

Weight Management in Animal Training: Pitfalls, Ethical Considerations and Alternative Options

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Abstract: Weight management is a practice that has been used in training birds for many years. This strategy involves determining a weight range in which a bird may be more likely to respond to food as a reinforcer for training or maintaining behaviors. This is a strategy which is rarely used to train in other taxonomic groups. This paper will explore the pitfalls of relying on weight as a measure of motivation. This includes trainers becoming desensitized to bird body language indicative of excessive motivation for food reinforcers. It will also explore ways to measure motivation for food that are not related to the number on the scale. It will also question the ethics of using weight management in animal training and provide alternative options which are commonly used to train other species of animals.

Background

The International Association of Avian Trainers and Educators defines weight management as follows:

Weight Management

Because the weight and appetite of an animal are valuable indicators of its general health, monitoring a bird's weight can be a valuable tool in understanding its motivation to present a desired behavior as it relates to various weight ranges. Once a weight range that corresponds to acceptable behavioral responses to food is established, a diet is prepared to maintain the bird in that weight range. The weight range may be adjusted depending on response during training sessions. Various conditions may influence behavior, such as weather, age, food items, etc. and should be taken into consideration when evaluating weights and diets. These weight ranges may also vary between individuals of the same species. The goal is to maintain the highest weight possible and provide the greatest amount of food while maintaining the desired behavioral response. This practice is referred to as "weight management." (1)

Weighing an animal to monitor for changes that may indicate health issues and also to maintain what is deemed a healthy weight for an animal (avoiding obesity, monitoring growth of young animals, etc.) are separate topics from weight management for creating motivation for food. While these are important tools in general health care, the focus of this paper is the use of weight management to facilitate animal training.

The weight management approach requires utilizing specific quantities of a diet to maintain the desired weight range. While this quantity may not represent a deficiency in food, in research settings it is generally termed a quantitative restrictive diet as opposed to an ad libitum diet in which the animal has free access to food at all times. It is also important to note that restrictive diets are not available to the animal at all times and therefore result in periods of deprivation. Deprivation is the term used to describe when something (in this case food) is not available; this does not necessarily mean that the diet is of insufficient quantity for the animal in training. These intervals in which food is not available are important to note as they can play a significant role in

motivation for food reinforcers. Additionally note-worthy is that chronic deprivation has been shown to have a much greater influence on feeding motivation than acute sudden deprivation (2) which will be discussed more later.

Hunger and Motivation

In animal training words like hunger and motivation are easily interchanged. However in reality hunger and motivation are two different discussion items. Hunger is not well defined in literature. It is generally agreed to be a negative subjective state. One from which animals will work to obtain relief. Inspired by the Brambell report, the first of The Five Freedoms by The Farm Animal Welfare Council states that animals should have Freedom from Hunger and Thirst - by ready access to fresh water and a diet to maintain full health and vigor. (3)

In the lab setting hunger can be measured as a metabolic state. This requires sampling not practical in the real world of animal training. Hunger is also sometimes measured by a change in “normal” expression of non-feeding oral activities such as redirected pecking in chickens and stereotypy. Also measured in chickens is drinker use (pecking at water and water consumption). Other behavioral measures include how quickly the animal eats, presentation of compensatory feeding behaviors, and activity levels. Operant responding is also used as a measure, usually comparing how the animal responds to a task soon after a meal and then again at various intervals later. (4) This can include measuring the force of the response, response latency and relative frequency of responses. (5)

Animal trainers who look at behavioral response as a means of measure of hunger typically rely on the operant response strategy, looking at an animal’s body language and species-typical behavior with food. For example, when a pine nut is offered to a macaw in a training scenario in which the bird is relaxed and comfortable and being asked to do nothing but accept food or perhaps present an easy to accomplish behavior that has been trained to fluency, the following observations could be used to rate hunger. See Table 1. (6)

Table 1. Assessing interest in reinforcers. Example: Macaw is offered a pine nut.

Observed Behaviors	Level of motivation
Holds pine nut in foot	Low
Bites tiny pieces off of pine nut slowly	Low
Drops half of the nut	Low
Wipes beak on perch (feaking observed)	Low
Proceeds to preen after drops nut	Low
Holds pine nut in foot and brings to mouth quickly	Medium
Quickly breaks nut into 2-3 pieces and swallow pieces	Medium
Directs attention back to trainer once nut is consumed	Medium
Swallows nut immediately without breaking into pieces	High
Quickly directs attention to trainer once nut	High

is consumed	
Offers trained behaviors in rapid succession	High
Presents behaviors equated with frustration or anxiety about food: may redirect aggressive behavior on nearby objects, birds, or people, stereotypic pacing, etc.	Excessive
Aggressive behavior presented towards other birds if competing for the same food resource	Excessive

In other words, there are observable behaviors that animal trainers can use to rate hunger. These observable behaviors will vary with species, for example a hawk may show behavioral responses that are different from a parrot. Although a potentially daunting task, animal training would benefit from clear definitions of measures of hunger, especially since food is a commonly used as a reinforcer for behavior. The five freedoms state that animal should have freedom from hunger. In the animal training world this leads to questions such as “at all times?” and is “any level of hunger acceptable?” Having measures of hunger and identifying ranges that are acceptable and not acceptable by the animal training industry, and why, gives animal trainers a guideline or at least a starting point to better evaluate hunger based on behavioral observations. This may in the future help address the questions raised by the first of The Five Freedoms. But more importantly it can potentially lead to improved welfare in animal training by helping trainers recognize when hunger is exceeding acceptable standards. It can also help provide an honest interpretation if assumptions are being made that an animal is hungry or must be hungry for example due to a late feed.

Motivation to present behavior is much broader than hunger. Animals present behaviors for many different types of reinforcers. Extinction procedures can cause vigorous presentation of behavior. Different schedules of reinforcement can allow numerous or extended presentations of behavior before reinforcers are delivered. Some humans present food acquisition behavior in the absence of hunger and it is also observed in animals as well, particularly those that cache food. This is a just a short list of items to consider when evaluating motivation. This distinction between hunger and motivation is important because it allows trainers other options for acquiring behavior that do not rely solely upon hunger.

Pit Falls & Ethical Considerations

In the definition for weight management, a weight range is identified that corresponds to an acceptable response for food. This may appear to be another means to measure hunger. However in practical application what is often observed is a fixation on maintaining the bird’s weight in the identified range as opposed to evaluating hunger based on behavioral response. This results in other observable behavior or physical manifestations that could be indicative of an inadequate quantitative restrictive diet. The following are observations that may signal the weight management strategy is poor and is not adequately addressing the needs of the animal.

Frantic or Anxious Behavior

Animals may show frantic behavior in the presence of food, when eating or when a stimulus is presented that is a potential indicator of food. Trainers may become desensitized to this response and consider it a “normal” hunger response or level of motivation for food. For example pigeons used in a behavioral analysis lab were weighed daily and fed a quantitative restricted diet by the lab students. The students were instructed to feed specific amounts based on the weights of the animals. The pigeons thrust themselves against the front of the cage when students were preparing to deliver food. When offered food, it was consumed very rapidly. Once fed, the animals sat calmly. However if the students reached or walked towards the food bin the pigeons would immediately throw themselves against the front of the cage again. On a side note, bright green fecal matter was also observed which is typically indicative of compromised health/welfare in pigeons due to lack of food. Behavioral and physical data were not being properly evaluated and considered in this weight management situation.

It has been demonstrated that appetitive food cues presented to organisms in a high drive state when actual consumption is not possible promote a state of frustrative nonreward. Researchers have emphasized the aversive nature of nonreward in deprived animals. Furthermore when food is withheld, food cues potentiate the probe startle response. The enhanced startle response for food-deprived subjects suggests that, to some extent, food cues elicited an aversive motivational reaction. Frustration generally involves heightened anxious arousal; hence, negative affect. The reports of greater arousal and loss of control from food-deprived subjects are consistent with this interpretation. There is also evidence that food-deprived rats, given food cues separately from feeding, also show decreased pleasure as a function of hunger. (7)

Water gorging/ Food related stereotypies

Studies show that rats drink more water when food deprived (8) There is also evidence that overdrinking can be a stress related behavior. (9) Birds that are food deprived may show increased drinking of water. (10) Broiler hens that are food restricted and allowed access to ad lib water can overdrink water. Because of this water can be provided for a few hours per day, but it can exacerbate the frustration caused by food restriction. (11) Rushen suggests that the occurrence of adjunctive drinking by sows results from the persistence of feeding motivation, perhaps because concentrated food does not provide sufficient stomach distension, combined with the knowledge that food will definitely not be forthcoming. Stereotyped sequences of behavior may be a means of reducing the arousal generated by the expectation of food. (12) Birds, especially those known to eat several times a day or throughout day have been observed water gorging in show settings. Water gorging should be considered an indicator that the feeding strategies are either inadequate in quantity and/or frequency. This can also result from long term chronic quantitative restricted feeding.

Stunted growth

In the poultry industry breeder broiler chickens are selectively bred to grow quickly. When these birds are fed ad libitum this results in extremely overweight birds with a myriad of physical problems. To address this many breeder broiler hens are intentionally placed on quantitative restrictive diets to stunt growth. (13) Stunted growth has been observed in macaques on restrictive diets when young. Researchers are advised to ensure sufficient food is provided to maintain normal growth rates whilst continuing to perform the behavioral tasks effectively in research settings.(14) Stunted growth is also used as a measure of poverty and malnutrition as a

result of inadequate feeding in humans. (15) Unfortunately stunted growth has also been observed in birds in bird shows, especially those that have been placed on quantitative restrictive diets during their first year.

Persistent juvenile behaviors

A phenomenon that has been observed in some species of birds that are entered into a quantitative restricted diet during development is the persistence of juvenile behaviors into adulthood. In psittacines this results in the observation of head bobbing behaviors, vocalizations associated with food begging and head feather erection similar to what is seen in fledgling aged and younger parrots. In parrots that remain on a quantitative restricted diet, as is done in weight management, these behaviors persist for many years into adulthood. It is possible these behaviors also remain due to reinforcement history, and/or imprinting on humans, however they have also been observed to go away if the bird is allowed access to an ad libitum diet for an extended period of time. This persistent presentation of juvenile behaviors when on quantitative restrictive diets has been also observed in ground hornbills, vulture species, ibis species, crows and ravens. A reverting to juvenile behavior has also been observed in parent raised hawks when placed on a very restricted diet.

Other possible health issues

It is difficult to thoroughly ascertain all the possible impacts short term and long term quantitative restrictive diets can have on animals being trained via this approach. Adequate nutrition and caloric intake affects numerous functions including feather production, bone density and brain chemistry. Some speculations have arisen in regard to a correlation between quantitative restrictive diets and feather damaging behavior observed in hawks that is initiated when placed on restrictive diets. Noting the behavior was absent on an ad libitum diet. Dr van Krimpen also found that increasing behavior related to feeding and satiety by dietary changes successfully reduced feather pecking behavior in chickens. (16) It is possible future exploration into the topic will reveal more correlations between health issues and long term restrictive diets.

Other fallout

An unfortunate observation is that weight management has been presented to the companion parrot community several times as a solution to creating motivation in pet parrots. Most trainers would agree that the application of weight management strategies is something that should be learned under the guidance of an experienced professional. This cautionary approach is to avoid many of the examples of poor application previously mentioned. It is also to help determine if indeed weight management would facilitate creating motivation for food. This leads to the question is weight management appropriate or even necessary in the companion bird world? The species of birds most commonly kept as companion animals typically include species whose natural history allows for a large diversity of potential reinforcers (social interactions, allopreening, enrichment, etc.) Additionally many include feeding and foraging strategies that respond extremely well to food management to create motivation for food. Food management is defined by The International Association of Avian Trainers and Educators as managing when and how food is delivered, what food items are offered, and the ratio of food items offered to create desire to present behaviors for food reinforcers. (17) Micromanaging weights and diets for these species is typically not necessary and can put companion animals at risk due to improper guidance.

Psychological Appetite

The previous examples illustrated what can happen when focus is primarily on keeping a bird within a certain weight range. Often the recommended objective is to work the bird at the highest weight possible. An example often used to suggest successful application of weight management is when the animal's working weight is higher than what it would be if fed ad libitum. This motivation to present behavior in this situation has gone by several names, including psychological appetite, psychological hunger, and most recently food paradox in certain bird training circles.

Malina states psychological appetite is the creation of a perceived feeling that there is a food shortage. The result is that the bird is more likely to be motivated to take advantage of the opportunity to obtain a food item. Psychological appetite is produced through creating a perceived food shortage based on how the food is presented. And, when combined with variable reinforcers and small windows of opportunity, psychological appetite provides increased motivation without having to reduce an animal's body weight. As the bird's weight continues to increase, the bird is working on habit and *psychological* appetite. If something causes the bird to fly off and sit in a tree, it may stay out longer if it feels there is no real drive to satiate its appetite. As you can see, while weight management is a factor in creating psychological appetite, once created, that psychological appetite can allow you to successfully work your birds at or above their ad-lib weights (18)

There are several challenges with this interpretation. Psychological appetite suggests an animal is not experiencing hunger. It also suggests that weight is linearly related to hunger, and that an animal is not experiencing hunger at a higher weight, all implying good animal welfare. However as has been demonstrated hunger is not the same as motivation and different measures need to be applied to ascertain if the animal is experiencing hunger. Additionally animals can and do experience hunger despite higher weights. A fact certainly not lost on an overweight person attempting to lose weight, or overweight animal that didn't receive its anticipated meal. In addition other factors can influence hunger that are not related to weight, such as time elapsed since the last meal was consumed. So while an animal may have a higher weight, it may very well be experiencing hunger.

Another aspect of this training strategy that poses welfare questions is the perceived shortage of food. Psychological appetite is comparable to food hoarding/food maintenance behavior seen in humans and also rats. When humans are deprived of food, they have a very predictable response: they become obsessed with seeking food. This has been shown in studies of people deprived of food throughout history, for example, children adopted from food insecure areas, survivors of concentration camps, prisoners of war, or people lost in the wilderness after accidents. Mildly or moderately food deprived children will exhibit this behavior problem as a response to a time or times in their life when they didn't have enough to eat, and could never be sure when their next meal would occur. The inconsistent availability of food can lead to behaviors like overeating and secretly hoarding food when it does become available. While this may make sense in a food-insecure situation, many children continue this behavior even when they are in a safe environment with plenty to eat. They will binge eat when food is available and store food for later, often making themselves sick because their bodies are not used to so much food. (19, 20)

Rats also hoard food or eat too much after starved for long periods of time. Rodents are not gastro-intestinally suited to true binge eating comparable to that of humans but those on calorie restriction pack in as much as they can when food is available. If experimental protocols permit, they also stash whatever they can carry. In rats perhaps the most basic indicator of the proposition that calorie restricted animals 'feel hungry' is that—given the opportunity—they all eat substantially more than they are allocated on other feeding regimens. (21)

Some parallels we observe is that even birds working above ad libitum weight and perceived to be responding due to psychological hunger are often obsessed with food acquisition, anxiety before feeding times, gorging when food is available, and overeating until sick when put on feed up or free feed. These are especially prevalent on animals that have been exposed to restricted diets for long periods of time. The Society for Neuroscience has adopted the US Public Health Service Policy on Humane Care and Use of Laboratory Animals (2002), which recommends that unless the contrary is established researchers should consider that procedures that cause pain or distress in humans may cause pain or distress in other animals. (22)

While a perceived food shortage may allow a bird to have motivation at a higher weight, it raises the question is this an acceptable psychological state for birds in an animal training program? A frequently presented argument is that psychological appetite replicates a natural occurrence in the wild. Animals don't always have food available and must seize opportunities when they arise. The crucial difference is that animals in the wild have the opportunity to seek food. Animals that do not have food seeking opportunities and are on restricted diets have been shown to have an increase in presentation of food/oral related behaviors such as repeated pecking at water in chickens that can develop into stereotypies. (23) Stereotypy is highly prevalent in captive domestic pigs. In large commercial production systems, pigs have minimal complexity in their housing systems. The combination of a frustrated feeding motivation combined with a lack of foraging opportunities highly impacts this problem. (24)

Animal trainers often speak of choice in animal training, but are weight managed animals really at liberty to choose when to seek/acquire food? Having no control of the opportunity to acquire food except under very limited conditions is not analogous to an animal that may be food deprived but has the opportunity to behave to potentially acquire food. Also in the wild food can be abundant for prolonged periods of times. It is usually not chronically restricted to limited quantities creating long term deprivation as opposed to acute deprivation. Although still diminished compared to the wild, it is possible that some birds such as those flown in falconry, or presentations that allows more unstructured flying, with a large variety of generalized behaviors may be experiencing better opportunity to express seeking behavior than a bird flying consistently patterned A to B's .

Another explanation sometimes presented for the response of a weight managed bird presenting behavior at a high weight is contrafreeloading. Contrafreeloading says that animals will expend energy to forage even when food is readily available. Some trainers and researchers interpret this as the animal wants to use its adaptations to acquire food. A key factor in contrafreeloading is that the animal is exploring *other* opportunities to acquire food while at the same time comparable food is available and easily accessed. Additionally some researchers believe contrafreeloading may not be about the reinforcing qualities of doing behavior, but about the

information that is acquired by doing the behavior. Information that leads to future resources is reinforcing. It has also been observed that contrafreeloading is relatively decreased when animals are hungry. (25) Instead they go directly to the known food source.

Relief Response Vs Behavioral Bliss

Observant animal trainers have noticed a difference in the way birds behave when presenting an action for food reinforcers in which motivation is created with different approaches. A behavioral bliss point occurs when an animal is given free access to alternative activities and will behave in a way to maximize its reinforcement (26) Birds that are trained with a behavioral bliss approach tend to show relaxed behavior in the presence of food. It appears they understand reinforcers are forth-coming. They do not experience deprivation to the point that they are either physically or psychologically concerned about food. They will take food when offered, but do not appear anxious or concerned about food. In contrast, those trained with a weight management approach exhibit much more focus on food acquisition. This may be because the animal is either hungry or not sure when the next meal is coming, and is therefore eager to eat when food is available. Animals in both conditions will perform behavior for food. But the body language of those birds will look quite different. This is because the motivating operations are different. The weight managed animal is seeking relief from hunger or a perceived food shortage, while the other is seeking the pleasure of the desired consequence. It is important to recognize there is a difference in these motivating operations and the difference has welfare implications.

Discussion

In research settings utilizing primates the primary animal welfare concerns associated with the use of food control protocols are: (i) the risk of nutritional imbalances, depending on the reward type and diet used; (ii) the potential for weight loss (or poor growth, in the case of growing animals) from programmed or non-programmed restriction; and (iii) the aversive experience of hunger. (27)

As discussed, weight management in bird training can impact animal welfare when applied poorly. This can include excessive hunger, stunted growth, water gorging/food seeking stereotypies, persistent juvenile behaviors and possibly other potential health problems. Weight management when applied properly may create a psychological state that also has poor welfare implications. While weight management can create the desired motivation for animals to present behavior (when applied well or poorly) the question becomes is it an ethically appropriate tool in animal training?

In the bird training world weight management has a long history of use; unfortunately this long term use doesn't necessarily equal best practices. The animal training industry has made tremendous changes in its approach to influencing behavior in the last 50 years. Many trainers have embraced force free science based training technology. Bird shows are removing equipment from raptors and free lofting birds as much as possible. And birds are being trained to do behaviors once thought impossible such as allowing blood draws and injections without restraint. Approaches in animal training are evolving and traditional practices are being questioned. Exploring alternatives to the use of weight management as a primary means of creating/measuring motivation for food needs to be a part of this evolution.

Many trainers already incorporate strategies that reduce or eliminate the need for weight management to create motivation for food. For example animals can be trained immediately preceding normal meal times, meal times can be staggered throughout the day to increase training opportunities, base diets can be provided at all times while preferred foods are saved for reinforcers to be offered during training, reinforcement schemes in which less preferred reinforcers are offered first and most preferred last, small pieces of food can be offered to allow for more repetitions before satiation, and/or the animals regular diet can be offered during training only. If any reduction in food provided is considered at all, the period is short lived. Once the learning has occurred, diets are quickly returned to levels considered typical for the animal. There are many examples in which the listed strategies for managing the delivery of food have proven to be successful in creating motivation for food reinforcers without compromising the health and welfare of the animal. (28) These strategies have been used for birds in both free flighted/free roaming situations and/or more controlled environments. It is also interesting to note that weight management as a means of creating motivation for food is predominantly seen in bird training (primarily bird shows and falconry) and in some research settings. It is rarely used to train other taxonomic groups.

Bird training also needs to consider the role of nonfood reinforcers in animal training. This also leads to the opportunity to include a variety of reinforcers as a means of increasing motivation. Atlantic bottlenose dolphin trainers at the Aquarium of Niagara Falls documented a significant increase in consistent performance of behavior when they introduced a variety of nonfood reinforcers into their repertoire. (29) Many species in bird shows are social, engage with enrichment readily, respond favorably to touch, forage frequently, cache, respond to sights, sounds, movement, etc. For example a male satin bower bird on exhibit was easily reinforced for behavior by offering blue items that could be used to decorate his bower. (See video clip here <http://www.youtube.com/watch?v=NaziP8mtqO4&list=PL535EQukKq4r-AOTuHXvtp7CXkQHI6TGK&feature=share&index=10>) Psittacines in particular can easily be successfully trained without the use of weight management due the long list of nonfood reinforcers to which they often respond.

In addition many marine mammal presentations consider the use of other schedules of reinforcement (besides an FR1) much more in their training strategy in comparison to bird shows. The typical marine mammal presentation typically has a limited number of animals to present a 20 to 30 minute show. This means a single animal may be required to present a variety of behaviors over a longer duration than most birds in bird shows. Different schedules of reinforcement can add unpredictability, and when applied properly can increase motivation. The combination of a variety of food and nonfood reinforcers and different schedules of reinforcement can contribute to an animal that is engaged in training for a longer duration.

The animals also typically know a variety of behaviors and may not know which behavior will be asked next. This approach is different from many bird shows in which animals are presenting the same behavior or repeated flight patterns each show, with a predictable reinforcer waiting at the end. Malina states in her description of psychological appetite. As the bird's weight continues to increase, the bird is working on habit and *psychological* appetite. If something causes the bird to fly off and sit in a tree, it may stay out longer if it feels there is no real drive to satiate its appetite. (30) It is easy to see if a bird is trained to present a patterned behavior with a

predictable reinforcer, that if it were to stray from its consistent path it might be difficult to regain its attention and focus without the use of elevated hunger. However with training strategies that include generalized behaviors, a variety of reinforcers, different schedules of reinforcement, and a variety of trained behaviors that are requested unpredictably, it is possible that bird training for shows could reconsider the need for weight management as a means of creating motivation.

It is interesting to note that most bird training begins without the scale. If a bird has no training history and no identifiable nonfood reinforcers, many trainers begin by offering food and evaluating motivation for food by observing behavioral response. Some trainers advocate getting a bird trained to stand on a scale as soon as possible and focus on a weight management approach. However this can cause focusing on weight to become the priority. While acquiring the weight might be helpful for monitoring health, encouraging trainers to continue to place emphasis on behavioral response and incorporating food management strategies can support a move away from weight management. This is also when having industry guidelines of observable measures of hunger and acceptable parameters would be helpful. It is in the best interest of the animals and the industry to teach trainers how to better evaluate and rate hunger using observational skills as opposed to the number on the scale.

Examples

The following are examples of bird training that have been successfully implemented that do not use weight management as a means of creating or determining motivation.

Free Flighted Flock of Cockatoos

Chris Shank of Cockatoo Downs maintains a flock of small cockatoos. Some of the flock members are parent raised and some are hand raised. The birds live in large outdoor aviaries attached to a barn. Chris has had many training sessions with some individuals in the flock and the birds have history of receiving sunflower seeds or pine nuts from her if cued for behavior. The birds have access to food in their cages at all times. The birds are also released almost daily and free fly on the property throughout the day. The birds forage on grass shoots and fruiting trees. The ones with training history will recall to Chris reliably when cued and participate in training sessions. In the afternoon they return to the aviaries where a fresh diet is waiting. There is an important difference in this training setting compared to bird shows that involve very short, predictable patterned flights or behaviors. The birds have and do spend considerable amounts of time in the environment and their behavior, in particular recall, is extremely generalized with a long history of reinforcement under many conditions. This strategy combined with management of preferred reinforcers allows these birds to feed ad libitum and still have motivation to present behavior. See video example: http://www.youtube.com/watch?v=HGF_KDV1kpY

Wild Pigeons

Wild pigeons are fed on a daily basis around 2 PM in a park. The pigeons receive preferred food items from several individuals in the park. Individual pigeons are recognizable by the people who feed the birds. The author visited the park and was able to train several birds to present a variety of behaviors in a short time using preferred reinforcers. Two of the pigeons were hand raised and released by one of the individuals who visits the park. Although usually associated with the flock, these pigeons often fly directly to him upon sight and will follow him back to his

apartment. Being wild pigeons they are free to leave or forage elsewhere. However the easily acquired preferred food items keep them returning on a daily basis.

See video example: <http://www.youtube.com/watch?v=t5gGBI6OhkY>

Ravens and Keas in Research Setting

Ravens and keas utilized in cognition studies at the University of Vienna in Austria are fed preferred food items when participating in experiments. The keas are fed a base diet of items which include fruits, vegetables and proteins (varying daily e.g. yogurt and topfen, corn, eggs or mashed meat) three times a day. Training for research projects is conducted in between mealtimes in the morning and the afternoon. The ravens are fed a base diet in the morning prior to training for research projects. They receive nuts cheese and dog food throughout the day for participating in the research study. They are then fed the rest of their base diet at the end of the day. Birds are weighed occasionally to monitor health as opposed to measuring weight for motivation for training. (31)

Free Flying Parrots, Cranes and Hornbill

Psittacines, crowned cranes, and a ground hornbill are free flown successfully without the use of weight management at Avian Behavior International. Animals receive portions of their diet throughout the day, and are reinforced with preferred food items, and nonfood reinforcers. Similar to the example at Cockatoo Downs, the birds are trained to generalize behaviors under a variety of conditions and environments. Animals are free to explore the environment, but are motivated to respond to cued behavior when the opportunity presents itself. Motivation for training is based on behavioral responses and weights are only measured to monitor health. (32)

See video examples <http://www.youtube.com/watch?v=KUhloUa6VT0> and <http://www.youtube.com/watch?v=49pFLXpenI>

Free Flying Caracara in Zoo

A striated caracara at ZSL London zoo was trained during the non-show season when on feed up. Trainers found the bird would present behavior even though it was 200g over its target weight. They utilized strategies such as only having the bird participate in educational presentations three days a week, managing food, and using nonfood reinforcers such as novel enrichment and caching opportunities. (33)

Macaw Flock in Zoo

A flock of eight scarlet macaws at the Dallas World Aquarium was trained by the author to present a flock flight several times a day without the use of weight management. The birds received a portion of their base diet which included pellets and fruits and vegetables in the morning. Approximately 1 to 2 hours later they participated in a training session in which flight behaviors were reinforced with seeds and nuts. They were then offered free access to their base diet and allowed to feed until satiated. Leftovers were removed and a second training session occurred later in the day. At the end of the day they were again allowed free access to their base diet for several hours. When the birds had gone to roost any left-over food was removed. Birds were weighed periodically to monitor health but were not weighed to identify a target weight for training or measure motivation.

Free Roaming Parrot in Conservation Project

Sirocco the kakapo is an imprinted endangered parrot that lives freely on a 310 ha island in New Zealand. Sirocco is free to consume normal vegetation available on the island at all times. Training Sirocco required rangers to track him using a telemetry device as he could be anywhere on the island. Once roughly located rangers would wait on the pathway for Sirocco to approach. Sirocco's affinity for people and their history of being associated with desired consequences resulted in Sirocco seeking out the rangers once he heard their voices. Sirocco would participate in training sessions for as long as two hours working primarily for small preferred food items not available in the environment and social interaction. (34) See video example: <http://www.youtube.com/watch?v=9rgs72JIdx4>

Exhibit Harpy Eagle in Zoo

A harpy eagle at the Dallas Zoo was trained without the use of weight management. Initial training began from outside of the enclosure. The bird was trained to target, and fly from point A to point B for keeper presentations inside the exhibit. The bird was also trained to shift into its cold weather holding area and also to enter a crate. The bird was trained to get on a scale although this was used to monitor health not motivation. Interest in food was evaluated by looking at behavioral response. The bird was also trained to allow touch to the chest and legs, the application of removable anklets and jesses, and to hop to a glove. (35) See video example: <http://www.youtube.com/watch?v=IeP1CBrkJtc>

There is much more to explore and discuss about the ways people are successfully training birds in free flight/free roaming and enclosed settings without the use of weight management. Of particular interest would be to explore the application of different strategies with a wide range of species. Bird collections often present a great diversity in avian natural history and some strategies may prove to more successful with some species than others. Only a few examples have been shared here, however it is hoped that more trainers will document and share their strategies to facilitate continued advances in bird training.

Conclusion

Training birds involves the use of many different strategies to influence motivation. Skilled trainers are drawing upon all those tools (reinforcement history, schedules of reinforcement, variety in reinforcers, awareness of environment and its effect on behavior, food management, etc.) Weight management for many has been a part of this toolbox. In some cases it has been the primary tool. However when scrutinized, weight management presents questions about welfare. More and more people are demonstrating birds can be trained without micromanaging diets and weights. Their successes open the door to strategies that allow reaching behavior goals and at the same time attending to high standards of animal welfare. These revelations suggest perhaps it is time to stop putting so much weight on the scale.

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