

Food for Thought Podcast Transcript
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This is Food for Thought, a podcast that highlights food sharing in non-human organisms. I am your host, Akasha Barreto and I am a current senior at Duke university. I have my roommate here to help guide the conversation and I will be answering any questions she has for me today, say hi Cidian! (hey everybody) Today we are going to be discussing the act of resource or food sharing, which I believe to be such a peculiar topic! I know that when it comes to what's on my plate, I usually don't like to share... how about you Cid? (definitely depends on the food) That is very valid! I feel like a lot of species could relate that there are certain situations in which they would share their food and others in which they would not

Now let's get into the topic of our conversation which is food sharing! Food sharing is a form of species interaction that I personally didn't understand, since I didn't believe it to have any evolutionary advantages, but boy was I wrong! Food sharing usually occurs between more than one organism, and there is usually a "possessor" and a "recipient" in the interaction. In this food sharing interaction, the "possessor" is the one who has control over a resource, and they usually show tolerance as they allow a competitor animal or the "recipient" to consume a part of its food (Jaeggi and Van Schaik, 2011).

Resource sharing is a complicated mechanism, and there are many different factors that influence the choice of food sharing, one of them being food availability, AKA the amount of food that is present for a population to eat! If there is less food or resources available, animals will be more hesitant to share their food, while if there is an abundance of food animals will be more open to sharing! For instance, studies have shown that chimpanzees who possess large, desirable food items (such as meat and honey or even large fruits) are more likely to share with their friends (Planck, 2018), while if the quality or the quantity of the food is lower, then the chimpanzee is less likely to share. Another condition in which food sharing is favored is dependent on the cost of defense, so if it costs more time/energy to defend their food, the possessor usually decides to share it with whatever individual that initially tried to come and take it (Hadjichrysanthou & Broom, 2012). If there was a small probability of successfully defending food from attackers, then they will offer to share the food so that they can at least have SOME of the benefits of the food. The individuals that have the resource do a quick cost vs benefits analysis to decide whether or not to share their food, give it up entirely, or fight to keep it. To put it into simpler terms, let's say you're a hyena that made a kill and there's a lion nearby. You have a low chance of being able to defend the food (because the probability of the lion fatally injuring you or chasing you off is higher than the probability of you being able to successfully defend your food). if you choose to fight, that's a REALLY HIGH cost, so as a hyena you would have to decide whether or not you would want to fight, or just share the food resource. It is crazy to imagine a hyena and a lion sharing food, since you would think that they are constantly competing for prey, but there is a lot of evidence and video footage of this online, look into The Hyena Project on Youtube if you are interested.

Cid question: Ok ok so I now understand the conditions in which sharing food likely takes place, but what exactly is advantageous about sharing the food?

Thank you for asking that, because that is a perfect Segway into our next piece of information! The first benefit of food sharing which we will be discussing is increased foraging success. So by sharing food or sharing information about where food is located, it increases the efficiency of foraging and also looking for food between species.

Some organisms perform an act called “recruitment calling” in which they have information about a location of food and give specific calls to attract nearby foragers. This recruitment calling is beneficial to the initial caller since individuals in a group have higher prey capture rates than a single individual, so by recruiting more members it increases the individual foraging efficiency (Stevens & Gilby, 2004). An example of this is actually spotted hyaenas! They recruit others to “take over a carcass” when approaching lions since lions and hyaenas usually eat the same prey. As the spotted hyaenas call others towards them to get the carcass, the larger group sizes allow them to overpower other species around, such as lions and leopards, and reach their carcasses more efficiently.

Another benefit of this recruitment calling mechanism of food sharing is predation avoidance, so as the recruitment calls occur and the group gets larger, it decreases the probability of being attacked by a predator. The food sharing mechanism, in a sense, calls for backup, since by recruiting others, an individual feeds in a group rather than alone, diluting the predation risk, increasing predation detection (so if you’re in a larger group you can see if there are predators approaching you), and if you are in a larger group, you can confuse predators. House sparrows actually perform recruitment calls in the presence of food that is easily divisible, but the call rate decreases dramatically as the group size increases; suggesting that birds may recruit others to dilute their own predation risk, but only when food is easily shareable and the risk of predation is high for solitary foragers (Stevens & Gilby, 2004).

Cid asks: are there ways in which sharing food can help you find a partner?

Yeah so the last benefit that we will be discussing in terms of food sharing is the fact that it increases mate opportunities. In many species, males that acquire food donate to females either before, during, or after copulation in order to increase the probability of producing healthy, viable offspring with females. It has also been shown that in species where there is a bias in mating (meaning that one sex has more of a say in choosing mates than the other), the males share with the females whenever there is an opportunity for the females to choose their mates. For instance, female chimpanzees showed a preference for males who demonstrated the highest frequency of food sharing. It is common for males to share food with the females’ offspring, so the female chimpanzees tend to choose the fittest available male that can provide food to both the female and her offspring and thus maximizing their reproductive potential (Tutin, 1978). In that sense, the males usually share their food in hopes that they can attract more females. That is, to put it in other words, an exchange for food for sex. This male-female sharing is more common in socially monogamous species, so I’m guessing they’re trying their best to increase their fitness and increase their chances of finding a mate.

Now moving away from the discussion of mating, we dive deeper into our topic by exploring sharing food with kin! sharing with family might result in long term benefits like future reciprocal sharing or altruism, and the sharing of mother to offspring can be explained by kin selection. Kin selection is a type of natural selection in which an individual behaves in a way that

might decrease their chances of survival (in this case, it could be because they're sharing their own food), but it increases the chance of survival for their kin (so it increases the probability that their kin would survive) most likely by giving them some of their food. One peculiar example of this is actually seen in vampire bats, and these bats actually perform both non-kin and kin-based reciprocal altruism, which we will be discussing next. Long term associations among females within bat communities, enable bats to regurgitate blood to one another on a regular basis and that significantly increase their chances of survival.

Cidian asks: Did you just say regurgitate? Like in birds?

Haha yes, they regurgitate blood. So basically, to fuel the body's metabolic engine, the bat individuals have to consume roughly 50% of their body weight in blood every single night (Wilkinson, 1990). At times, it can be difficult for the younger bats to accomplish this, so the mother bats regurgitate the blood they captured for that day back into their offspring in order to increase their chances of survival. As I stated earlier, these vampire bats also perform non-kin based reciprocal altruism, so it has also been seen that sometimes other adults (not the parent) regurgitate to the vampire bat juveniles as well. This is so that the young bat can fend off starvation, at least for one more night and have another chance to find a meal. I think it's kinda sweet if you ask me. The results of this study found that vampire bats do NOT share blood randomly, they actually share preferentially with individuals who are frequent roost mates (so individuals that they usually share a lot of space with), and often times (but as we discussed - not always), they are related. This finding supports that both reciprocity and kin selection exists in these vampire bats. The food sharing appears to be altruistic in this population, as the donor bat usually gives up the food (which might have otherwise been used to ensure its own survival or that of its offspring), to a recipient bat whose chances of survival are thereby increased.

So all in all, we talked about a lot of the different advantages of food sharing! Food sharing is a mechanism that has been around for ages, and it has evolved for many specific purposes! I am sure it not only increases an organism's chances of survival, but it also increases the strength of their social relationships, since many animals are more likely to share resources with their kin. As we discussed, food sharing increases foraging efficiency, helps mitigate predation risks, increases opportunities to find a mate, and there are so many more advantages that we just didn't get a chance to go into depth in this podcast such as building stronger social relations and helping to reduce excessive food waste (environmental-conscience.com). & Here I was, thinking that there were no real benefits to sharing food, when in reality there are so many! Maybe I should start sharing my food with people, hopefully that helps me find a mate (but I will say, I think I am going to have to refrain from regurgitating my food like the bats that we discussed). So with that, Cidian, do you have any other questions or closing remarks? (NOPE, I THINK YOU COVERED IT ALL!) Alright well I am your host, Akasha Barreto, (AND I AM YOUR GUEST, CIDIAN EDWARDS) and this has been a segment of "Food for Thought", thank you for listening in and we hope you tune in next time! BYEEEEEE

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