

SHORT COMMUNICATIONS

Food Sharing Among Captive Gibbons (*Hylobates lar*)

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ABSTRACT. A captive family group of gibbons engages in food sharing during consistently patterned sequences of behaviors in which begging gestures are employed. The predominant occurrence of the behavior involves the juvenile female begging from her older, adult sister who acted as her "surrogate mother". An examination of the variables potentially affecting the behavior, such as hunger, the availability and accessibility of preferred foods, the inability to forage individually, and the social relationships between members of the family, indicates that food sharing may assist the young in acquiring appropriate food habits, supplement their foraging capabilities, and may serve to reinforce the social bonds between adult and immature members of the family group.

INTRODUCTION

A family group of captive white-handed gibbons (*Hylobates lar*) engages in a form of food sharing in which one animal is allowed to take food held by another without encountering active resistance or punitive retaliation. Similar behavior has been reported to occur within a group of 12 laboratory gibbons with food sharing predominantly occurring between juveniles (BERKSON & SCHUSTERMAN, 1964). FOX (1972) described the freedom with which a captive two-year old siamang took food from the hands of his parents and infant brother. Observers of feral gibbons have described only isolated instances in which infant and juveniles have been permitted to take food from adults (CARPENTER, 1940; ELLEFSON, 1968), and hence it is not possible to determine from the literature whether or not the relative frequency of food sharing captive groups is paralleled in natural situations.

The manner in which individual members of a social group obtain their food and respond to social situations which involve food may be indicative of the structure of the society. The behaviors surrounding food may also aid in determining the society's structure; status is sometimes measured by priority of access to a desired object, such as food (JOLLY, 1972). Among primates, feeding is ordinarily an individual affair, and when food is transferred between members of a group the incident may reveal the nature of individual relationships or serve in the formation of these relationships.

When status is measured by priority of access, as determined by the outcome of agonistic encounters involving preferred objects or activities (e.g., food and sex), it is more likely that an animal already established to be subordinate will relinquish food to one of higher rank than for the reverse to occur. This situation is known to exist among chimpanzees and rhesus monkeys (NISSEN & CRAWFORD, 1936; NOWLISS, 1941; TELEKI, 1973). However, chimpanzees have also permitted the transfer of food from individuals of higher status to those of lower status when a highly preferred

food, particularly meat, is in scarce supply (VAN LAWICK-GOODALL, 1968; TELEKI, 1973). The meat may exchange hands following "begging" gestures and vocalizations by the subordinate. The food is seldom directly handed over to the begging animal, but it may be permitted to pull portions away or to eat simultaneously from the same source. TELEKI (1973) observed the actual handing over of meat to another only four times within one year.

Food sharing also occurs when infant or juvenile primates are allowed to take food from the hands and mouths of their mothers. Such cases have been described for howler monkeys (CARPENTER, 1965), chimpanzees (VAN LAWICK-GOODALL, 1968), gorillas (SCHALLER, 1963), Indian langurs (JAY, 1965), and feral gibbons (CARPENTER, 1940; ELLEFSON, 1968). It is this mode of food sharing which most closely resembles the social feeding activities of the captive gibbons of this study. An analysis of the components of this behavior and the social roles and relationships between members of the gibbon group may aid in determining the functions and motivations underlying food sharing within the social framework of the gibbon family. Included among the questions the behavior raises are whether or not it is motivated by hunger, serves as a means for the young to learn appropriate foods, or operates as a method of distributing preferred foods in scarce supply.

THE SUBJECTS AND THEIR ENVIRONMENT

The family group of common white-handed gibbons (*Hylobates lar*) occupies an islet within the grounds of the Phoenix Zoo, Phoenix, Arizona. A female Nubian goat, also resident on the island, aids in keeping it clear of vegetable refuse. Waterfowl and other birds are frequent visitors to the island, but no nesting has been observed.

At the beginning of the study in March, 1974, the gibbon group was composed of a male acquired by the zoo as an adult in 1962 ($A \delta$) and his two female daughters: a sexually mature six-year old ($A \text{♀}$) and a two-year old juvenile ($J \text{♀}$). The mother of the females had been removed from the island after being injured in an antagonistic encounter with $A \text{♀}$ when $J \text{♀}$ was approximately one year old. According to zoo personnel, $J \text{♀}$ was subsequently "mothered" by her sibling ($A \text{♀}$). In October, 1974, $A \text{♀}$ gave birth to a male infant ($I \delta$) fathered by $A \delta$.

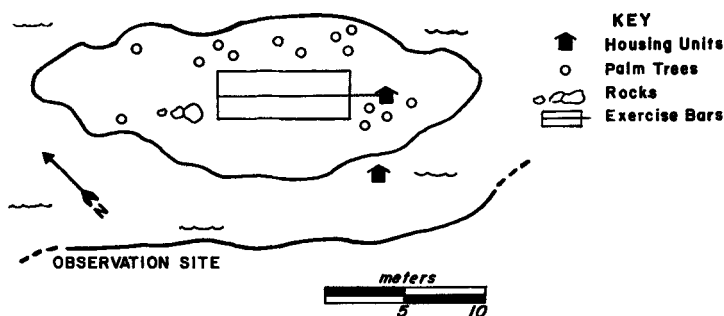


Fig. 1. Diagram of "Gibbon Island" within the Phoenix Zoo.

The oval-shaped island contains a semi-natural environment and measures approximately 30 meters north to south by 12 meters east to west. A semicircle of palm trees serves as a backdrop for a grassy area containing exercise bars topped by a small housing unit. Another housing unit built on stilts is located directly offshore (Fig. 1).

The animals are fed once daily and given a varied diet of fruits, vegetables, bread, and commercial monkey chow. They are deliberately overfed to compensate for competition with the goat and the birdlife.

METHOD

The gibbons were observed for 50 hours from March 5 to March 30, 1974 (designated "Spring") and for 120 hours from September 1, 1974 to May 15, 1975 (designated "Fall"). All observation occurred between the hours of 9:00 a.m. and 5:00 p.m.. Journal style notes were supplemented by a checklist noting behaviors related to food sharing and the social contacts between *A* ♀ and *J* ♂. Social activities were timed from the initiation of close contact to termination of contact and the cessation of specific activities.

Observation focused on *A* ♀ who emerged as the social center of the family. Most interaction occurred between *A* ♀ and *J* ♀. *A* ♂'s social activities were usually restricted to being groomed by *A* ♀ and occasional wrestling with *J* ♀.

RESULTS

FOOD SHARING BEHAVIOR

The pattern of behaviors related to the transfer of food between the gibbons tends to be consistent and characterizes each food sharing session. Food sharing is initiated by the beggar (see Table 1 for terms used in this study) who approaches another engaged in feeding. The beggar may pause a short distance away and direct its gaze towards the food or it may immediately endeavor to gain possession of the other's food. Attempts to wrest the food away are made by using the hands to pull at the food or kicking with the feet. The reaching or kicking attempts are usually repeated until the beggar succeeds in attaining its goal. Complete failure to procure a portion of another's food was observed in only 4% of 171 food sharing sessions.

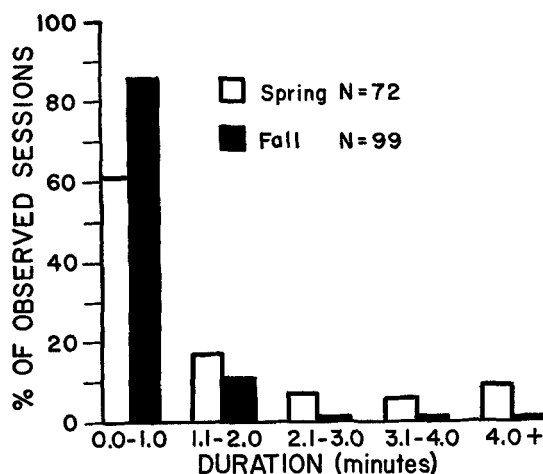
The response of the gibbon being begged from varies. Food may be relinquished without resistance, or it may be held away from the other. Occasionally, the animal will leave or push the beggar away, though this is not necessarily effective in deterring the beggar from persisting in its attempts. Food is not always released voluntarily, but may be snatched away despite preventative measures, although punitive action is seldom taken nor are attempts made to retrieve the purloined item. No retaliation was observed in the Spring of 1974, but slapping and threatening facial expressions have been occasionally directed towards the begging *J* ♀ by *A* ♀ following the birth of *A* ♀'s infant (*I* ♂).

After a successful session the beggar usually departs to eat at a distance from the others, at times returning for more. The beggar may receive all or a portion of the

Table 1. Definitions of behavioral terms used in this study.

Term	Definition
Approach	To move within arm's distance of another animal or object.
Beggar	A gibbon taking or attempting to take food from another.
Begging gestures	Kicking, reaching, or directing line of sight towards food held by another; attempting to pull the food away with the hands or feet.
Following	To traverse the same distance crossed by another within 5 seconds of the preceding animal and stopping within arm's distance of it.
Giver	One who relinquishes food to another, regardless of whether or not the act is voluntary.
Grooming	Parting and stroking the fur of another or one's self with the fingers.
Grooming sequence	New sequence begins if one animal moves off 10-20 feet, if there is a pause for more than 30 seconds, or if the groomer and the recipient change roles or partners.
Huddling	Sitting or lying passively next to another with some bodily contact; one unit was measured until the behavior ceased or was interrupted by an activity (e.g., grooming).
Leave	To move away from within arm's distance of another animal or object.
Food sharing session	Beginning with the initiation of begging gestures and ending when one animal leaves, the food is dropped or consumed, or the begging gestures cease for at least 30 seconds.
Sharing	To receive, give, or use something in common with another or others, without regard to whether or not the act is voluntary.
Threatening	Facial expression which conveys aggressiveness; the mouth is opened wide with the teeth bared, eyebrows are raised.
Wrestling	Rapid grabbing towards another gibbon, biting, occasional threatening and chasing; a new sequence was measured if the activity ceased for more than 30 seconds.

item, a factor which may be dependent on the nature of the foodstuff. Soft foods (e.g., bananas, bread, and sods of barley grass) are more apt to be transferred in pieces due to the ease with which they may be broken, as opposed to harder foods such as apples and celery. With larger foods (e.g. bunches of celery and barley sods) a compromise of ownership may occur. Both animals may hold onto the item and

**Fig. 2.** Duration of food sharing sessions, comparing the Spring and Fall.

pull pieces off with the free hand or draw the whole towards the mouth and bite from it. *J* ♀ has also drawn *A* ♀'s hand to her own mouth and nipped at the food she holds. Although food may be freely shared, none of the gibbons has been seen to clearly offer or give food to another.

The majority of food sharing sessions are less than a minute in duration (Fig. 2). Sixty-one percent of the sessions observed in the Spring and 85 percent of the sessions observed in the Fall were under one minute in length. The longest sessions, two of over 30 minutes, involved bird meat shared between the two females. The first session involved a dead sparrow pulled from the water by *A* ♀, and the second followed *A* ♀'s capture of a small bird (see Postscript for description of predatory incident). *A* ♂ displayed but slight interest in these events and did not participate in the meat-eating. These activities lead to the observers' awareness of slapping and reaching directed by the two females towards nearby birds and ducks. Such incidents recurred throughout the duration of the study, increasing in frequency during the months of April and May when ducklings abound on the lake.

FOOD SHARING AND FOOD SUPPLY

The frequency of food sharing does not rise in times of diminished food supply, either prior to feeding or in the succeeding hours. This fails to support the ideas that food sharing may serve to insure the distribution of scant resources between members of the highly territorial gibbon group or that begging may be motivated by hunger. Rather, the behavior reaches a peak during feeding time when a plentiful variety of food is available. Thirty-five percent of all observed food sharing sessions ($N=171$) occurred within the hour following feeding time, with this figure rising as high as 75 percent for two two-week periods. The highest frequency for any other hour of the day, relative to the time of feeding, was 17 percent.

Individual or species preferences for certain foods, especially if they are in scarce supply, could be a factor in prompting the initiation of begging or reluctance to part with certain foods. The lengthy sessions involving the sharing of bird meat between *A* ♀ and *J* ♀ is analogous in this respect to the meat sharing sessions witnessed among chimpanzees (TELEKI, 1973; VAN LAWICK-GOODALL, 1968). An examination of the individual and group feeding habits of the gibbons supports this contention.

The six foods constituting the basic daily diet (apples, bananas, barley, bread, celery, and oranges) were assigned a ranking of individual preference according to the number of times the individual was seen eating each food. The ranks between individuals are relatively consistent ($r_s=.989$, $p<.01$, $N=6$). The top three choices are identical for *A* ♀ and *J* ♀ (oranges=1, bananas=2, and bread=3). *A* ♂'s preferences differ but slightly (bread=1, oranges=2, and bananas=3). Since *J* ♀ was the most frequent beggar (see below), she was similarly assigned preference rankings according to the number of times she was observed begging for each of the six foods, and a Spearman rank-order correlation coefficient was calculated comparing her overall preferences with the begging ranking. The rank orders of begging and food preference of *J* ♀ were not found to be significantly different ($r_s=.943$, $p<.05$, $N=6$). Despite the parallel, the problem has not been completely resolved since the statistic does not include a measure of the abundance of the foods begged. Although

a significant correlation is shown between preferred foods and foods begged, it must be considered that the majority of food sharing sessions takes place at feeding time when all foods are abundant (see above). Also, many cases have been documented in which food lying freely on the ground and easily accessible has been ignored while attempts are made to beg an item of the same food from another.

The incidence of begging by $J \text{♀}$ has *sometimes* increased when an unusual food or object is found on the island. These sessions have involved packets of mustard, paper cups, and the leaves of the quaking aspen (*Populus tremuloides*) which were pulled from the surrounding moat. Conversely, no begging behavior or unusual activity surrounded the three instances new foods, summer squash (*Cucurbita pepo*), pomegranates (*Punica granatum*), and eggplant (*Solanum melongena*), were introduced with the daily feeding.

FOOD SHARING AND SOCIAL RELATIONSHIPS

The food sharing behavior occurs primarily between $A \text{♀}$ and her juvenile sister

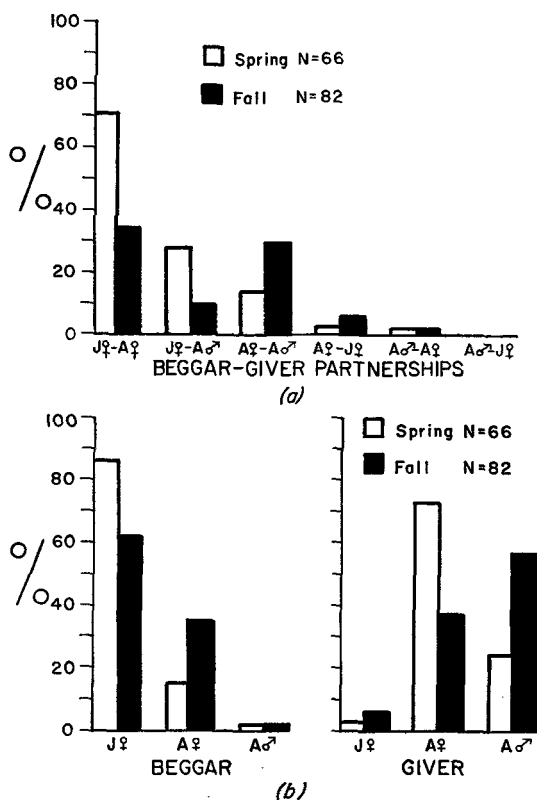


Fig. 3. (a) Comparison between the Spring and the Fall (September–December, 1974 only) of the percent of the total food sharing sessions in each season that each possible beggar-giver partnership occurred. (b) Comparison between the Spring and Fall (September–December, 1974 only) of the percent of the total food sharing sessions in each season during which each gibbon acted as the beggar and the percent each acted as the giver.

J ♀ (Fig. 3a), with the younger animal usually playing the role of beggar (Fig. 3b.) *J* ♀ was the beggar in 86% of the total sessions and the giver in only 3%.

The frequency of food sharing was much lower with the resumption of observation in the Fall of 1974, and the frequency (number of sessions per hour of observation) remained at low levels to the end of the study, usually less than one session per hour of observation (Fig. 4). The nature of the behavior also changed. A higher percentage of sessions consisted of either *A* ♀ or *J* ♀ quickly snatching food from *A* ♂ (Fig. 3a, b.). The rise in frequency (Fig. 4) in the two-week interval following the infant's birth (*I* ♂) is due to *A* ♀ snatching food from *A* ♂ and *J* ♀ for 75% of the food sharing sessions of that period. The rise in Fall Period 7 is due to *J* ♀ begging aspen leaves from *A* ♀ and *A* ♂.

In addition to the decrease in begging, the relationship between *J* ♀ and *A* ♀ changed in other ways during the Fall observations. The changes may be manifestations of (1) the maturation of *J* ♀ or (2) the demands on *A* ♀'s attention by her infant (*I* ♂). The indication that begging is primarily an activity of the young is supported by the changing relationship between the two females and the reduction in food sharing activity as *J* ♀ matures.

The proportion of social encounters between the females initiated by *A* ♀ has declined through time as have the frequencies of social behaviors requiring the active participation of both. An analysis of the changes in social contact through time may aid in determining whether the decline in food sharing between the pair is due to the actions of either the older (*A* ♀) or younger sister (*J* ♀) and how these changes affect the "surrogate mother" relationship. This may further aid in clarifying whether the changes can be ascribed to maturation of *J* ♀ or to the introduction of a new family member.

The % Approach—% Leave index measures the proportion of times that *J* ♀ initiates and maintains proximity to *A* ♀ relative to the proportion of times *A* ♀ initiates proximity. The percentage of occasions on which the distance between the

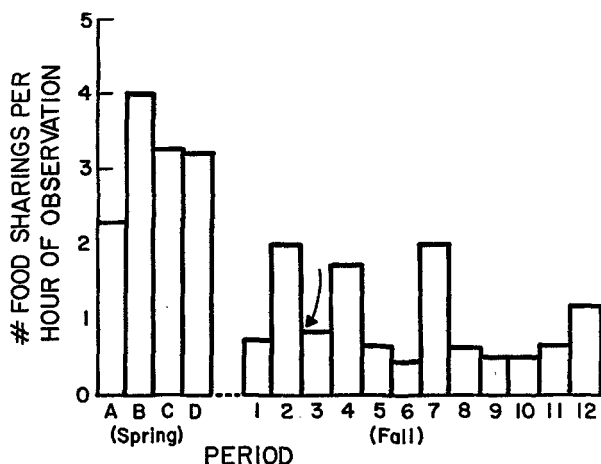


Fig. 4. The frequency of food sharing per hour of observation calculated for two-week periods. The arrow indicates the date of birth of the male infant (*I* ♂).

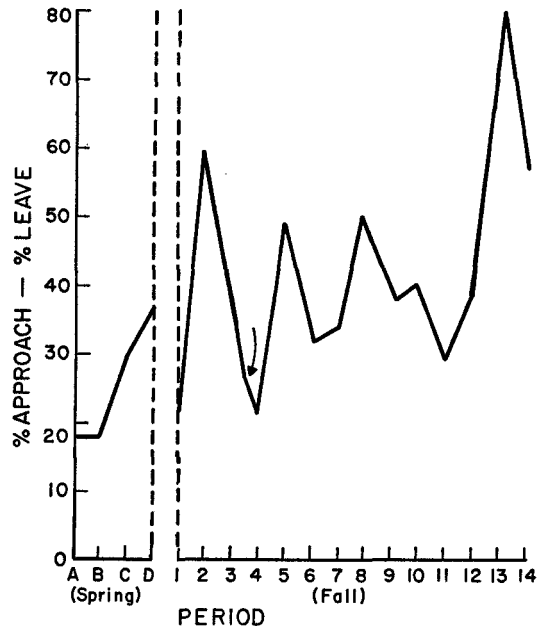


Fig. 5. % Approach due to $J \text{♀}$ — % Leave due to $J \text{♀}$ between $J \text{♀}$ and $A \text{♀}$ calculated for two-week periods. Arrow indicates the date of birth of $I \text{♂}$.

two was increased to greater than arm's length due to action by $J \text{♀}$ (% Leave) was subtracted from the percentage of occasions that the distance between them was reduced to arm's length or less due to $J \text{♀}$'s movement (Fig. 5) (HINDE & SPENCER-BOOTH, 1968). The index was derived to represent the behavior of both partners and to incorporate the full contribution of each in controlling proximity while remaining independent of changes in the absolute and relative levels of locomotor activity of both animals (HINDE & ATKINSON, 1970). A negative value would indicate that $A \text{♀}$ was primarily responsible for controlling proximity between the pair. A positive value, as were all the values calculated in this study, indicates that $J \text{♀}$ is responsible for controlling proximity to $A \text{♀}$.

$J \text{♀}$'s role in controlling proximity gradually increased to a fluctuation at relatively high levels, where the index becomes more or less invariant with respect to changes in $J \text{♀}$'s activity, except for a short period following $I \text{♂}$'s birth during which $A \text{♀}$ frequently approached and groomed $J \text{♀}$. Otherwise, $A \text{♀}$ was infrequently involved in social activity with the others during the four two-week periods following $I \text{♂}$'s birth. Following that rise in grooming activity the frequency of grooming and huddling between $J \text{♀}$ and $A \text{♀}$ fell to effectively zero (Fig. 6a) and remained low until the termination of the study. Grooming activity within the group previous to the birth of $I \text{♂}$ consisted of $A \text{♀}$ grooming $J \text{♀}$ and $A \text{♂}$ for 85% of all grooming activity. Forty-three percent of the 85% was directed towards $J \text{♀}$. $J \text{♀}$ groomed for 15% of the total grooming activity. Nineteen percent of $J \text{♀}$'s grooming activity was directed toward $A \text{♀}$ (RACKLEY, 1974). The decline in $A \text{♀}$'s grooming of $J \text{♀}$ approximately parallels the decrease in her initiative in controlling proximity to $J \text{♀}$; $J \text{♀}$ became increasingly responsible for controlling social interaction between the pair.

$J \text{♀}$'s association with her adult sister $A \text{♀}$ since $I \text{♂}$'s birth is apparently motivated more by her own interest in the infant than in an effort to maintain active interaction with $A \text{♀}$. The behaviors involving dual participation, wrestling, huddling, and grooming, dwindled in frequency whereas $J \text{♀}$ persistently followed and maintained close contact with $A \text{♀}$ following the birth (Fig. 6a). At the age of four months $I \text{♂}$ began to leave $A \text{♀}$ completely to within a distance of 2–3 meters. $J \text{♀}$, three years of age at this point, began taking advantage of these occasions to “kidnap” $I \text{♂}$ and carry him for a few moments until he is retrieved by his mother. The rise in Period 12

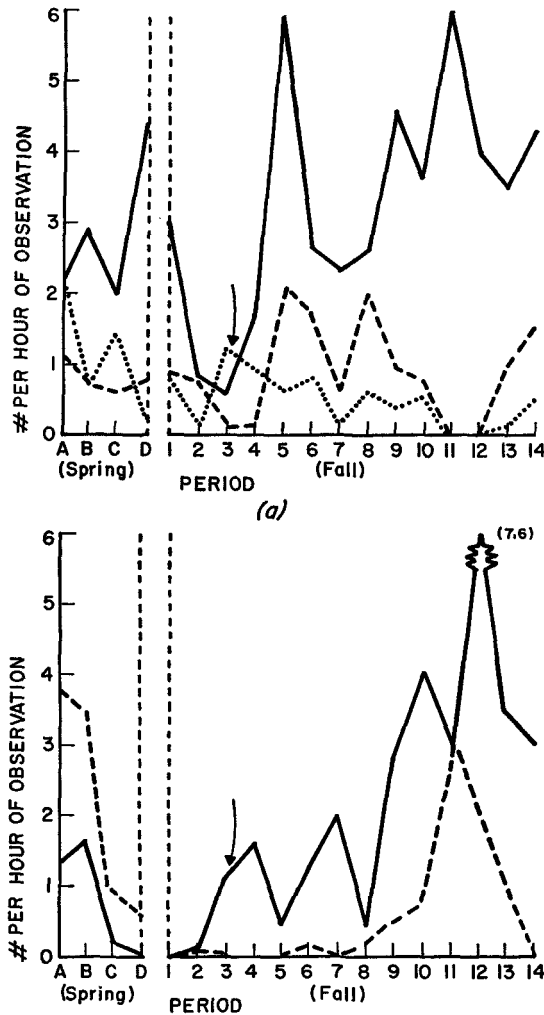


Fig. 6. Social interactions between the juvenile and adult members of the gibbon family. Arrow indicates date of birth of $I \text{♂}$. (a) The frequencies per hour of observation of social interactions between $J \text{♀}$ and $A \text{♀}$, calculated for two-week periods. Solid line: $J \text{♀}$ follows $A \text{♀}$. Dashed line: $J \text{♀}$ huddles with $A \text{♀}$. Dotted line: Mutual grooming. (b) Frequency of wrestling initiated by $J \text{♀}$ with each of the two adults per hour of observation, calculated for two-week periods. Solid line: $J \text{♀}$ with $I \text{♂}$. Dashed line: $J \text{♀}$ with $A \text{♀}$.

of % Approach—% Leave (Fig. 6) occurred at the same time the kidnapping episodes began. The kidnapping incidents continued through the remainder of the study. $I \delta$ was eight months old at the termination of observation.

$J \varphi$'s wrestling activities shifted from $A \varphi$ to $A \delta$ (Fig. 6b). This is consistent with CARPENTER'S (1934) report that wrestling is a common occurrence between the adult male and juveniles of a gibbon family. Since wrestling appears playful, this may reflect the lack of age-mates in the small gibbon family group. A visual inspection of the graphs of $J \varphi$ initiating wrestling activity with $A \delta$ (Fig. 6b) and % Approach—% Leave (Fig. 5) seemingly shows that the proportion of times $J \varphi$ increases her control over proximity to $A \varphi$ varies inversely with the frequency she initiates wrestling activity with $A \delta$. However, the rank-order correlation was not significant ($r_s = -.02$, $.3 < p < .5$, $N = 12$).

The changing structure and interrelationships of the gibbon family has been affected both by the increasing independence of $J \varphi$ and the addition of a dependent new member ($I \delta$) placing demands on $J \varphi$'s former playmate and "surrogate mother". Since a decrease in frequency of food sharing between $J \varphi$ and $A \varphi$ was noted prior to $I \delta$'s birth, the birth probably compounded maturational changes already affecting the relationship between the two females, and the reduction in food sharing may be attributed to increased independence of $J \varphi$ from $A \varphi$.

FOOD SHARING AND LEARNING

In cases where an immature primate is allowed to take food from its mother, the possibility exists that the young animal learns which are appropriate foods without dangerous trial and error experimentation. However, observations of $I \delta$ do not fully support this proposal. Since the time he began to manually explore his environment, at about the age of 2-1/2 months, any substance that he could reach and manipulate was mouthed and chewed, including grass, twigs, leaves, and rocks, as well as food. Until the age of seven months, $I \delta$ was generally inattentive to the feeding activities of his mother, although he began to regularly take solid foods at 4-1/2 months. At seven months of age, he began to pay close attention to $A \varphi$'s feeding activities, closely tracking her motions with his eyes and attempting to touch food and take it away from her. $A \varphi$'s responses included holding the food out of his reach as well as permitting him to share her food.

If food sharing plays a role in learning, it is probably not of fundamental importance, although it may supplement the information acquired by the infant during his own exploration and observations of his mother and others in his group.

DISCUSSION

The function of food sharing in the small gibbon society is not sharply defined by the actions of the animals. The initiation of begging activities does not appear to be motivated by hunger or the desire for certain foods since the behavior occurs in relatively high frequency shortly after feeding time when an ample food supply is easily accessible to all. On occasion, each of the two females has been seen to traverse the length of the island to beg an item of food despite the presence of an item of the same food lying well within her reach.

The most consistent component of food sharing is the identity of the participating animals. The majority of food sharing sessions involve the juvenile female begging from her older sister, her surrogate mother. A high prevalence of food sharing among juvenile gibbons is also described by BERKSON and SCHUSTERMAN (1964), yet the behavior is reported to primarily occur *between* the six juveniles of the 12 animal laboratory group and to include the reciprocal exchange of food, rather than the strictly unidirectional transfer observed among the gibbons of the Phoenix Zoo. A reciprocal situation involves the original possessor of the food attempting to recover some of the food from the original beggar. Reciprocity was observed only between juveniles and the few instances that food sharing was observed between adults were entirely unidirectional.

The results of deprivation and dominance experiments (dominance was measured by "food retrieving" with no further details given by the authors) on the group of six juveniles led BERKSON and SCHUSTERMAN to conclude that reciprocal food sharing is an infantile method of obtaining food prior to the development of sufficient motor capability required for self-sustenance in an arboreal environment. The reciprocal nature of the behavior between juveniles was considered to be a function of the lack of well-established unidirectional dominance in the immature animals. The ages and relationships of the animals were not given.

BERKSON's and SCHUSTERMAN's conclusions are not wholly compatible with the circumstances in this study where food sharing primarily occurs in one direction: the juvenile female taking from the adult female. By age standards, the "subordinate" is taking from the "dominant". Nor does the feral situation seem amenable to the maintenance of a trait between juveniles, particularly if the mean family size of the territorial gibbon group is more reliably the three member group reported by ELLEFSON and BERNSTEIN (JOLLY, 1972) than the 4.3 member family determined by CARPENTER (1934). By these estimates, a gibbon family would contain usually only one juvenile and probably no more than two.

NAPIER and NAPIER (1967) report a two-year interval between births. The two-year old juvenile of this study was a very active animal and quite possessed of the sufficient motor capability to sustain herself. With CHIVERS (1972) describing two-year old juveniles as "completely independent", it does not seem consistent that juveniles, separated by two-year intervals, would require feeding assistance, especially from another immature animal. The thesis that the behavior may be *functional* in the survival of immature gibbons may be partially valid, but no observational evidence is known which would accord the behavior a critical function.

As a behavior of the young, begging may aid the immature gibbon in the acquisition of appropriate food habits. Juvenile begging has attended the presence of unusual objects and foods on the island first investigated by an adult, although both the juvenile and the infant have expressed curiosity at unusual objects and mounted them prior to adult testing, indicating that a great deal of trial and error learning takes place. The monitoring of parental feeding activities may play a minor role in learning, perhaps assisting in the seasonal transition of foods once major feeding habits have been established, similar to the manner in which baboons may spread information regarding a new food through the sniffing of another's muzzle (ALTMANN & ALTMANN, 1970).

The continuance of food sharing and begging behaviors into the ages when an immature gibbon is nevertheless fully capable of fending for itself within the family territory may be a means of maintaining the social bonds between family members until the young animals are fully independent socially and ready to leave the natal group. The need for physical contact and reassurance in young primates has been repeatedly emphasized (JOLLY, 1972). The mother-infant bond is important for socialization and survival of the young, and a behavior related to feeding that emphasized these contacts could play an important part in maintaining amiable relations between members of the gibbon family group until the young are physically and emotionally fully capable of coping with their environment. In this study, where a surrogate mother bond may have been formed between a juvenile female and her adult sister, the food sharing behaviors may have been emphasized even more than usual.

POSTSCRIPT: Description of Predation by Captive Gibbons

27 April, 1974; 10:30 a.m. A ♀ began running around and between the trunks of three small palm trees. She ran in a squatting position, leaning forward over the ground with arms spread out to the sides. She swatted several times at something in front of her, which proved to be a small, light grey bird fluttering barely above ground, apparently unable to fly. A ♀ chased the bird to a dip in the island where she remained out of sight for about 30 seconds. When she reappeared she walked to the bars. There was no sign of the bird.

12:30 p.m. A ♀ repeated the chasing episode through the same trees. She was joined 15 seconds later by J ♀ who brachiated over from the opposite end of the island. The bird, again fluttering barely above ground level, left the trees and headed for the center of the island with its two pursuers close behind. A ♀ slammed the palm of her hand down, trapping it. She moved it back and forth between her hands, and the bird managed to free itself. The two females then chased it to the north shore, A ♀ with body close to the ground J ♀ more erect. The bird was recaptured at the edge of the island. It is not known how death took place, for J ♀ obstructed the actual catch and kill by A ♀. A 30-minute food sharing session between the two females followed. All but the tail feathers was consumed.

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