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A Dog That Seems to Know When His Owner Is Coming Home: Videotaped Experiments and Observations

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Abstract—Many dog owners claim that their animals know when a member of the household is about to come home, showing their anticipation by waiting at a door or window. We have investigated such a dog, called Jaytee, in more than 100 videotaped experiments. His owner, Pam Smart (P.S.) traveled at least 7 km away from home while the place where the dog usually waited for her was filmed continuously. The time-coded videotapes were scored blind. In experiments in which P.S. returned at randomly selected times, Jaytee was at the window 4% of the time during the main period of her absence and 55% of the time when she was returning ($p < .0001$). Jaytee showed a similar pattern of behavior in experiments conducted independently by Wiseman, Smith, and Milton (1998). When P.S. returned at nonroutine times of her own choosing, Jaytee also spent very significantly more time at the window when she was on her way home. His anticipatory behavior usually began shortly before she set off. Jaytee also anticipated P.S.'s return when he was left at P.S.'s sister's house or alone in P.S.'s flat. In control experiments, when P.S. was not returning, Jaytee did not wait at the window more and more as time went on. Possible explanations for Jaytee's behavior are discussed. We conclude that the dog's anticipation may have depended on a telepathic influence from his owner.

Keywords: dog—anticipation—telepathy—human-animal bonds

Introduction

Many dog owners claim that their animal knows when a member of the household is about to come home. Typically, the dog is said to go and wait at a door, window, or gate while the person is on the way home (Sheldrake, 1994, 1999a). Random household surveys in Britain and the United States have shown that between 45% and 52% of dog owners say they have noticed this kind of behavior (Brown and Sheldrake, 1998; Sheldrake, Lawlor, and Turney, 1998; Sheldrake and Smart, 1997).

Dog owners often ascribe their animal's anticipations to telepathy or a sixth sense, but there could be more conventional explanations:

First, the dog could be hearing or smelling its owner approaching. Second, the dog could be reacting to routine times of return. Third, it could be responding to subtle cues from people at home who know when the absent person is returning. Fourth, the animal may go to the place at which it waits for its owner when the person is not on the way home; the people at home may remember its apparent anticipation only when the person returns shortly afterward, forgetting the other occasions. Thus the phenomenon could simply be an artifact of selective memory.

In order to test these possibilities, the dog should be capable of reacting at least 10 minutes in advance, the person to whom the dog responds should come home at nonroutine times, the people at home should not know when this person is coming, and the behavior of the dog should be recorded in such a way that selective memory can be ruled out (Sheldrake, 1994). This recording of the dog's behavior can be done most effectively by means of time-coded videotape.

In this paper we describe a series of videotaped experiments and observations with a dog called Jaytee, belonging to Pamela Smart (P.S.).

Jaytee's Anticipatory Behavior

P.S. adopted Jaytee from Manchester Dogs' Home in 1989, when he was still a puppy, and soon formed a close bond with him. She lived in Ramsbottom, Greater Manchester, in a ground-floor flat, adjacent to the flat of her parents, William and Muriel Smart, who were retired. When she went out, she usually left Jaytee with her parents.

In 1991, when P.S. was working as a secretary in Manchester, her parents noticed that Jaytee used to go to the French window in the living room almost every weekday at about 4:30 p.m., around the time she set off to come home. Her journey usually took 45–60 minutes, and Jaytee would wait at the window most of the time she was on her way. Since she worked routine office hours, the family assumed that Jaytee's behavior depended on some kind of time sense.

P.S. was laid off from her job in 1993 and was subsequently unemployed. She was often away from home for hours at a time and was no longer tied to any regular pattern of activity. Her parents usually did not know when she would be returning, but Jaytee still continued to anticipate her return. His reactions seemed to occur around the time she set off on her homeward journey.

In April 1994, P.S. read an article in the British *Sunday Telegraph* about the research Rupert Sheldrake (R.S.) was doing on this phenomenon (Matthews, 1994) and volunteered to take part. The first stage in this investigation was the keeping of a log by P.S. and her parents. Between May 1994 and February 1995 on 100 occasions she left Jaytee with her parents when she went out, and they made notes on Jaytee's reactions. P.S. herself kept a record of where she

had been, how far she had traveled (usually at least 6 km and sometimes 50 km), her mode of transport, and when she had set off to come home. On 85 of these 100 occasions, Jaytee reacted by going to wait at the French window in the living room before P.S. returned, usually 10 or more minutes in advance.

When these data were analyzed statistically, a linear regression of Jaytee's waiting times against P.S.'s journey times showed that the times when Jaytee began waiting were very significantly ($p < .0001$) related to the times that P.S. set off (Sheldrake and Smart, 1998). It did not seem to matter how far away she was.

Jaytee's anticipatory reactions usually began when P.S. was more than 6 km away. He could not have heard her car at such distances, especially against the background of the heavy traffic in Greater Manchester and on the M66 motorway, which runs close to Ramsbottom. Moreover, Mr. and Mrs. Smart had already noticed that Jaytee still anticipated P.S.'s return when she arrived in unfamiliar vehicles.

Nevertheless, to check that Jaytee was not reacting to the sound of P.S.'s car or other familiar vehicles, we investigated whether he still anticipated her arrival when she traveled by unusual means: by bicycle, by train, and by taxi. He did (Sheldrake and Smart, 1998).

P.S. did not usually tell her parents in advance when she would be coming home, nor did she telephone to inform them. Indeed, she often did not know in advance when she would be returning after shopping, visiting friends and relations, attending meetings, or an evening out. But it is possible that her parents might in some cases have guessed when she might be coming, and then, consciously or unconsciously, communicated their expectation to Jaytee. Some of his reactions might therefore be due to her parents' anticipation, rather than depending on some mysterious influence from P.S. herself.

To test this possibility, we carried out experiments in which P.S. set off at times selected at random after she had left home. These times were unknown to anyone else. In these experiments, Jaytee started to wait when she set off, even though no one at home knew when she would be coming (Sheldrake and Smart, 1998). Therefore his reactions could not be explained in terms of her parents' expectations.

Our first series of investigations involved the recording of Jaytee's reactions in a notebook and, hence, necessitated a subjective assessment of his behavior. In this paper we describe a preplanned series of 12 experiments with randomly chosen return times in which Jaytee's behavior was recorded throughout the entire period of P.S.'s absence on time-coded videotape. We also discuss four videotaped experiments with randomly chosen return times carried out with Jaytee at our invitation by Wiseman, Smith, and Milton (Sheldrake, 1999b; Wiseman, Smith, and Milton, 1998).

In addition, we describe 95 videotaped observations of Jaytee's behavior in three different environments. We made these observations to find out more about the natural history of the dog's anticipatory behavior. On these occasions, P.S. did not return at randomly selected times, but rather at times of her

own choosing. She went out shopping, visiting friends or members of her family, attending meetings, or visiting pubs and returned when she felt like it. Her journeys varied in distance between 7 and 22 km away from home. They took place at various times of the day or evening and followed no routine pattern. When she left Jaytee with members of her family, they were not informed when she would be returning, and she usually did not know in advance herself. On 50 occasions, Jaytee was left on his own.

We also carried out a series of 10 control observations in which Jaytee was filmed continuously on evenings when P.S. was not returning home, or was returning unusually late.

Methods

In these experiments, when P.S. went out she left Jaytee either with her parents, William and Muriel Smart; or alone in her own flat in Ramsbottom, Greater Manchester, next door to her parents' flat; or with her sister, Cathie MacKenzie, in the nearby town of Edenfield. Having left Jaytee, P.S. traveled a minimum distance of 7 km. She recorded in a notebook the details of where she had been, when she set off to come home, how long her journey took, and her mode of transport. In some cases she traveled in taxis or in cars belonging to her sisters or friends, but in most cases she traveled in her own car, since we had already established that Jaytee's anticipatory behavior still occurred when she traveled in unfamiliar vehicles, and hence could not be explained in terms of the dog hearing her car (Sheldrake and Smart, 1998).

While P.S. was out, Jaytee's visits to the window and his absences from it were monitored continuously on videotape. The videotaping procedure was kept as simple as possible, so that the filming of Jaytee could be done routinely and automatically. The video camera was set up on a tripod and left running continuously in the long-play mode with a long-play film, with the time-code recorded on it. In this way up to 4 hours of continuous observation was possible without anyone needing to attend to the camera. P.S. switched the camera on just before she left and switched it off when she returned. Because of the need to keep Jaytee's visits to the window under continuous surveillance, all experiments involved absences of less than 4 hours.

The camera pointed at the area where Jaytee usually waited. In both P.S.'s parents' flat and in P.S.'s own flat (a ground-floor flat adjacent to her parents') this was by the French window in the living room, through which he could see the road outside where P.S. drew up and parked her car. In P.S.'s sister's house, Jaytee jumped up onto the back of a sofa from which he could see out of the window.

Experiments With Randomly Selected Return Times

In a preplanned series of 12 experiments with randomly selected return times, Jaytee was left at P.S. parents' flat and neither P.S. nor her parents knew

in advance when she would be returning. In all these experiments, P.S. traveled in her own car.

P.S. was beeped on a telephone pager when it was time to set off home. On most occasions, the random selection of the times and the beeping of P.S. were done by R.S., who was in London, over 300 km away. On two occasions (on November 19, 1996 and July 1, 1997) the selection of random times and the beeping was done by another person in London who was unknown to P.S. and Jaytee.

These beep times were within a prearranged period, between 45 and 90 minutes long. This period commenced 80 to 170 minutes after P.S. had gone out. The beep window was then divided into 20 equal intervals, and one of these was selected at random by throwing a die three times, to determine the page, row, and column in standard random number tables (Snedecor and Cochran, 1967). Reading downward from this point looking at the first two digits of each random number, the first pair of digits between 01 and 20 determined the time at which the beep was to be given.

Three of the 12 experiments were carried out in the afternoon, with beeps at 2:22, 3:04, and 3:36 p.m.; the remaining experiments were carried out in the evening with beeps at a range of times between 8:09 and 9:39 p.m.

Observations in Different Environments

We carried out a preplanned series of 30 observations in P.S.'s parents' flat between May 1995 and July 1996. Seven of P.S. absences were in the daytime, at various times in the morning and afternoon, with P.S.'s times of return ranging from 11:13 a.m. to 3:36 p.m. Twenty-three were in the evening, with P.S. returning at a range of times between 7:30 and 10:45 p.m. The length of her absences ranged from 85 to 220 minutes.

In P.S.'s parents' flat we also carried out a preplanned series of 10 control experiments on evenings when P.S. was not returning or coming home unusually late. Her parents were not informed that she would not be returning during the 4-hour period that the videotape was running. This series of observations was made between July and November 1997, during the period when we were doing experiments with randomly selected return times.

We also carried out a preplanned series of 50 observations in P.S.'s own flat, where Jaytee was left on his own, between May 1995 and September 1997. On 15 of these occasions, P.S. went out and returned in the morning, with times of return ranging from 9:59 to 11:57 a.m.; on 34 occasions she returned in the afternoon, at a range of times between 12:20 and 4:50 p.m.; and on one occasion she returned in the evening, at 9:27 p.m. The length of her absences ranged from 81 to 223 minutes.

The five observations at P.S.'s sister's house were conducted between October 1995 and June 1996, two in the morning and three in the evening, with absences ranging from 93 to 199 minutes.

Analysis of Videotapes and Tabulation of Data

The videotapes were analyzed blind by Jane Turney and/or Dr. Amanda Jacks, who did not know when P.S. set off to come home or other details of the experiments. Starting from the beginning of the tape, they recorded the exact times (to the nearest second) when Jaytee was in the target area near the window and made notes on his activities there: for example that he was barking at a passing cat, sleeping in the sun, or sitting looking out of the window for no apparent reason. In cases where the same tape was scored blind by both people, the agreement between their records was excellent, showing occasional differences of only a second or so. (Although the scoring was carried out blind, when the end of the tape was reached and P.S. was seen entering the room, the judges then knew at what time she had arrived, and hence were no longer blind. But by this time the data had all been recorded and were not subsequently altered.) Some of the videotapes were also scored independently by P.S. and R.S. to see how well their records corresponded to each other and to the blind scores by Jane Turney of Amanda Jacks. Again the agreement was excellent, with occasional differences of only a second or two.

For the tabulation of the data, two methods were used. First, all the visits of Jaytee to the window were included, even if he was there for reasons that seemed to be unconnected with his anticipatory behavior, for example if he was simply sleeping in the sun, barking at passing cats, or watching people unloading cars. In this way any selective use of data was avoided, although the data were noisy because they included irrelevant visits to the window that had nothing to do with P.S.'s returns. Second, these visits to the window that seemed to have nothing to do with Jaytee's anticipatory behavior were excluded. This set of data was cleaner but more dependent on subjective assessments. However, since these assessments were done blind they should not have involved any systematic bias.

Statistical Analysis

We used two main methods of analyzing the data, both of which were preplanned. The first provided a simple way of averaging and comparing different experiments. For each experiment, the percentage of the time that Jaytee spent by the window was calculated for three periods:

1. The first 10 minutes after P.S. got into her car and started traveling homeward (the return period). In the case of experiments with randomly selected return times, this return period was deemed to begin at the time P.S. received the beep signaling that she should set off. All homeward journeys lasted at least 13 minutes. Thus Jaytee's reactions in the last 3 or more minutes of P.S.'s journey were omitted from the analysis in case he could have been responding to the sounds of her car approaching. In fact most journey times were more than 15 minutes long, so more than five minutes of Jaytee's behavior were omitted. In cases where the jour-

ney time lasted 23 minutes or more, the percentage of time for the combined first and second 10-minute periods of the return journey was also calculated, and a separate statistical analysis was carried out for comparison with the usual method involving only 10-minute return periods.

2. The 10-minute period prior to the return period (the prereturn period).
3. The time when P.S. was absent prior to the prereturn period (the main period). Because the experiments varied in length, the length of the main period ranged between 50 and 200 minutes.

The percentage of the time that Jaytee spent by the window in these three periods was analyzed statistically by a repeated-measures analysis of variance (ANOVA), and comparisons of pairs of periods were made using the paired-sample *t* test.

The second method of analyzing the data also involved 10-minute return periods, but the main period was also divided up into 10-minute intervals, defined in relation to the time at which P.S. was beeped to come home. The total number of seconds that Jaytee spent by the window in each of these 10-minute periods was then plotted on graphs. In cases where P.S.'s return journey lasted 23 minutes or more, data for two 10-minute return periods are shown on the graphs, representing the first 20 minutes of her homeward journey.

A statistical analysis of the time-course data (including all visits to the window) was carried out for us by Dr. Dean Radin using a randomized permutation analysis (RPA) (Good, 1994; Hjorth, 1994). For each data set, he calculated the correlation between time at the window versus the 10-minute segment number of the original data for all experiments (as plotted in the graphs in Figure 4). These correlations showed strong positive trends. The RPA calculations made the assumption that under the null hypothesis, Jaytee should have spent about the same amount of time at the window in each of the 10-minute periods. The *z* scores were formed as *z* = (original correlation – average permutated correlation)/(standard deviation of permutated correlations), based on 500 random permutations. The RPA tests converged very rapidly; typically only about 100 random permutations were needed, so the estimated *z* scores with 500 permutations were quite accurate.

Results

Experiments With Randomly Selected Return Times

The overall results summarized in Figure 1 show that Jaytee was at the window far more when P.S. was on her way home than during the main period of her absence. When all Jaytee's visits to the window were included in the analysis (Figure 1A), he was at the window for an average of 55% of the time during the first 10 minutes of P.S.'s return journey, as opposed to 4% of the time during the main period of P.S.'s absence. During the 10-minute prereturn period he was at the window 23% of the time. These differences were highly significant statistically (repeated-measures ANOVA, F value [df 2, 22] = 20.46;

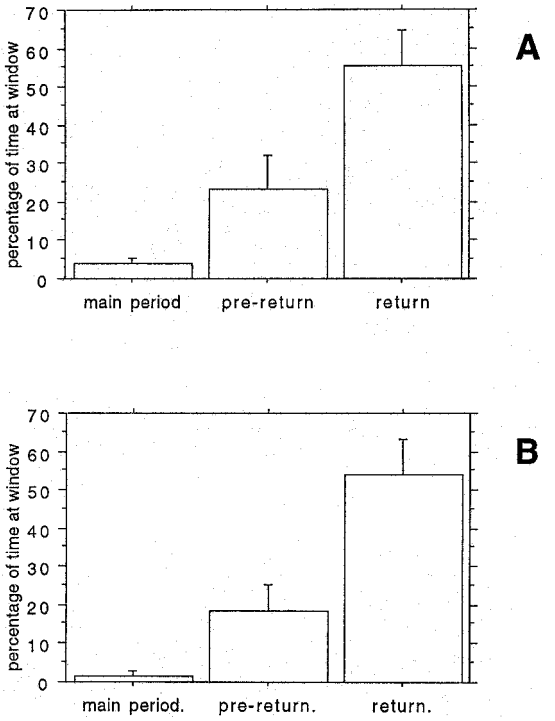

Fig. 1. The average percentage of time spent at the window by Jaytee during the main period of P.S.'s absence (main period) during the 10 minutes prior to her setting off to come home (prereturn), and during the first 10 minutes of her homeward journey (return). Standard errors are indicated by bars. (A) Data for all visits to the window. (B) Data excluding irrelevant visits.

$p < .0001$; paired-sample t test comparing main period with return period $p = .0001$).

When Jaytee's irrelevant visits to the window were excluded from the analysis, the general pattern was very similar (Figure 1B), but the percentage of time at the window was of course somewhat lower. In the main period Jaytee spent 0.5% of the time by the window, in the prereturn period 18%, and in the return period 54%. The significance of these differences was higher than when all Jaytee's visits were included (repeated-measures ANOVA, F value [df 2, 22] 24.36; $p = 3 \times 10^{-6}$).

In six out of the 12 experiments, P.S.'s return journeys took more than 23 minutes and hence included two 10-minute periods rather than just one. In the analysis shown in Figures 1A and B, only the first 10-minute return period was included. When both 10-minute return periods from these experiments were included in the analysis, the average percentage of time at the window during the return period increased from 55% to 61% when all visits to the window

were included, and from 54% to 59% when irrelevant visits were excluded. The statistical significance of the differences was even higher than before [repeated-measures ANOVA, F values (df 2, 22) 25.43 and 29.03 respectively].

The increased percentage of time the Jaytee spent at the window during the 10-minute prereturn period was statistically significant (paired-sample t test comparing main period with prereturn period for the data included all visits to the window, $p = .04$). The difference between the prereturn and return periods was very significant ($p = .0009$). However, Jaytee did not visit the window in the prereturn period in all experiments, but only in seven out of 12.

The detailed time courses for all 12 beep experiments are shown in Figure 2. The graphs show the duration of all Jaytee's visits to the window in each 10-minute period, both with and without the exclusion of irrelevant visits. In one of these experiments, Jaytee did not go to the window at all, but in all the others he was at the window for the highest proportion of the time when P.S. was on her way home.

In six of these experiments, P.S. was beeped to come home in the first half of the beep window (early beep) and in the other six she was beeped in the second half (late beep). Inspection of the graphs shows that Jaytee responded in the prereturn period in only two of the early-beep experiments, whereas he did so in five of the late-beep experiments (three when irrelevant visits to the window were excluded).

Thirty Ordinary Homecomings

In order to observe how Jaytee behaved under more or less natural conditions, we made a preplanned series of 30 videotapes of Jaytee at P.S.'s parents' flat while P.S. went out and about. She returned at times of her own choosing, ranging from 11:13 a.m. to 10:45 p.m., with absences ranging from 85 to 220 minutes. P.S. did not tell her parents when she would be returning, and usually she did not know in advance herself.

The overall results are shown in Figure 3A. The general pattern is clear. On average, Jaytee was at the window for the highest proportion of the time (65%) in the return period, when P.S. was on her way home. He was at the window 31% of the time in the 10-minute prereturn period, and only 11% of the time during the main period of her absence. These differences were highly significant statistically ($p < .0001$). The paired-sample t test (two-tailed) showed that the difference between the main period and return period was significant at $p < .0001$, between the prereturn and return period at $p = .008$, and between the main period and prereturn period at $p = .0009$.

A number of interesting details are hidden by this averaging process. First of all, although on 24 occasions Jaytee spent more time at the window when P.S. was on her way home, on six occasions he did not. On five (all in the evening) he did not go to the window at all during the first 10 minutes of her homeward journey. On the sixth (in the morning) he did so for only 10 seconds. On some of these occasions he was unusually inactive and may have been exhausted

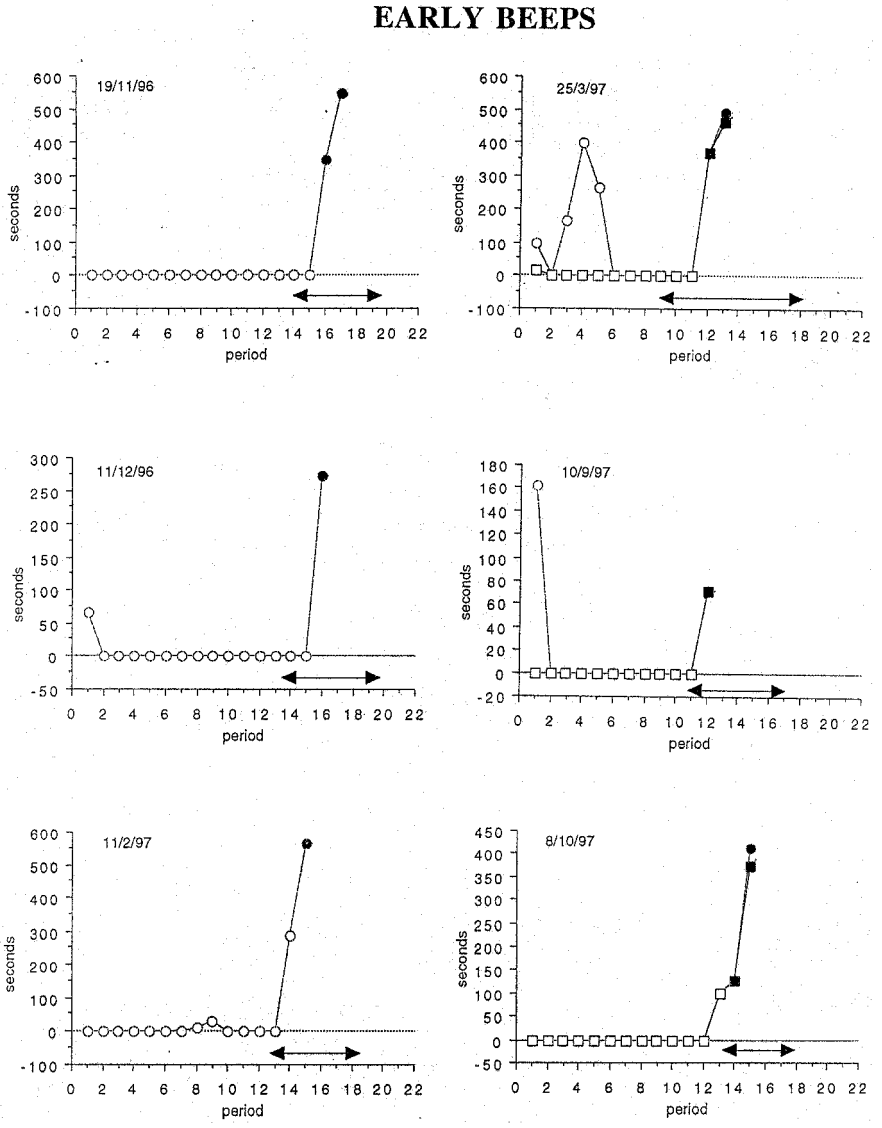

Fig. 2. The time courses from all 12 experiments in which P.S. came home at randomly selected times in response to being beeped. The ordinate shows the total number of seconds that Jaytee spent at the window in each 10-minute period, the abscissa the series of 10-minute periods defined in relation to the time at which P.S. was beeped to come home. Data for all Jaytee's visits to the window, including irrelevant visits, are indicated by circles, and data from which irrelevant visits have been excluded are indicated by squares. The beep

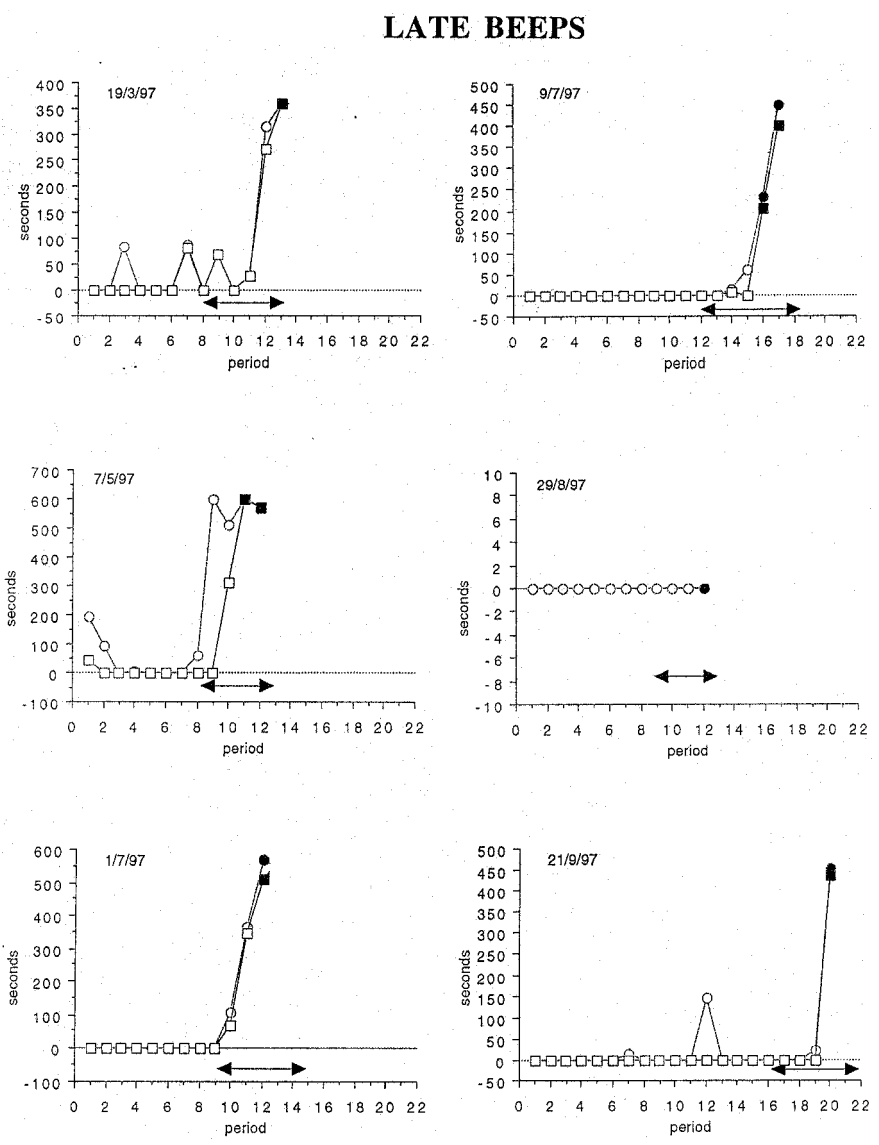

Fig. 2 (continued). window is indicated by a line with two arrowheads, and this represents the period during which P.S. could have received the signal to come home. Experiments with beeps in the first half of the beep window (early beeps) are on the left, and those with beeps in the second half of the beep window (late beeps) are on the right. The points for the 10-minute periods immediately following the beep during which P.S. was returning are indicated by filled circles or squares.

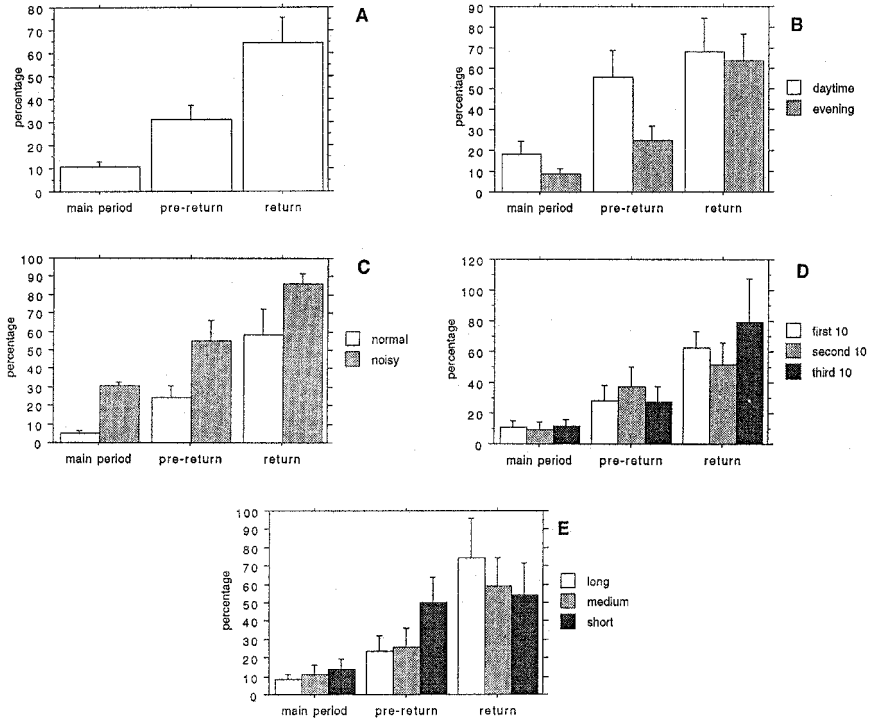

Fig. 3. Percentage of time spent at the window by Jaytee during the main period of P.S.'s absence, during the 10 minutes prior to her setting off to come home (prereturn), and during the first 10 minutes of her homeward journey (return). Standard errors are indicated by bars. (A) Averages from 30 ordinary homecomings. (B) Comparison of experiments in the daytime (7) and in the evening (23). (C) Comparison of normal experiments (23) and noisy experiments (7) in which Jaytee was at the window for more than 15% of the time during the main period of P.S.'s absence. (D) Comparison of the first, second, and third groups of 10 experiments. (E) Comparison of long (13), medium (9), and short (8) experiments.

after long walks or sick. But irrespective of the reasons for his unresponsiveness, the fact is that he did not show his usual signs of anticipation on six out of 30 occasions.

Second, in the daytime Jaytee was generally more active and alert than in the evening, and on average he was at the window more (Figure 3B). There was more activity outside for him to watch, and on sunny days he tended to snooze by the window in the sunlight.

Third, the effect of data noise on the pattern of Jaytee's response can be examined directly by comparing noisy experiments with normal experiments (Figure 3C). Noisy experiments were defined as ones in which Jaytee spent more than 15% of the time at the window in the main period. By this criterion

seven out of the 30 experiments were noisy. Most noisy experiments occurred in the daytime when there was much activity outdoors that Jaytee went to the window to watch. Also, on sunny days he tended to lie down by the window in the sun and go to sleep. Nevertheless, in both normal and noisy experiments Jaytee was at the window least in the main period, more in the prereturn period and most when P.S. was actually returning. These differences were highly significant for both normal and noisy experiments analyzed separately ($p = .0004$ and $p = .0001$, respectively).

Fourth, the question of whether Jaytee's pattern of response changed with time can be examined by comparing the average of the first 10 experiments (from May to September 1995) with the second (from September 1995 to January 1996) and third batches of 10 experiments (from January to July 1996). The pattern was similar in all three groups (Figure 3D).

Finally, the length of time that P.S. was away from home varied considerably. Did Jaytee behave in a similar way when she returned after short absences and after longer ones? To explore this question, we have divided the data up into three groups: long, medium, and short absences, defined respectively as 180 minutes or more, 110–170 minutes, and 80–100 minutes. The general pattern in all three groups was similar, but in the short absences the experiments were noisier, and Jaytee showed more anticipation in the prereturn period (Figure 3E).

Since Jaytee was at the window most in the final period, when P.S. was on the way home, could it be that Jaytee simply went to the window more and more when P.S. was out? If he did so, he would automatically be at the window most in the final period whatever the length of the experiment, and more in the penultimate period that in the previous periods.

The going to the window more and more hypothesis can be tested by looking in more detail at the average time courses of long, medium, and short experiments in Figure 4. This figure shows data from all the experiments, as well as from the normal experiments after the exclusion of the minority of noisy experiments, which tended to obscure the usual pattern.

The data in Figure 4 show that Jaytee's waiting at the window occurred soonest in the short experiments, later in the medium experiments and latest in the long experiments. In other words, Jaytee's behavior was more closely related to P.S.'s impending return than to the amount of time that had elapsed since she went out. If Jaytee had simply gone to the window more and more as time went on, there should have been little or no difference between the time he spent there in the long, medium, and short experiments in any given period. This can be tested statistically. (In the following analyses, all the data were included, with no exclusions of noisy experiments.)

When P.S. was returning in the short experiments in period 8, Jaytee was at the window a significantly higher proportion of the time than in period 8 of the medium and long duration experiments (by a factorial analysis of variance, $p = .004$). Likewise, Jaytee spent a significantly higher proportion of the time at the window when P.S. was on the way home in the medium experiments in

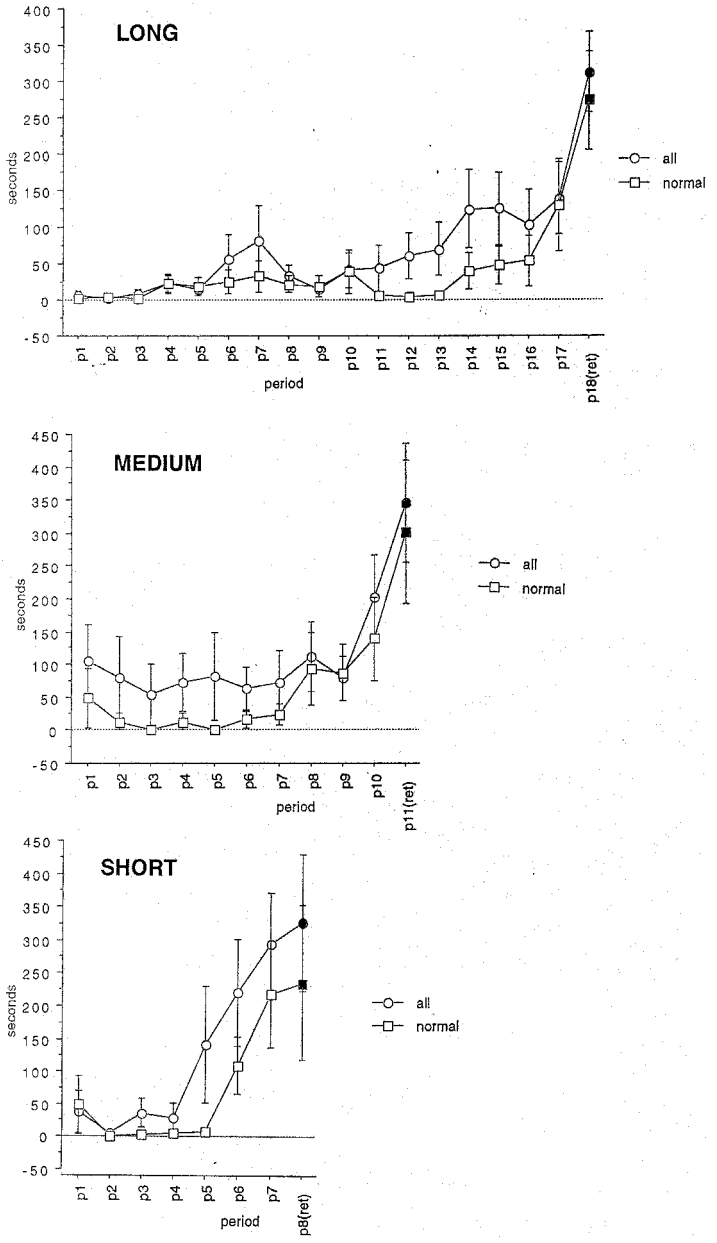

Fig. 4. The time courses of Jaytee's visits to the window during P.S.'s long, medium, and short absences. The horizontal axis shows the series of 10-minute periods (p1, p2, *etc.*). The vertical axis shows the average number of seconds that Jaytee spent at the window in each 10-minute period. Data for all 30 experiments are shown, as well as data for normal experiments after the exclusion of the seven noisy experiments. The last period shown on the graph represents the first 10 minutes of P.S.'s return journey (ret), the point for this is indicated by a filled circle or square. The bars show standard errors.

period 11 than in period 11 of the long absences, when she would not be returning for more than another hour ($p = .003$).

In a randomized permutation analysis (RPA), including all experiments, the observed time courses were tested against the null hypothesis that Jaytee should have spent about the same amount of time at the window in each of the 10-minute periods. The probabilities that the observed pattern of data differed from the null hypothesis by chance were

Long experiments	$p < .0008$
Medium experiments	$p < .01$
Short experiments	$p < .008$
Combined	$p < .000003$

Jaytee's Behavior When P.S. Was Not Returning

In order to study Jaytee's behavior when P.S. was not coming home, we filmed him at P.S.'s parents' flat on 10 evenings when P.S. was either spending the night away from home or coming home at least one hour after the filming period had terminated. Figure 5 shows the average time he spent at the window in the series of 10-minute periods between 6:30 and 10:00 p.m. In these control observations, Jaytee made a number of visits to the window for a variety of reasons, as usual, but he did not go to the window more and more as the evening went on.

Observations on Jaytee at P.S.'s Sister's House

P.S. sometimes left Jaytee at her sister's house, and here too he usually went to the window when she was coming home. P.S. did not tell her sister when she would be returning, but her sister usually knew when she was on her way because of Jaytee's behavior.

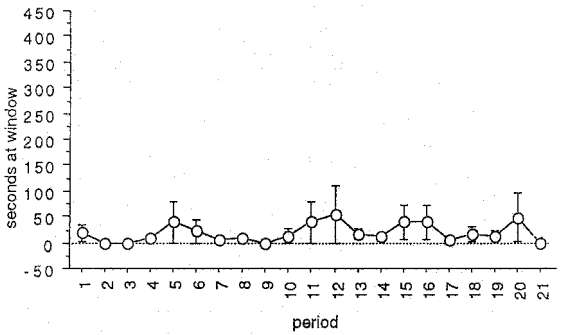

Fig. 5. Time spent by Jaytee by the window on evenings when P.S. was not coming home. The first of the 30 10-minute periods was from 6:30 to 6:40 p.m., the last from 9:50 to 10:00 p.m. The figures shown are averages from 10 evenings. The bars show standard errors.

In this house, in order to look out of the window Jaytee had to balance himself on the back of a sofa. Unlike the situation in P.S.'s parents flat and in her own flat, Jaytee could not wait by the window comfortably and rarely stayed for long. Nevertheless, in a series of five videotaped experiments, his general pattern of response (Figure 6A) was similar to that in P.S.'s parents' flat (Figure 3), although the percentage of time spent at the window was lower, the variability was greater and differences were not statistically significant.

Observations on Jaytee Left on His Own

We carried out a preplanned series of 50 videotaped experiments in which Jaytee was left by himself in P.S.'s own flat while she went out. The overall pattern (Figure 6B) was similar to that in P.S.'s parents' flat (Figure 3) and her sister's house (Figure 6A). The differences were significant statistically (repeated-measures ANOVA, $p < .01$; paired-sample t test comparing the main period with return period, $p < .005$). But the average proportion of the time at the window was lower than in P.S.'s parents' flat.

A closer analysis of the data revealed that Jaytee showed two different patterns of response. In most of the tests (35 out of 50) Jaytee did not go to the window when P.S. was on her way home. In fact he made few or no visits to the

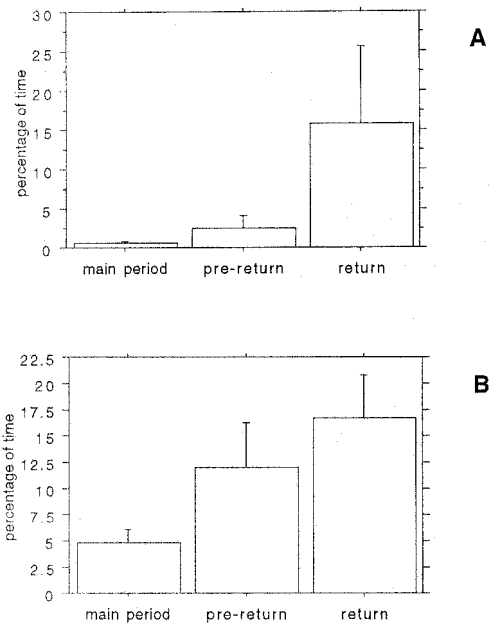

Fig. 6. Percentage of time spent by the window by Jaytee during the main period, prereturn, and return periods. The bars show standard errors. (A) In P.S.'s sister's house (average of five experiments). (B) Alone in P.S.'s flat (average of 50 experiments).

window during the entire time she was absent. One reason may be that the view from the window was largely obscured by a bush, so there was not much scope for watching activities outside, although it was still possible to see the road on which P.S. approached in her car.

By contrast, in 15 out of 50 experiments (30%), Jaytee behaved much as he did at P.S.'s parent's flat and showed his usual anticipatory waiting while P.S. was preparing to come home and while she was on her way.

An Independent Replication

During the course of our research with Jaytee, at our invitation Wiseman, Smith, and Milton carried out four experiments with Jaytee, three at P.S.'s parents' flat and one at her sister's house. During these experiments, Wiseman filmed Jaytee while Smith accompanied P.S. and returned with her at randomly selected times in cars unfamiliar to Jaytee (Wiseman, Smith, and Milton, 1998).

In all three experiments at P.S.'s parents' flat, the pattern of response was very similar to the pattern we observed, with Jaytee at the window most when P.S. was returning. Using the same definition of the main, prereturn, and return periods used in Figure 1, the average proportion of the time that Jaytee spent at the window was 4% in the main period, 48% in the prereturn period, and 78% in the return period. The differences between the periods were significant (by repeated-measures ANOVA, $p = .02$; comparison of the main period with return period by the paired-sample t test, $p = .03$). When the time courses were plotted following the same method used in our Figure 2, they showed a very similar pattern (Figure 7).

Wiseman, Smith, and Milton recorded Jaytee's behavior only during the experimental period during which P.S. could have been asked to go home, and have no data on his behavior during the preceding period, up to 90 minutes long, from the time that P.S. left home until the beginning of the experimental period. This is the main difference between the graphs from Wiseman, Smith, and Milton's experiments and our own.

In Wiseman, Smith, and Milton's experiment at P.S.'s sister's house, the first time Jaytee went to look out of the window for no apparent reason coincided with P.S. setting off to come home.

In spite of these striking effects, Wiseman, Smith, and Milton (1998, 2000) portrayed their results as a refutation of Jaytee's ability to anticipate P.S.'s returns. They arrived at this conclusion by the use of narrow and arbitrary criteria for Jaytee's signal, based on his going to the window for no apparent external reason for a brief period (less than a minute in one experiment, and for at least two minutes in the others). They disregarded the rest of their own data and did not plot graphs.

Unfortunately Wiseman, Smith, and Milton based their criteria not on the waiting behavior of Jaytee that we had already observed and documented on more than 100 occasions before they carried out their tests (Sheldrake and

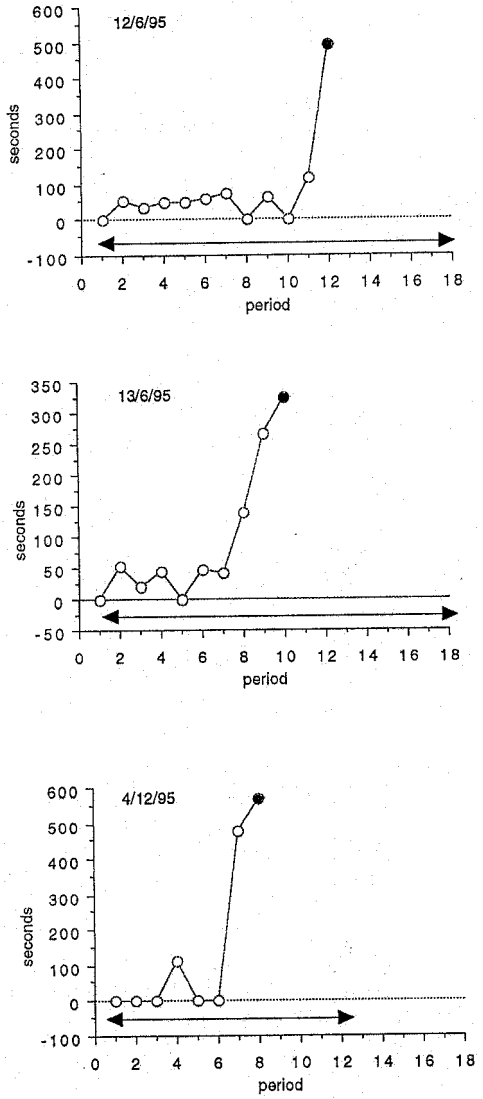

Fig. 7. The time courses from the three experiments conducted by Wiseman and Smith with Jaytee at P.S.'s parents' flat. The data are taken from Wiseman, Smith, and Milton (1998); the graphs are plotted in the same way as those in Figure 2 and show the total amount of time that the dog spent at the window in successive 10-minute periods, defined in relation to the randomly selected time at which P.S. was told to return home. The final point on each graph, indicated by a filled circle, represents the first 10 minutes of P.S.'s return journey.

Smart, 1998), but rather on a claim made by the media about Jaytee's behavior. They showed, unsurprisingly, that statements on popular television shows are sometimes oversimplified. Ironically, the way their own skeptical conclusions were publicized in the media provided several striking examples of misleading claims (Sheldrake, 1999b, 2000).

Discussion

Normal Explanations of Jaytee's Behavior

The data presented in this paper imply that Jaytee's waiting by the window when his owner is coming home cannot be explained in terms of any of the following hypotheses:

1. Routine. Jaytee's anticipatory behavior when P.S. was coming home occurred at various times in the morning, afternoon, and evening and did not depend on a routine time of return. This was apparent in the series of 30 ordinary homecomings (Figures 3 and 4) as well as in our experiments with randomly selected return times (Figures 1 and 2; see also Sheldrake and Smart, 1998). The data from the experiments of Wiseman, Smith, and Milton (1998) with randomly selected return times replicate and confirm our own findings (Figure 7). Moreover, in control observations when P.S. was not coming home Jaytee did not start waiting at a particular time (Figure 5).

2. Hearing a familiar vehicle. In many experiments, Jaytee's anticipatory behavior was already apparent in the prereturn periods (Figures 2, 3, 4, and 6) before P.S. had actually set off in a vehicle, and hence before he could have heard any characteristic sounds. When she was actually traveling home, Jaytee was waiting at the window when the vehicle was at least 7 km away, and in some cases more than 25 km. Although dogs can hear higher pitches than human beings, their general sensitivity to noise levels is similar to that of people (Munro, Paul, and Cox, 1997; Shiu, Munro, and Cox, 1997). It is not possible that Jaytee could have heard the sounds of familiar cars at such distances against all the background noises of Greater Manchester, and in a manner independent of the direction of the wind. Moreover, Jaytee also waited for P.S. in a similar way when she was traveling in taxis or other unfamiliar vehicles (Sheldrake, 1999a; Sheldrake and Smart, 1998), an effect replicated by Wiseman, Smith, and Milton (Figure 7).

3. Picking up clues from people at home. P.S. did not tell her parents or her sister when she would be coming home, and often did not know in advance herself. But perhaps in some of P.S.'s ordinary homecomings, her parents or her sister might have guessed approximately when she would return and consciously or unconsciously communicated their expectation to Jaytee. But this possibility cannot account for Jaytee's behavior in the trials with randomly selected return times (Figures 1, 2, and 7) nor when he was alone (Figure 6B).

4. Selective memory or selective reporting of data. The video recordings permitted all Jaytee's visits to the window to be recorded, and the data presented in this paper include all the visits he made, even when these were obviously

related to events going on outside, such as cats passing the window, or when he was sleeping by the window in the sunlight. The videotapes were analyzed blind by people who did not know the details of the experiments. Hence there was no scope for selective memory or selective reporting of data. The data from the experiments conducted with Jaytee by Wiseman, Smith, and Milton (1998) also show the same pattern of behavior by Jaytee as our own experiments (Figure 7).

5. Jaytee going to the window more and more the longer his owner was absent. The data in Figure 4 and the statistical analysis described above show that Jaytee's visits to the window were not explicable in terms of his going there more and more the longer P.S. had been absent. Nor did he go to the window more and more as time went on in the control experiments (Figure 5). His waiting by the window was related to P.S.'s returns, rather than to the length of time she had been away from home.

The Possibility of Telepathy

Jaytee seemed to be detecting P.S.'s intention to come home in a way that could not be explained in terms of any of the normal hypotheses considered above. Perhaps he was responding to her intentions or thoughts telepathically.

The hypothesis of telepathy would not only agree with Jaytee's waiting behavior when P.S. was actually on her way home, but it could help to explain why Jaytee began to spend more time at the window before she set off. In real-life situations when P.S. returned home at nonroutine times of her own choosing, Jaytee's anticipations regularly began in the prereturn period, before she started driving home (Figures 3, 4, and 6; see also Sheldrake and Smart, 1998). This pattern of behavior is in good agreement with the telepathic hypothesis because prior to getting into a car and driving, or being driven, P.S. was forming the intention to go home and preparing to do so. If Jaytee was responding telepathically to her intention to return, he would be expected to show this anticipation before she actually got into the car.

But Jaytee also showed signs of anticipation in the experiments when P.S. returned at randomly selected times, *before* she received the signal to go home (Figures 1 and 2). How could he have anticipated when P.S. was going to be beeped?

It is perhaps conceivable that Jaytee was telepathically picking up R.S.'s intention to beep P.S. from over 300 km away, but we do not take this possibility very seriously. On one occasion (on July 1, 1997) the beeping was done not by R.S. but by someone neither P.S. nor Jaytee had met, and Jaytee still responded in advance (Figure 2). It is also perhaps conceivable that Jaytee had a precognition of when P.S. would be beeped. But this would involve introducing another paranormal hypothesis in addition to the telepathic hypothesis. It is more economical to consider a possible explanation in terms of telepathy from P.S.

In all the experiments with randomly selected return times, P.S. knew that she would be beeped to come home within a particular time period. Ideally, her

mind would have been entirely engaged with other concerns until the beep came. But unavoidably she was sometimes thinking about the signal to go home before it came, especially if it came toward the end of the period of time in which she knew she would be beeped. Jaytee might have picked up these anticipatory thoughts, just as he seemed to respond to a fully formed intention to go home.

If Jaytee was indeed responding to P.S.'s expectation that she would soon be receiving the signal to return, then this anticipatory effect would be expected to show up more when the beep came toward the end of the period in which she knew she would be beeped than at the beginning. In four out of six of the trials in which P.S. was beeped in the first half of the beep period (early beep), Jaytee did not show any anticipation prior to P.S. setting off (Figure 2). By contrast, there were signs of anticipation in all but one of the late-beep trials. The exception was a trial in which Jaytee did not go to the window at all throughout the entire experiment. Thus Jaytee's anticipation of the beep signaling P.S.'s return may have been related to her own anticipation of the beep, which tended to be greater the later the signal came.

A similar anticipation of P.S.'s setting off occurred in the experiments conducted by Richard Wiseman and Matthew Smith (Figure 7). Here again, Jaytee's early response may well have taken place in response to P.S.'s anticipation. While she was with Smith waiting for him to tell her when to return, she found it impossible not to think about going home. Smith himself knew when they were going to set off because the randomly determined time had been set in advance (Wiseman, Smith, and Milton, 1998). He could well have communicated his anticipation to P.S. unconsciously, for example through an increasing tenseness as the predetermined time approached. Moreover, in all three experiments, the randomly selected return time was in the second half of the experimental period, corresponding to the late beeps in our own experiments (Figure 2B).

This increasing anticipation by P.S. that she would soon be going home as the experimental period progressed was an unavoidable feature of the experimental design adopted both by ourselves and by Wiseman, Smith, and Milton.

Why Did Jaytee Sometimes Not React to P.S.'s Returns?

In all our series of experiments with Jaytee, on some occasions he did not show his usual anticipatory behavior. In our preliminary series of 100 observations, he failed to do so on 15 occasions. On some of these occasions he was tired after long walks; on some he was sick; on others he was distracted by a bitch in heat in a neighboring apartment (Sheldrake and Smart, 1998). But in a few cases there was no obvious reason for his failure to react. In our series of 12 experiments with randomly selected return times, he did not go to the window at all in one experiment (Figure 2). In the series of 30 ordinary homecomings, he did not show his anticipatory behavior in six experiments.

When Jaytee was left in P.S.'s flat on his own, his lack of anticipatory behav-

ior was usual rather than exceptional. On most occasions he did not go to wait for her at the window or indeed visit the window at all. Nevertheless on 15 out of 50 occasions he showed his usual pattern of anticipation, waiting at the window when P.S. was returning. Thus he seemed capable of anticipating P.S.'s returns when he was on his own, but did not usually do so. Why not? Our guess is that it was a matter of motivation. His waiting at the window while P.S. was on her homeward journey may have been more for the sake of communicating his anticipation to members of P.S.'s family, as if to tell them she was on her way. When there was no one to tell, he was less motivated to wait at the window. Nevertheless, he sometimes did it anyway.

The difference in his behavior in P.S.'s own flat and in her parents' was a matter of degree. In both places, he sometimes waited by the window when P.S. was returning, and sometimes failed to wait there. In P.S.'s parents' flat the ratio of occasions on which he waited to those he did not was around 80:20, whereas when he was alone in P.S.'s own flat it was 30:70.

Evolutionary Implications

The hypothesis that some dogs, such as Jaytee, can anticipate their owners' arrivals telepathically obviously needs to be tested further. We have already obtained comparable results with several other dogs. Similar anticipatory behavior is said by many animal owners to occur with other domesticated species, especially cats, parrots, and horses (Brown and Sheldrake, 1998; Sheldrake, 1999a; Sheldrake, Lawlor, and Turney, 1998; Sheldrake and Smart, 1997), and there is a need for experimental research on anticipatory behavior by animals of these species. It would also be worth investigating whether animals in the wild seem to know when members of their group are coming home: for example, do wolf cubs waiting at their den show signs of anticipation before the return of adults with food?

Although parapsychologists and psychical researchers have conducted much research on person-to-person telepathy (for a review, see Radin, 1997), there has very little previous research on person-to-animal or animal-to-animal telepathy (Sheldrake, 1999a). If it turns out that telepathic communication does indeed occur among nonhuman animals, then this would imply a biological and evolutionary origin for person-to-person telepathy and would enable this paranormal phenomenon to seem more normal, at least in the sense that it is biological and has an evolutionary history.

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