Feathered Einsteins

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Abstract

How much do you know about the Autism Spectrum? Understanding the traits and training methods for this condition in people can give us an insight on the behavioural issues in our parrot patients and how to assist with conditioning them to life in human society.

Introduction

Anyone who has worked with parrots can see the innate intelligence in these birds. Unfortunately assimilating parrots to life with humans does not always go to plan. Providing a grounding of appropriate training methods from a young age will lead to a reduction in pet parrots who cannot cope in a home situation.

By applying training methods already developed for people on the Autism Spectrum to parrots we may be able to help parrots adapt to life in a typical human household.

Comparison of Autistics and Parrots

Autism spectrum disorder is a serious neurodevelopmental disorder that impairs a person's ability to communicate and interact with others. It also includes restricted repetitive behaviours, interests and activities (**mayoclinic.org**). Some of the most brilliant minds in the world are either on the Autism Spectrum or were thought to have been on the Spectrum. The most notable in our industry being Temple Grandin who is quite open about her idiosyncrasies. Other people in history who were likely on the spectrum include Einstein, Mozart, Newton, Darwin, Thomas Jefferson, Michelangelo and Andy Warhol (**Autismmythbusters.com**). So what actually is Autism? The Diagnostic and Statistical Manual for Mental Disorders 4th edition lists the following criteria:

- A qualitative impairment in social interactions;
- A qualitative impairment in communication; and
- Restricted repetitive and stereotyped patterns of behavior, interests and activities.

How does this correlate with domestic parrots? If we look at the characteristics of autistic people in a broad way, many pet parrots actually fit these criteria. For example:

- Impairment in social interactions – some parrots refuse to socialize with people at all or possibly only one member of the family.
- Impairment in communications – birds resorting to aggressive biting to communicate their wants and needs to their owners.
- Restricted repetitive and stereotyped patterns of behavior, interests and activities - parrots that refuse to leave their cage, or feather barbering parrots.

No specific research has been carried out to date on correlations between Autism per say and Parrots, though correlations have been made with training methods (Pepperberg and Sherman, 2002) and Stereotypical behaviours (Garner et al., 2003). Grandin has made a number of analogies between people on the Autism spectrum and animals in general (Grandin and Johnson, 2005). Grandin believes two traits of Autistics and animals enable us to make this analogy. These are:

1. Heightened senses compared with the average person (neurotypical). The majority of autistic people have some form of heightened senses, such as super sensitivity to tactile stimuli, sounds, visual cues, olfaction and taste. In some cases this can literally cause physical pain to them, more often it is simply distracting. Parrots are known to have heightened visual and hearing senses compared with neurotypical people. Research has also shown they likely have a heightened sense of smell as well (Steiger et al., 2008).

2. Inability to generalize. Grandin considers this one of the most important reasons why human beings are more advanced than other animals. The ability to make associations. Animals have been shown time and again to be not able to make the significant generalizations the people can. For example, when training a guide dog, it is not good enough to show them how to stop

at one street corner, they need to be shown on multiple street corners in multiple setting to make the generalization to stop at any street corner.

A third trait I believe could be added into this argument is:

3.   Reduced or absent "Theory of Mind". Theory of mind is the ability to predict or infer what others want, see or need may be different to your own. This ability is thought to be reduced in autistics. Whilst animals are considered to have a basic theory of mind, it is not considered as advanced as neurotypical humans over about the age of 5. Parrots also have been shown to have a rudimentary "Theory of Mind" (Peron et al., 2011), which like humans must be taught to an extent.

Comparison of Brain Structures of Autistics and Birds

Theory of mind and the ability to generalise is thought to arise from the frontal cortex area of the brain. Whilst autistics do have a frontal cortex, and in some cases larger than normal frontal cortices, the microcircuitry for this area appears to be excessive and disjointed causing widespread malfunction in integrating stimuli from other areas of the brain (Courchesne and Pearce, 2005). Research into the functioning of bird brains has inferred that the nidopallium caudolaterale of birds has a similar functional role as the frontal cortex of mammals.

Autistic people and birds have been shown to have fewer neural connections between the Thalamus and the frontal cortex/nidopallium caudolaterale compared with neurotypical humans (Gunturken, 2005; Verhoeven et al., 2010). The role of the Thalamus is to collect information, in particular sensory information. This information is then sorted by various areas of the brain into usable information. Reduced processing capabilities of the frontal cortex in autistics is likely what creates their hypersensitive traits, as does having fewer neurons to the nidopallium caudolateralie in birds. This means that the all of the stimuli from sensory information collected can potentially get in the way when trying to make inferences, decisions or generalised associations.

Training Methods

Whatever training method is used for creating desirable behaviours in special needs children and birds, the most important factor is starting early. Early intervention has been viewed as the crux of any training methods used for Autism. Voos et al. (2013) has even seen positive changes in not only behaviour of young children but also

significant changes in brain activity utilising fMRI and EEG readings. Early intervention in the rearing of parrots has also been shown to produce positive behavioural traits and reduced stress in Parrots (Collette et al., 2000).

Birds and Autistics do not make generalisations easily but through constant and consistent reinforcement, they can learn specific tasks. Consistency in the choice of training methods used is also important to any special needs child or animal. Any research paper should show this consistency to accurately prove or disprove a hypothesis. Unfortunately this does not always occur in the real world, where lay people often chop and change to different methods depending upon what is the current "Fad".

One of the most popular training methods for parrots and autistic children with problem behaviours is "Applied Behavioural Analysis". It can also be used to encourage new desired behaviours. This method involves functionally assessing the relationship between a targeted behaviour and the environment to identify the antecedents and consequences. It is also known as the ABC method of training:

A.   Antecedent - A directive or request for the child/bird to perform an action
B.   Behaviour - A behaviour or response from the child/bird - successful performance, noncompliance or no response.
C.   Consequence - A consequence, defined as the reaction from the trainer, which can range from strong positive reinforcement (eg a special treat or verbal praise) to a strong negative response (eg verbal "No", or withholding attention).

Further techniques often used in Applied Behavioural Analysis are as follows:

• Task Analysis - a process in which a task is analysed into its component parts to that those pats can be taught through the use of chaining.
• Chaining - the skill to be learned is broken down into the smallest units for easy learning eg to stop a bird biting at you when you are getting food bowls from the cage would involve a chain of two tasks - first being to move away from the food bowl and second would be to stay away whilst the food is being changed.
• Prompting - the trainer provides assistance to encourage the desired response from the child/bird.
• Fading - the overall goal is for the child/bird to eventually not need prompts. Prompts are gradually faded out as the new behaviour is learned.
• Shaping - this involves gradually modifying an existing behaviour into the desired behaviour. For example a parrot screeching for attention can have the screech modified into words or a whis-

tle to get attention.

- Differential reinforcement - reinforcement provides a response to a child/bird's behaviour that will most likely increase that behaviour. It is "differential" because the level of reinforcement varies depending on the child/bird's response. Difficult tasks can be reinforced heavily where easy or already learned tasks may be reinforced less heavily. Systematically changing the reinforcement will encourage the child/bird to respond appropriately under occasional reinforcement in a non-training setting. Some examples of positive reinforcements include: food, preferred activities (eg access to a toy), and attention.

- Generalisation - once a skill is learned in one environment, you then need to teach the skill in other settings. For example: bird learns to step up from cage. It will then need to be taught to step up from a play gym, the floor, when there are other preferred people in the room and for other people.

Susan Friedman of "Behaviour Works" has information on training new behaviours in this method as well as changing challenging behaviours.

An alternative training method used by Pepperberg (2006) whilst training African Greys including the famous "Alex", involves using the model/rival technique or observational learning. The model/rival technique uses a three way social interaction system to demonstrate the appropriate behaviour to the target animal. In this way the target animal sees the model animal performing the required task and getting a reinforcer. This method of training puts greater emphasis on the "social brain" hypothesis, which presumes that social animals have evolved intelligence to solve social problems (Seyfarth and Cheney, 2015). An example of how this learning technique works in the wild would be as follows: how does an African grey know when to fly away from a predator? They are not born knowing certain animals are dangerous, the learn to fly away not by having a predator attack them but by watching the other parrots in their flock fly away. Observational training has also been used in Autistics (Taylor et al., 2012) as well as other species of animals (McKinley and Young, 2003). It has also been shown to be a superior method of training in Autistics (Cardon and Wilcox, 2011). Given the social nature of most of our domestic parrots, utilising observational learning methods has the potential to be utilised in a household situation.

An offshoot of this form of training involves video modelling to demonstrate target behaviours for children on the Autism Spectrum (Alzyoudi et al., 2015). Appropriate behaviours are recorded and then played back to the child often in a loop, afterwards the child is tested in a one on one training session. Benefits of this method of training for Autistics includes: cost effective training (less requirements for multiple persons for training sessions and ability to replay session to multiple children or multiple times), decreased tendency to focus on distractions during training sessions and increased retention due to the consistent repetition of the target behaviour (Cardon and Wilcox, 2011). No research into this form of training has been used in animals. Whilst it is generally accepted that parrots and animals in general can see pictures on the television it is likely that they would require a higher rate of picture frames per second to have sustained interest in a television program.

Conclusion

Given the numbers of parrots who are rehomed to rescue groups over the world due to behavioural issues, and loved pets with stereotypical and undesirable behaviours, we have a long way to go in creating pet parrots that are happy and confident in their human orientated environment. In an ideal world, parrot schools or day care centres would provide a setting where owners of parrots could allow their birds to not only socialise but also learn new and appropriate behaviours from already trained birds. This is obviously unlikely to be a viable option in most areas of Australia due to the requirements for travel to an appropriate training centre and availability of trainers and parrots to use. An alternative could be to utilise video modeling of appropriate behaviours that owners can purchase and play on a continuous loop to their parrots when they are at work or not at home. Parrots could be viewing appropriate behaviours and even though they are not getting one on one socialising, they potentially will receive extra stimulation needed when being left by themselves to develop new and appropriate behaviours.

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