychological assessment of the animals and relationships with them (*Karsh* and *Turner*, 1988; *Turner* and *Stammbach-Geering*, 1990); and 3) factors affecting the interactive behaviour between cats and humans (*Meier* and *Turner*, 1985; *Turner* et al., 1986; *Mertens* and *Turner*, 1988; and the present study).

After initially determining the feasibility of observing, recording and analyzing human-cat interactions using ethological methods in the standardized setting (Mertens and Turner, 1988), we were ready to attempt analysis of long-standing relationships in the home setting. The results are presented here and in Turner and Stammbach-Geering (1990). To simplify matters, I have concentrated on relationships between housewives and cats and factors hypothesized to affect their behaviour and interactions: a) marital status of the woman whether single and living alone, living with a partner but not/no longer with children at home, or living with both a partner and children at home, i. e. mothers; b) housing conditions of the cat – whether an indoor cat or a cat allowed outdoor access; c) pedigree of the cat, i. e. whether a member of one of the purebred races or a domestic mixture; and d) number of cats kept - one vs. more than one. Our results on relationships between cats and humans of various ages and either sex are/will be reported elsewhere (see e. g. Mertens and Turner, 1988).

# **OBSERVATIONS IN THE HOME SETTING**

For this study, my assistants visited 158 cat-owning households in Switzerland, which had volunteered for participation. They recorded all interactions observed between the cat(s) there and the adult woman of the household during three consecutive days. To enable this, they used an ethogram (available from the author at cost) – a catalog of 33 well-defined behavioural elements which could be exhibited by the cat, the person or both – and recorded the elements observed chronologically on an electronic keyboard (\* ZIRELCO Datapad) with automatic time-measurement. As already the case in *Turner* and *Stammbach-Geering* (1990), three elements among the 33 that were recorded, analyzed and reported on below, deserve special attention here: Either the woman or the cat could show an «intent» to interact by approaching the

partner or vocalizing with/towards the partner after a defined period without interaction. If either the partner reacted to that, or if the initiator continued the approach to cross an imaginary 1 metre circle around the partner, then «start interaction» was recorded. And «end interaction» was typed whenever one of the two crossed back over that line or withdrew from the scene completely without being followed by the partner.

From these data it was therefore possible to assess: the initiator of an interaction; the partner's willingness to comply with the interactional wishes of its counterpart; the content of interactions and which elements frequently occurred together; and the total duration of interaction. Average observation time per household was just under 16 hours during the day and average cat presence at home during those 16 hours was 10.8 hours. 344 cats lived in the 158 households visited and over 6000 social interactions between the humans and cats were recorded.

#### **CLUSTERS OF BEHAVIOURAL ELEMENTS**

The first step in any ethological study of relationships is the description of the content of interactions involved. A cluster analysis (Varclus SAS) of the individual frequencies of all 33 ethogram elements (table 1) over all human-cat dyads explained 22.8% of the total variation, or a proportion of 0.69, with the 7 clusters shown in Table 1. I have chosen names for the clusters that qualitatively indicate their content. Elements of distance regulation often appeared together, but apparently on two levels, with fine-scale distance regulation usually governing the occurrence of interaction. Greeting behaviour (vocalizing, rubbing) and allogrooming (the cat's licking of itself) were often associated with eating. Another group of elements were obviously involved in contact establishment, maintenance or discontinuation. Social behaviour of the human partner relative to the cat separated out as a cluster of elements that frequently occur together - including petting the cat, but not playing. Play behaviour and brushing the cat were more closely associated in their own cluster. Lastly, «infantile» behavioural patterns of cats separated out nicely in another cluster.

#### **GENERAL DURATION OF THE INTERACTIONS**

Average total interaction time between a housewife and cat was 27% of the time the cat was present; average time spent in close proximity (i. e. within 1 meter of each other) was 16.7% of the time the cat was present; average petting time was only 3.2% and average playing time a very low 0.6% of the time the cat was present. (Values are model averages which approximate the arithmetic means.) But to complicate matters, an analysis of covariance on the variable total inter-

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Table 1: Clusters of behavioural elements frequently exhibited together (principal component cluster analysis)

#### 1. Fine-scale DISTANCE REGULATION (of interactions)

- approaches
- intends to interact
- closes to within 1 metre
- starts interaction
- departs from 1 metre area
- ends interaction
- withdraws

# 2. Coarse-scale DISTANCE REGULATION (presence)

- opens door
- leaves (the house)

# 3. GREETING + EATING BEHAVIOUR

- comes in
- vocalizes
- rubs (head/flank)
- eats
- grooms itself

# CONTACT – ESTABLISHMENT/MAINTENANCE/ DISCONTINUATION

- stands up
- follows
- turns head towards
- sits/crouches/lies down
- bites or scratches

#### SOCIAL BEHAVIOUR of the human

- pets the cat
- stops petting
- calls the cat
- speaks to the cat
- prepares the cat's food
- feeds the cat
- lifts the cat
- sends/pushes the cat away

#### 6. PLAY BEHAVIOUR

- plays with
- stops playing with
- brushes/looks after the cat

# 7. INFANTILE BEHAVIOUR

- kneads/treads the paws
- purrs
- stretches out a paw

action time between the housewife and cat showed that interaction time increased by 1% (or ca. 6 minutes) for each additional observation hour (a measurable observer effect) and decreased by 1.5% (or almost 10 minutes) for each additional hour of cat presence. Therefore, all further analyses were of covariance with both total observation time and cat presence time in the household as covariables, and marital status, cat housing condition, cat race and number of cats kept, tested as main effects. The models were all highly significant, the interactions not, and the percentages listed below are of (or relative to) the particular class-average presence.

#### **Marital status and interaction time**

Table 2 presents the results of the separate analyses of covariance for each variable and shows all comparisons of main effects. The top three rows compare the effect of marital status: In couples without children at home, the women spent on the average 6.3% more of the time the cat was present interacting with the cat than women did in households where children were present. Not surprisingly (due to probable dependencies within the data), women in couples also spent significantly more time close to the cat, petting the cat and playing with it than did mothers. Aside from a tendency for single women to spend more time petting the cat than mothers, no differences were found along these variables between single women and mothers or between single woman and those without children. I suspect that at least part of the difference between woman in couples and mothers is simply due to the mothers' preoccupation with other duties and will substantiate this below.

## Cat housing condition and interaction time

Corrected for time present, exclusively indoor cats showed a 7.9% higher total interaction time than did cats with outdoor access, were found in close proximity 4.7% more of the time and played/were played with 0.6% more of the time than cats with outdoor access (Table 2). As we will see below, this was most probably due to the cat and not the owner, and I suggest that it is the cat, which is actively compensating for some lack of environmental stimuli indoors by interacting more often with its owner than an outdoor cat does.

#### Genetic «pureness» and interaction time

From all of the comparisons along all possible variables, the only significant difference found between house cats (domestic mixtures) and purebred cats was in the amount of time spent playing with them and playing (Table 2). House cats showed 0.3% more play time than purebreds – a small, but nevertheless, measurable difference. However, I should cau-

Table 2: Results of the analyses of covariance for main effects on various variables. Percentages indicate percentage points of difference; number of asterixes indicates the usual levels of significance.

Comparison of:	Total inter.	Variable tested: Time close proximity	Petting time	Play time
Single women vs. mothers	_1		1.2% (*)	_
Women without children vs. mothers	6.3%***	5.4%***	1.1%*	0.3%*
Single women vs. those without children	-	_	<del>-</del>	
Indoor vs. outdoor cats	7.9%**	4.7%**	_	0.6%***
House cats vs. purebred cats	-		-	0.3%*
Single cats vs. cats in multiple cat households	10.6%***	5.7%**	1.7%**	0.4%***

<sup>1)</sup> no significant difference

tion that all purebred races were pooled for this comparison to increase sample size, and this certainly masked any differences between specific breeds. (In a follow-up study, I am currently comparing the behaviour of Siamese and Persians and their relationships with elderly owners.)

# Number of cats and interaction time

When I compared single cats with cats in multiple cat households (Table 2), I found – corrected for time present and PER CAT – that single cats showed a 10.6% higher total interaction time than each cat in multiple cat households; time spent in close proximity, petting time and play time were also higher than for each cat in multiple cat households. These differences were probably due to differences between the woman's behaviour in single and multiple cat-households, and not the cat's behaviour, as indicated below.

#### Successful «intents» and interaction time

One of the main goals of my project was to test and determine potential measures of relationship success. Firstly, I looked at the proportion of intents to interact that were successful separately for the cat and the person, and attempted to correlate these values with total interaction time over all human-cat pairs. I found no significant correlation for the cat data (Spearman  $r_d = 0.073$ , n = 344, P = 0.178), but a significant negative correlation for the women ( $r_d = -0.144$ , n = 344, P = 0.008\*\*). I. e. the more successful the person is in initiating interactions, the shorter, the total interaction time with the cat. We might think we're being successful, but if high interaction time with the cat is our goal, then the cat may be «pulling the wool over our eyes». In spite of this interesting finding, I chose to not work further with this measure because it didn't combine data

for the person and the cat into one measure and would, therefore, require twice as many tests.

That was, however, the case with my second measure: the proportion of all successful intents to interact that were due to the cat. Over all person-cat pairs, this measure was indeed positively correlated with total interaction time in a relationship ( $r_d = 0.133$ , n = 344, P = 0.014\*). I. e. the higher the proportion of all successful intents to interact that were due to the cat, the more time spent interacting.

The weighted, covariance-model average for that proportion was 0.526, or 52.6%. However, as indicated in Table 3, it varied significantly with some of the factors originally hypothesized to influence the relationship.

It is some 10% lower for single women than for women living with a partner and children, and also tended to be lower for single women than for women living with just a partner. In

Table 3: Differences in the proportion of successful intents to interact that were due to the cat by effect.

	Proportion of successful intents due to the cat:	
Single women vs. mothers Women without children vs. mother	$-10.2\%$ ** $=^{1}$	
Single women vs. those without chil	dren –6.8% (*)	
Indoor vs. outdoor cats	10.7%***	
House cats vs. purebred cats		
Single cats vs. cats in multiple cat he	ouseholds -8.2%**	

<sup>1)</sup> no difference

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other words, more of the «successful» intents to interact are due to the women, when the live alone; but as stated above, that means a lower total interaction time!

It is almost 11% higher for indoor cats than for cats with outdoor access, which is why I ascribed the higher total interaction time, higher time in close proximity etc. of indoor cats mentioned above to the cat's behaviour and not the woman's.

And the proportion of successful intents to interact due to the cat is significantly lower (by about 8%) for single cats than for cats in multiple cat households. Presumably, the cats in multiple cat households are vying for the attention of their owner, who, as stated above, spends less time interacting with each, than in single cat households.

#### **GOAL «MESHING» IN RELATIONSHIPS**

Obviously, this proportion is, indeed, a candidate for an ethological measure of relationship quality – under the assumption that high levels of interaction time also indicate something about its quality. But the situation where neither partner «desires» a great amount of interaction and both are «perfectly satisfied» with that lower contact level is not adequately covered. Something indicative of human ethologist, Robert *Hinde's* (1976) «meshing» in relationships – a measure of how well the interactional goals of each partner fit with those of its counterpart – was still needed. I found it in the form of a conditional success:

From the 158 households with some 344 cats, 6062 intents to interact by either the woman, or the cat had been recorded, as

well as which partner, if either one, actually started the interaction. For each human-cat pair, I calculated the proportion of «start interactions» due to the cat whenever the woman had shown an intent to interact, i. e. the individual cat's willingness to comply with the woman's wish to interact. And for each pair, whenever the cat had shown an intent to interact, I calculated the proportion of «starts» due to the woman, or, the woman's willingness to comply with the cat's wish to interact. The average values for cat willingness to comply and the woman's willingness to comply over all human-cat pairs were very close to each other -0.31 and 0.29, respectively; this is probably already an indication of high-quality relationship – at least in the human-cat dyads observed here. More importantly, the two values for each human-cat pair were positively, and significantly correlated over all pairs (Spearman r<sub>d</sub> = 0.316, n = 344, P = 0.000\*\*\*). In other words, if the woman complies with the cat's wishes to interact, then the cat complies with the woman's wishes at other times; if the woman doesn't comply with the cat's wishes, then neither does the cat, with the woman's wishes.

Either of these measures could change along the factors postulated to influence the ethology of the human-cat relationship. But I found no significant differences in the CAT's willingness to comply with the interactional wishes of single women, women in couples or mothers, nor differences in willingness to comply with the person's wishes between indoor and outdoor cats, between house cats and purebreds or between single cats and animals in multiple cat households (Table 4). The cat was in each case equally willing to interact.

Table 4: Differences in «willingness to comply with the partner's interactional wishes» by effect (see text)

Comparison of:	Cat's willingness to comply	Woman's willingness to comply	
Single woman vs. mothers	=1)		
Women without children vs. mothers	=		
Single women vs. those without children		-9.8% <b>(*</b> )	
Indoor vs. outdoor cats	=	-8.5%*	
House cats vs. purebred cats			
Single cats vs. cats in multiple cat households	=	9.2%*	

<sup>1)</sup> no difference

But with respect to the WOMAN's willingness to comply with the cat's wishes to interact, I found several differences: Single women tended to be less willing (about 10 percentage points) to comply with the cat's wish to interact than women living with a partner were. Perhaps they are less tolerant of others in general, or perhaps the women from couples are generally more nuturing.

The women in general were significantly more likely to comply with the cat's wish to interact if it had outdoor access, than if it were an indoor cat (Table 4). Since the analysis of covariance, mentioned at the outset, indicated a decrease in total interaction time by about 10 minutes for each additional hour of cat presence, I interpret this as follows: Indoor cats are always available, but for cats with outdoor access, owners don't miss a chance to interact when they're at home.

No difference was found in the woman's willingness to comply with the cat's wishes to interact between house cats and purebred animals – which perhaps dispells any notion that purebreds are especially pampered.

And lastly, I found that the interactional wishes of single cats were significantly more likely (by about 9 percentage points in Table 4) to be complied with than those of cats in multiple cat housholds. This could be due to either pampering the single cat, or simply, behavioural time-budgeting problems of the women in households with more than one cat. From the current data it is impossible to say which.

# **POINTS TO PONDER**

Petting and playing: At first glance, one might think it rather striking that petting and playing were not assigned to the same general cluster of behavioural elements, and also, that they were shown so little of the time the cat was present at home. But earlier research (Mertens and Turner, 1988) has indicated that cats differ individually in their preferences for these two activities: some animals prefer the close contact of petting but not playing, while others prefer to play, but don't appreciate being petted. When the same owners as in this study were asked to rate their cats for «enjoyment of physical contact» and «playfulness» (among other traits), no correlation between the two traits was found (see Turner and Stammbach-Geering, 1990); however, when asked to rate their «ideal» cats and relationships, the two traits were significantly and positively correlated! This is a perfect example of a false expectation among cat owners that might lead to disappointment in the relationship.

Nevertheless, the majority of owners were perfectly satisfied with both the amount of physical contact shown and their cats in general, and *Turner* and *Stammbach-Geering* (1990) were

also able to show that the owners interpret «enjoyment of physical contact», not «playfulness», as a sign of high affection towards the person.

Marital status and «significant others»: In total interaction time, no differences were found between single women and women with partners or with partners and children. Nor did Turner and Stammbach-Geering (1990) find any differences in the personal ratings of cat- or relationship-traits between women of different marital status. Still, women from couples spent more time interacting with their cats than women with partners and children, and I suggest that the pets might have elicited «nurturing» behaviour in these women, just as the children might have done amongst the mothers. Single women were more often responsible for initiation of interactions with their cats (but with lower total interaction time) than women with «significant others» – partners, children – were; they also tended to be less willing to comply with the cats' wishes to interact than the other women. Fortunately for them, the cats were equally willing to comply with the interactional wishes of all women.

Indoor cats versus outdoor-access: Apparently, cats housed exclusively indoors tend to compensate for the presumed lower level of environmental stimuli there by interacting more with their owners, which, as shown above, was due to their own initiative. The owners of indoor cats also rated their animals as being «more curious» than owners of cats with outdoor access did – a further sign of compensation for a less stimulating environment indoors (Turner and Stammbach-Geering, 1990). But again, from the cats' point of view, indoor and outdoor cats were equally willing to comply with the interactional wishes of their owners.

One versus more than one cat: Single cats were interacted with more of their presence time than each of the cats in multiple cat households were. But the proportion of successful intents to interact that was due to the cat was significantly lower for single cats, which should have resulted in a lower total interaction time. Nevertheless, the interactional wishes of those single cats were more likely to be complied with (pampering or more time available?); the cats in multiple cat dwellings were also responsible for initiating a greater proportion of the interactions in their homes, perhaps competing for the attention of their owners, who spent less time interacting with each of them. In support of this interpretation, owners of more than one cat said their animals should be less «curious» than owners of single cats said theirs should be, with multiple cats possibly keeping their owners quite busy (Turner and Stammbach-Geering, 1990).

# Symmetry, asymmetry and compliance in the human-cat relationship

The more successful the person was in initiating the interactions in a human-cat relationship, the shorter the total interaction time was. Obviously, forcing one's own will on the cat doesn't bring much in terms of interaction time. The higher the proportion of all successful intents to interact that were due to the cat, the more time spent interacting. Obviously, when the cat wants to interact, the interactions last longer. Therefore, one maxim about the human-cat relationship is reinforced by these data: the cat has its own will when it comes to interacting, and it pays off to respect that will!

Nevertheless, both the cat and the human in a particular relationship were quite often equally willing to comply with the interactional wishes of the partner! If the human was not so willing to comply, then neither was the cat; high compliance by the human was associated with high compliance on the part of the cat. A symmetry exists in the relationships at all levels. More generally though, the cats were willing to comply with the persons' interactional wishes irrespective of marital status, housing conditions, genetic history and number of cats kept, whereas the persons were not (Table 4). It is within the realm of conscious choice of the person to increase (or decrease) his or her willingness to comply with the cat's interactional wishes. *Turner* and *Stammbach-Geering* (1990) have already shown that women from human-cat pairs more willing to comply with the wishes of the partner, view the ideal cat as being even more independent than they already are. Therefore, high compliance on the part of the human is associated with acceptance of the cat's independence, which is, in turn, most probably associated with a higher proportion of the intents to interact being due to the cat and, therefore, a higher total interaction time – appreciated by most human «cat owners». The fact that the human-cat relationship can exist at low levels of compliance bilaterally, but also that a high level of compliance on the part of one partner (the human) automatically leads to a higher level of compliance in the other partner (the cat), probably explains the wide-spread popularity and success of human-cat relationships.

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# Ethologie de la relation humain-chat

Il s'agit d'une étude comparative de comportement effectuée en milieu privé afin d'analyser l'éthologie de la relation humain-chat.

Les paramètres postulés (et confirmés) comme influençant la relation sont les suivants: état civil de l'humain (femme seule, femme avec partenaire ou avec partenaire et enfants, etc.), habitudes du chat (chat d'appartement ou d'extérieur), nombre de chats dans le ménage et race du chat (pure race ou croisé), bien que ce dernier paramètre ait rarement une influence significative.

Les effets suivants ont été constatés:

- 1) Plus la personne a de succès en initiant une interaction, plus le temps consacré aux interactions avec l'animal est court.
- 2) Plus le chat a de succès en initiant une interaction, plus le temps consacré aux interactions est long.
- 3) La «disponibilité aux intentions d'interaction de l'autre» est la plus forte entre les femmes et les chats, ce qui explique en partie la popularité du chat comme animal domestique.

### L'etologia del rapporto uomo-gatto

Sono stati eseguiti studi comparativi sui comportamenti casalinghi, per analizzare il rapporto uomo-gatto. Sono stati postulati e confermati i seguenti parametri: stato civile dell'uomo (donna sola, donna con partner o donna con partner e bambini); condizioni d'alloggio (gatto d'appartamento o gatto con possibilità di movimento); numero dei gatti tenuti (uno o più); e benchè raramente significativo la purezza della razza (razza pura o bastardo). Si è tenuto conto dei seguenti metri di successo sia a livello di interazioni sociali che nelle relazioni in generale, con i seguenti risultati: 1. Più successo ha

la persona ad iniziare un'interazione, più breve è la durata totale dell'interazione con l'animale. 2. Quanto più il gatto si mostra disposto ad interagire, più é lunga la durata dell'interazione nella relazione. 3. Il fatto di essere ben disposti verso i desideri di interazione del partner è in tutte le coppie uomogatto correlato positivamente fra il gatto e la donna. Questo spiega in parte le popolarità del gatto come animale casalingo.

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