

Why Are Younger Cats More Playful?

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Abstract In many animals it is observed that younger individuals are more playful. We investigated the way play declines with age in the domestic cat, *Felis catus*. All the observations were made by 24 hour videorecording. From videotape, we divided the behavior of the cats into inactive time, when the cats slept in the house, and active time, when the cats were awake outside of the house. Active time was divided into 2 categories, playful mood and non-playful mood. There were 7 points related to the decline of play; 1) asynchrony of playful mood, 2) presence of other cats, 3) response of other kittens, 4) sexual behavior, 5) power, 6) being bored/tired, and 7) distraction.

Key words Cat, *Felis*, Play, Development, Behavior

Introduction

Kittens which appear on TV, in movies, or in the arts often depicted playing with other kittens or with objects such as balls of yarn; adult cats, on the other hand, are like ornaments that sit still on a sofa. Why does such playful behavior decline with age?

Many animals show the same tendency for the younger ones to be more playful (Dolhinow & Bishop 1970; Baldwin & Baldwin 1974; West 1974). West (1974) suggested that play might decline due to the tendency of kittens to disperse at a certain age, thus decreasing the opportunity for play and due also to changing preferences of individuals for social contact or particular forms of social contact. This was because he proposed that the function of play is to develop and maintain friendly social relations and ample opportunities for physical exercise. However, many papers have differed in regard to both the physical function and the socialization function (e.g., Bekoff 1976; Martin & Caro 1985).

As Martin (1984) pointed out, quantitative description of behavior of domestic cats stem mainly from laboratory studies and are open to the criticism that artificial conditions may produce misleading results. More information about the behavior under more natural conditions is surely needed.

We thought there was another problem. Many papers on the play of the domestic cat

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(e.g., Bateson & Young 1981; Martin & Bateson 1985a, b) were based on the analysis of each behavior (e.g., chasing, pawing, etc.). Of course the analysis of details is important. But in addition to the analysis of details, comprehensive understanding of play is important.

This study was done with the focus on two points; maintaining more natural conditions in captivity and studying the play over the whole day's activity and in relation to other group members.

Materials and Methods

Subject animals were all house- or laboratory-reared domestic cats, *Felis catus*. In Cage A, there were 9 cats from 5 litters. They were CHAM (female), HIME (female), and AI (male) born on 28th March 1983, HAIJI (female) and MIE (female) born on 1st April 1983, GREEN (female) and BUL (male) born on 18th July 1982, NUE (female) born on 8th June 1983, and MICH (female) born in May 1982 (MICH's birthdate is unknown because she was brought from a private home). There was no kinship among these 5 litters. Although the time when each litter had been brought into Cage A varied, they had developed familiarity by the start of this study.

In Cage B, there were 6 cats. One litter of three 2 month old cats named HYO (female), TORA (female), and LION (male) were derived from a private home on 5th November 1983. Another litter of three 2 month old cats named HIE (male), JULY (female), and MAI (female) were derived from another private home on 21st November 1983 and brought into Cage B. At first some aggressive behavior was observed between these two litters. But in a month they seemed to become familiar with each other. Aggression was never observed after December 1983. HYO disappeared in December 1983.

Nine cats named CHAM, HIME, AI, HAIJI, MIE, GREEN, BUL, NUE, MICH were kept in Cage A (360 × 240 × 240 cm). Six cats named TORA, HYO, LION, JULY, HIE, MAI were kept in Cage B (200 × 200 × 200 cm). Cages were set on the roof of our laboratory building. Each cage contained a house where cats could sleep or protect themselves from rain and snow. One side of the house was glass so that the inside could be seen. "Cats food" (Oriental Yeast. Co. Ltd.) and water were available *ad libitum*. Observations and recording of the behavior were made by a video camera which was set in front of the cage so that the whole cage could be viewed. The cats primarily slept in the house and seldom played there. The time they spent in the house was recorded as 'non-active' time, and the time they spent out of the house as 'active' time. The active time was divided into 2 categories; the playful mood and the non-playful mood. The following behavior patterns were recorded as belonging to the playful mood.

Chase : running after other cats or objects.

Jump : jumping on the other cats or objects.

paw : pawing with forepaw.

Rear : standing on hindlegs.

Roll: lying on side or back and pawing or kicking.

Run: running about in the cage without approaching something.

Wrestle: lying on side or back and clasping others or objects.

Though the list of behaviors which are aspects of playful behavior is shown, we define the behavior patterns subjectively to some extent. It was difficult to consider to which behavior pattern a particular behavior belonged. However it was easier to describe to which category (playful or non-playful) a particular behavior belonged. Martin & Caro (1985) pointed out that humans clearly can and do recognize when an animal is playing, despite many problems with defining play. All the observations and recording were done by Naomi Ohkawa throughout this study.

Results

Activity/play time pattern

When a cat was in the house, it almost always slept and so was thought to be in the inactive state. When a cat was outside of the house, it was thought to be in the active state. Fig. 1 shows the activity pattern of 4 adult cats in Cage A. The upper line for each cat shows the active time and the lower one shows the inactive time. Almost all the cats spent 2-3 hours in the house and spent 2-3 hours outside of the house. These data were obtained from 24 hour videorecording. We examined the details for 2-3 hours of active/inactive time when there was less disturbance from university students. The change of pattern with age is shown for the cats of Cage B in Fig. 2-a , b, c, and d. The dark portion indicates the playful mood. Two month old kittens slept anywhere in and out of the house. Some periods during active time were really inactive, when they slept. The time when they slept out of the house is shown. Kittens older than 3 months did not sleep out of the house. They spent almost all the inactive time as sleeping time. Play emerged when all the cats were in active time (see 80-100 minutes in Fig. 2-b, 10-30 minutes in Fig. 2-d). On the other hand when active/inactive patterns of two cats overlapped, play did not occur or the playful mood did not last long (10 minutes in Fig. 2-b, 190 minutes in Fig. 2-d). Among the young, the activity patterns were largely synchronize and they were playing almost continuously. This synchrony was no longer observed among older cats, which tended to play only when their active/inactive patterns were synchronized.

Ratio of play duration to activity duration

The ratio of playful time to active time is shown in Fig. 3. Solid circles correspond to Cage B and open ones to Cage A. The circles of the same individuals are connected by lines. When the cats were young, they spent almost all their time as playful mood time. Older cats had a tendency to spend some time as non-playful mood time, such as sitting still outside of the house.

Duration of the play time

Change in the duration of playful mood time with age is shown in Fig. 4-a , b. Fig 4-

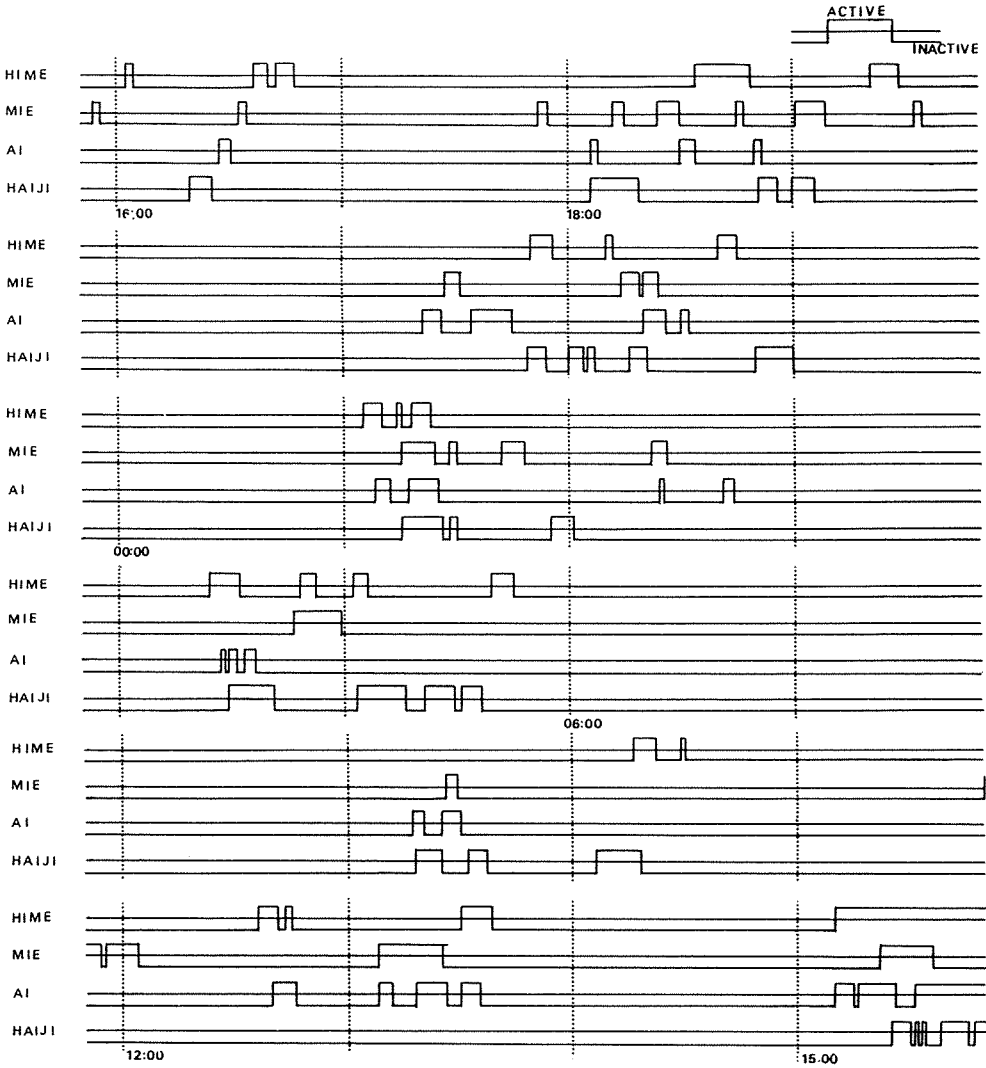


Fig. 1. Cats' activity pattern for 24 hours. These cats are adults kept in Cage A. The upper line for each cat shows the active time and the lower one shows the inactive time.

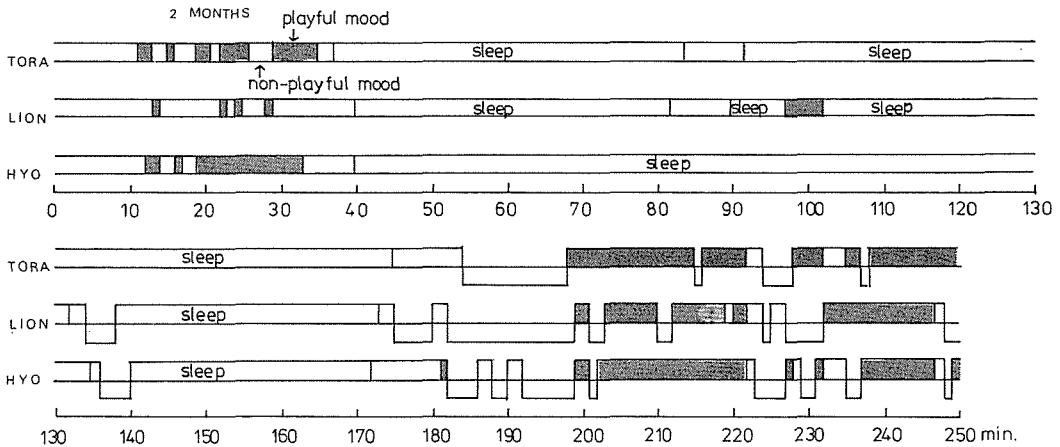


Fig. 2-a. Activity patterns of 2 month old kittens. The dark portion indicates the playful mood. Since 2-month-old cats can sleep anywhere in and out of the house, the time when they sleep out of the house is also shown.

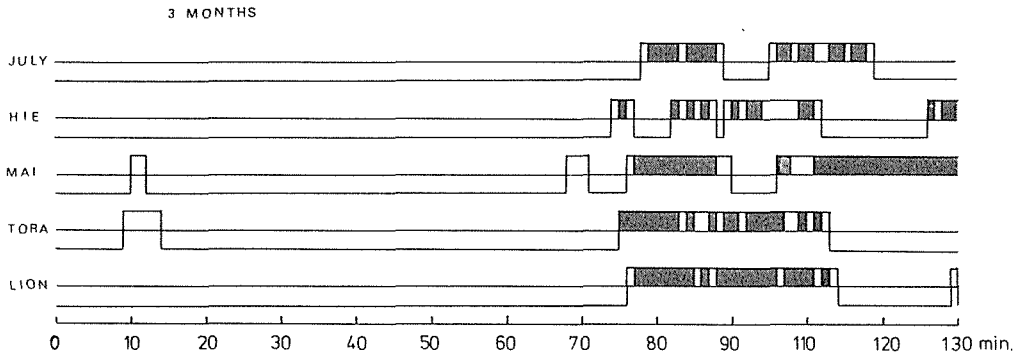


Fig. 2-b. Activity patterns of 3 month old kittens. The dark portion indicates the playful mood.

a shows the data for the cats of Cage B. Significant difference was detected between play time duration of 2 month old kittens and other ages, but not between the other comparisons (by Mann-Witney U-test). Fig. 4-b shows the data for the cats of Cage A. Significant differences were not detected between any 2 groups (by U-test). But the maximum play time duration became short with age.

Description of playful behavior

Observation 1 (2-4 month old kitten)

The kitten was running about. He held himself ready to jump on something and then jumped at the corner of the box. As soon as he jumped, he jumped backward then changed direction. He pawed another kitten and pawed the paper and then leaped on the other kitten. After that he dashed at something which was not present but the kitten could see in his imaginative world. He slowed down and wandered about for a while. Suddenly, he stalked something. He ran, jumped, and leaped until he looked tired. Then he entered the house and slept.

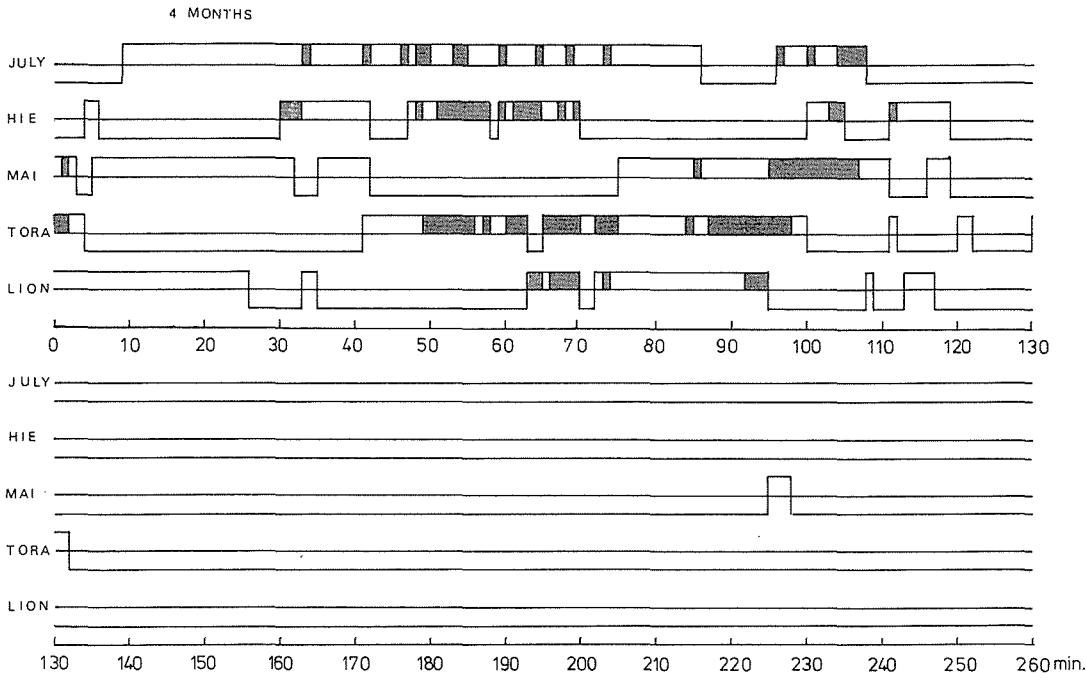


Fig. 2-c. Activity patterns of 4 month old kittens. The dark portion indicates the playful mood.

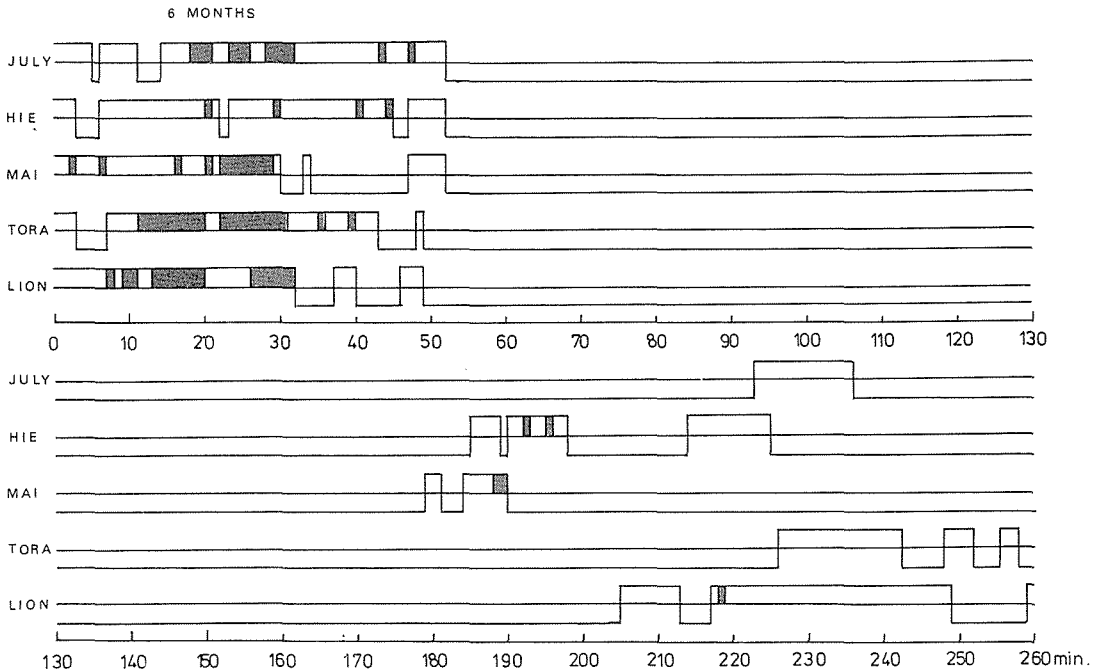


Fig. 2-d. Activity patterns of 6 month old kittens. The dark portion indicates the playful mood.

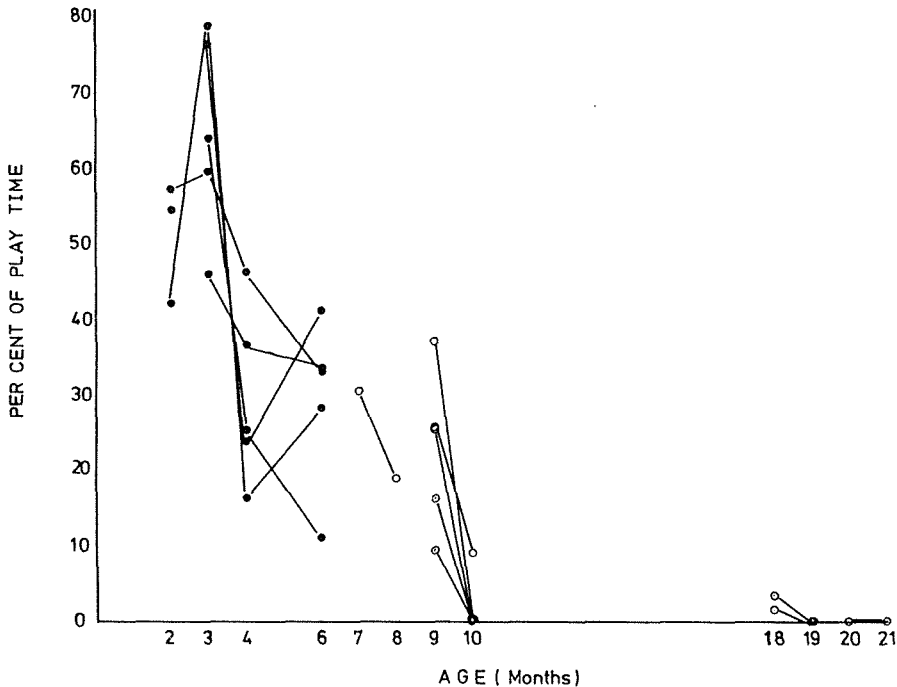


Fig. 3. The change of the ratio of playful time to active time with age. Older cats did not play compared with younger ones. Solid circles correspond to Cage B and open ones to Cage A. The circles of the same individuals are connected by lines.

Observation 2 (6-month old kitten)

LION was rolling. TORA pawed LION's tail and rolled, too. LION got up and tried to paw or bite TORA lying on the ground. TORA tried to avoid being touched and kicked LION by using all four limbs. LION succeeded in biting her, then rolled spontaneously. The two cats were now lying on the ground and they wrestled each other. TORA suddenly got up and then tried to paw or bite LION, who was still lying. This pattern was repeated again and again. The play came to an end when LION sniffed TORA's genitals. TORA got up and went away.

Observation 3 (6-month old kitten)

MAI rolled and pawed TORA. But TORA did not pay attention to MAI and went away. MAI selfgroomed, still lying on the ground. Then JULY passed by. MAI pawed JULY. JULY watched MAI for a while and suddenly rolled. MAI got up and leaped on JULY, who kicked MAI. MAI leaped backward. MAI leaped on JULY and leaped backward repeatedly. Once JULY got up, but she did not leap on MAI and she rolled. Then MAI leaped on JULY. This time JULY quickly got up and took a sitting posture. MAI pawed the sitting JULY but JULY pushed MAI back with her fore leg. MAI again pawed her, but JULY refused her strongly again. MAI walked away.

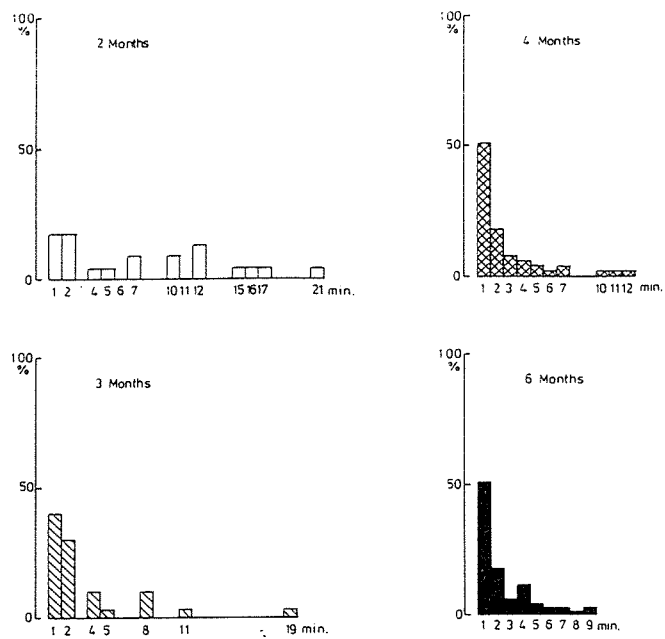


Fig. 4-a. Change in the duration of playful mood time with age for the cats of Cage B. Significant difference was detected between 2 months and other ages, but not between the other comparisons (by U-test). The maximum play time duration became short with age.

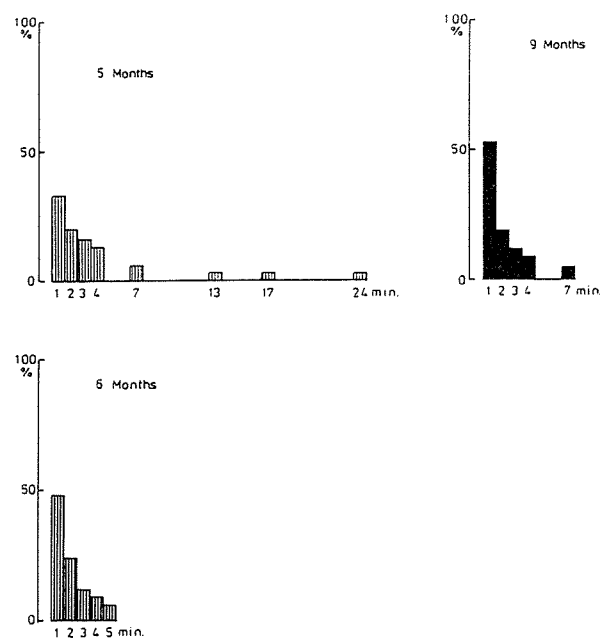


Fig. 4-b. Change in the duration of playful mood time with age for the cats of Cage A. Significant differences were not detected (by U-test). The maximum play time duration became short with age.

Observation 4 (6 month old kitten)

TORA rolled and crawled on her back and pawed LION. LION only licked TORA. TORA then got up and walked away.

Observation 5 (6 month old kitten)

TORA pawed JULY's tail. JULY rolled and kicked TORA. TORA refrained from leaping on JULY and walked into the house.

Observation 6 (6 month old kitten)

TORA and LION played together but stopped playing in response to a sudden sound.

Effects of other cats presence

Fig. 5 shows how many cats (exclusive of the subject) were active when play begin. These data were obtained from the five cats of Cage B. They seldom started to play when no others were outside of the house (i.e., in the inactive state). Among 4 and 6 month old kittens, half of the play occurred when all the 5 cats were in the active state. Fig. 6 shows how many cats (exclusive of the subject) were playing when play begin. A 3 month old kitten seldom played by itself. But among 4 and 6 month old kittens, play occurred even if there were no other playing cats. The time when all the five cats were playing almost disappeared. Fig. 7 shows the relationship between length of the active time (time from exiting to reentering the house) and the presence of other cats outside the house. If some cats were out of the house the others stayed longer (significant difference was detected by U-test).

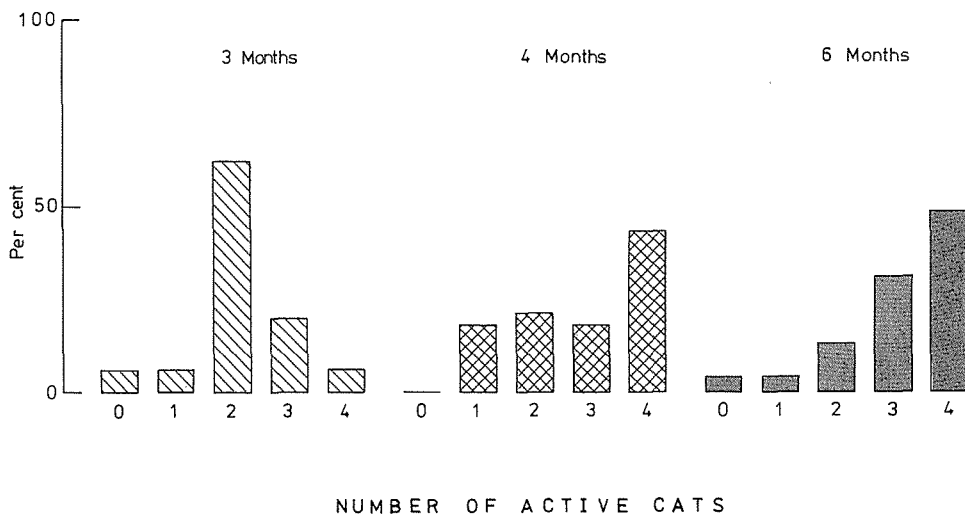


Fig. 5. The number of active cats (exclusive of the subject) when play begin.

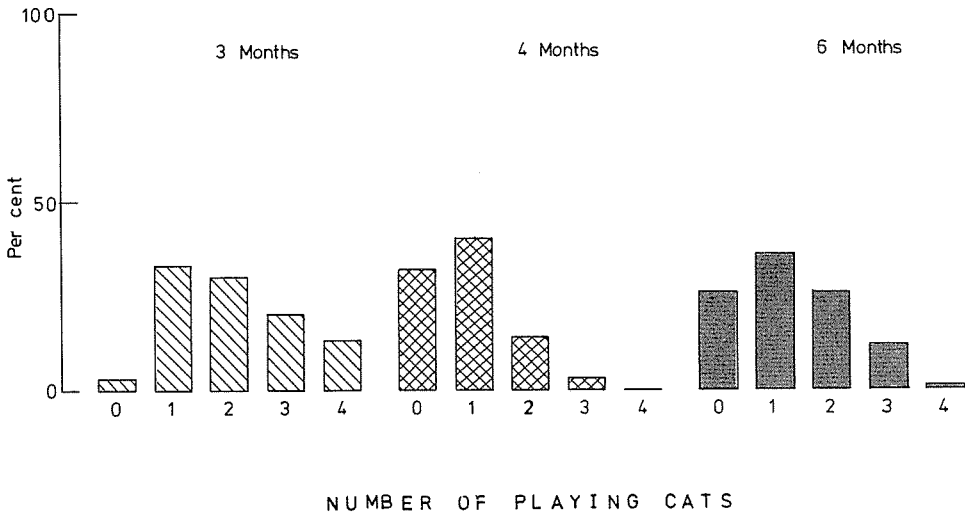


Fig. 6. The number of playing cats (exclusive of the subject) when play begins.

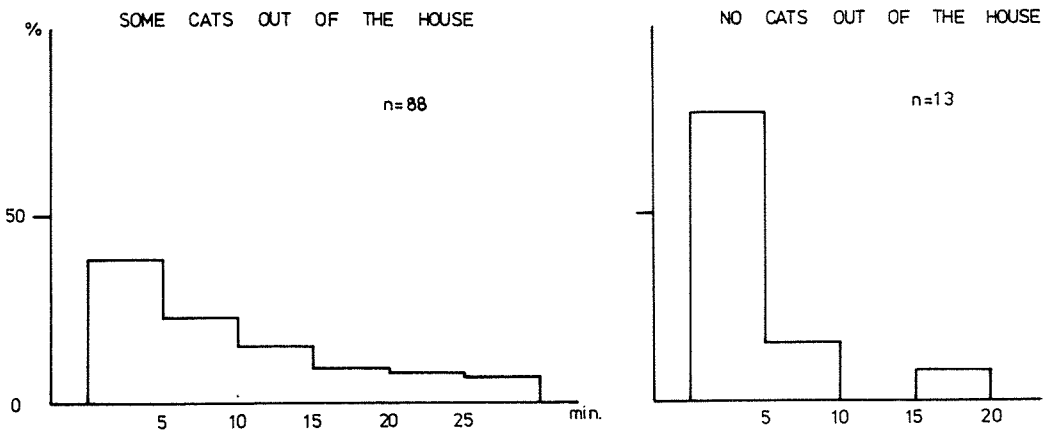


Fig. 7. The Relationship between length of the active time (time from exiting to reentering the house) and the presence of other cats outside the house. When some cats were out of the house, they stayed longer ($p < 0.05$ by U-test).

Response

The play bouts which started by leaping on or pawing of other cats were selected and divided into 2 categories. One category included those in which other cats showed some response such as Jump, Paw, Chase or Run in return. The other included those in which the other cats were ignored. Fig. 8 shows how long their playful mood can last in each case. In 2-4 month old kittens, the other cats' responses did not affect their play. In 5-9 month old kittens, their playful mood lasted longer if other cats showed some response ($p < 0.05$ by U-test). In adult cats, the other one's response had no effect.

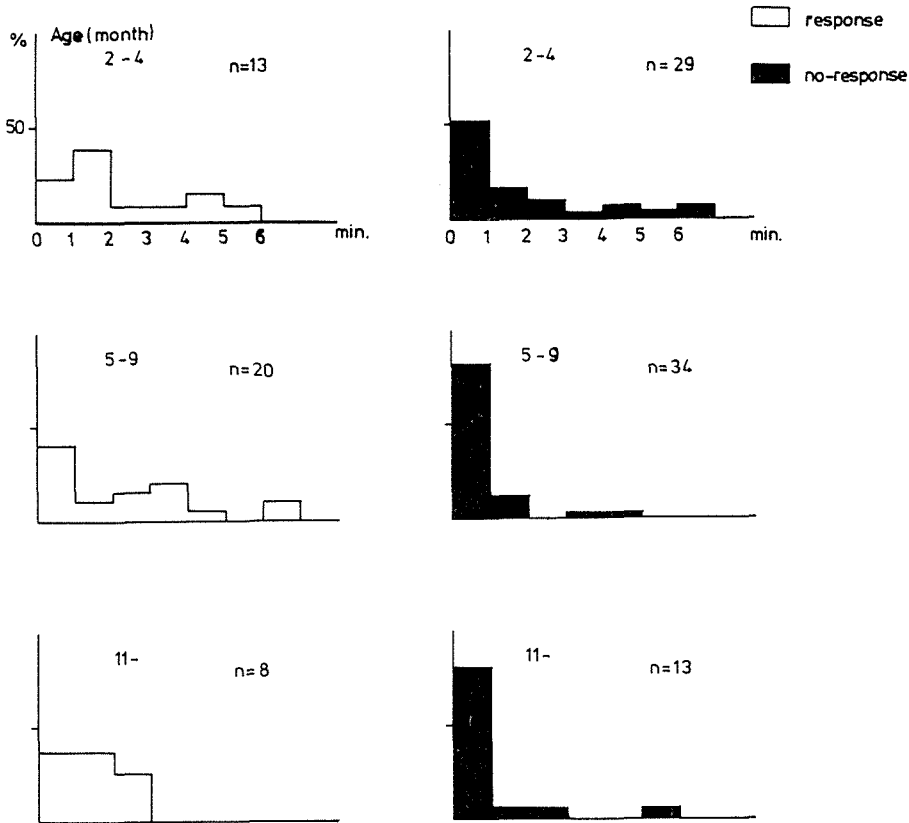


Fig. 8. The length of playful mood. The play bouts which started by leaping on or pawing of other cats were selected and divided into 2 categories. One category (response) included those in which other cats showed some response, the other (no-response) included those in which other cats were ignored.

Discussion

So far, the papers concerned with cat's play (West 1974; Barret & Bateson 1978; Caro 1980; Bateson & Young 1981; Martin & Bateson 1985a, b) have analyzed the frequency of each behavior pattern, or discriminated social play from object play. But the things that cats play with (e.g., ball of yarn, other kittens, their own or the others' tails, toys) and the behavior pattern changed from minute to minute. We thought it more natural not to record each behavior pattern but to record the type of play itself, including object play and social play.

The ratio of playful mood time to active time became lower with age (Fig. 2-b). This was due to the increasing amount of time spent in a quiet, alert state, i.e., sitting and visually attending to events in the environment but not moving (West 1974), and also due to the tendency for the duration of the playful mood time to become shorter (Fig. 4). They could not maintain their playful mood long as they grew.

First of all we want to discuss what shortened the playful mood time duration and what affected play.

1: Asynchrony of playful moods. When cats were young, their activity patterns were synchronized. With increasing age, however, their activity patterns easily lost synchrony (Fig. 2). As play occurred when the activity patterns were synchronized, play would decline with age. But even when their activity patterns were synchronized, adults seldom played. There might be alternate waves of playful and non-playful mood during the active time. Among younger kittens, activity patterns nearly coincided with playful mood patterns. On the other hand, among adults, patterns of activity did not coincide with those of the playful moods. The play of adults requires the synchrony of playful moods, in addition to the synchrony of activity patterns.

2: The presence of active cats. A cat played when there were some active cats present (Fig. 5). But these active cats were not always playing cats. As Fig. 6 shows, a cat could play even if there were no playing colleagues (among 4 and 6 month old kittens). A 3 month old kitten seldom played when there were no other playing cats. This was because their active patterns or playful mood patterns were always synchronized. Some cats had to be outside of the house for a particular cat to play. A cat seldom started to play when it was the only cat outside of the house.

3: Response of other kittens. If a cat wanted to play with another, it pawed him. Younger kittens did not care about the others' response. But 5-9 month old kittens could play longer if others showed responses such as Paw or Chase (Fig. 8). If others showed no response, they played with objects or other cats for a while, but their playful mood did not last long. The playful mood of adults did not last long whether others showed response or not.

4: Sexual behavior. Play sometimes changed into such sexual behavior as sniffing genitals (Observation 2). If a male sniffs a female's genitals, this female will stop playing. West (1974) proposed that the development of sexual behavior at about 4 months alters formerly friendly relations among males and females. Among kittens younger than 4 months old, this sexual influence was not observed.

5: Power. Play was misunderstood as real fighting, if cats could not control their power while play became exciting (Observation 3). It was not certain that MAI jumped with great force or not. But in this case JULY always played a subordinate role throughout play, that is she lay and never tried to leap on MAI. On the other hand, MAI always leaped on JULY. This play might well be misunderstood as a real fight. Usually their roles alternated in play-fighting (Observation 2). In rhesus monkeys, Symons (1974) reported that one of the conspicuous features of play-fighting was that neither monkey adopted a submissive role. When they were young and their power was not so great, their

play was not affected by their power.

6: Being bored/being tired. Playing cats were bored with play itself (Observation 1). For 2-4 month old kittens, there were too many things which attracted their attention. They were seldom bored with play. They spent almost the entire active time as playful time. They continued to play until they got tired and went in the house for sleep. Older cats easily stopped playing and sat still outside of the house. Even when they got tired and wanted to sleep, they would not go into the house. They were still in their active time but not in a playful mood. With age, this effect became stronger.

7: Distraction. Cats stopped playing because they were distracted by other things, such as a sudden sound or the sudden visit of a visitor of a human observer (Observation 6). This effect could be seen in individuals of any age.

Next, we want to discuss how play declines with age. When cats are young, they tend to leap suddenly on the other kittens or to dash toward some object. They do not care about the other's response (Fig. 8) and continue to play as long as they can continue their playful mood. It might be acceptable for them to jump on another cat suddenly. They need not show a 'play signal'. This may be because their power is not strong enough to hurt the other and because their playful moods are synchronized. Any behavior is recognized as play by each cat and is never misunderstood as a real fight. Kittens indulge in play until they get tired. The curiosity of young cats is changeable. Even when they quit playing as a result of a sudden sound, soon after they find something to play with. Things which attract the attention of kittens spring up one after another.

When a kitten grows older, his play is a little bit different from what it used to be. Rolling becomes important. This behavior was never seen in the play of 2 month old kittens. It seems that the individual which wants to play rolls. Rolling seems to be a kind of 'play signal' to start play. When a kitten grows old, his power becomes strong enough to hurt others. It needs to show 'this is play' (Bekoff 1976). Also, misinterpretations of playful moods emerge when they grow older. They do not start to play with a sudden leap. If they exhibit such a behavior, it is perceived as aggressive and they may be attacked. A kitten puts its body beneath the other's when it rolls. It seems to show by rolling that "I am subordinate". Bekoff (1974) suggested that Bow is an important behavior in initiating social play in canids. The Bow in canids appears to have the same meaning as Roll in cats. Both are helpful to show that there is no aggressiveness intended. These two behavior patterns have some relation to mating. In the domestic cat, a female rolls to invite a male during courtship. In the domestic dog there is an increase in male-female play during both pre-estrous and estrous phases (Christie & Bell 1972). Bekoff (1974) observed numerous bows in courting.

Rolling serves to delay the decline of play for a while. But, because of misunderstandings of playful moods, their strength, and sexual behavior, adults seldom play. They do, however, have active but non-playful times, when they come out of the house and sit still. Even adult cats stayed longer out of the house if others were out of the house. It might be very important to share time and space with others. They might need contact with other cats. When cats are young, they contact one another directly (physically) through play. With increasing age, they avoid being too close lest they should be attacked. D'Amato

(1986) reported that prolonged housing conditions caused behavioral desynchronization in male mice. He explained that this was due to agonistic behaviors found in long-lasting grouped male mice. Although cats avoid being too close with age, their needs for contacts do not decrease. It is sufficient for adults simply to share a little time and space in the company of others.

Acknowledgements

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