Challenging Survival of the Fittest:

Disability and Behavior Modifications in Nonhuman Primates

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Primatology, the study of primate behavior, is one way we learn about our human ancestors and how humans have developed into who we are today. Primatology research is also important in its own right, as learning about a species' behavior can help us with conservation and breeding efforts, as well as show us truly amazing and humbling things about the animal world (Sellers, n.d.). Disability in nonhuman primates is an often-overlooked aspect of the field of primatology with limited research about how wild and captive primates respond to disability in other individuals and adapt their behavior if they are disabled themselves. By learning about disability in our closest animal relatives, perhaps we can shape our own perceptions about disabled humans and consider the social model of disability, which puts forward the idea that a non-accessible environments have a larger role in producing disability rather than the impairment or difference in an individual itself (Lovell, Mason, Astbury, & Talbot, 2014). Beliefs in "survival of the fittest" or that "nature will run its course" are common, and people think that disabled animals do not stand a chance in the wild, which often carries over to their perceptions of disabled people (Taylor, 2017).

The argument that there is no point in helping people with disabilities because they are unfit for survival if nature were allowed to run its course is often accepted. Primate behavior is often seen as what is "natural" for humans. For example, historically both scientists and members of the public believed that the patriarchy was natural or innate to humans because chimpanzees lived in male-dominated groups (Saini, 2017). This is not the case in other

nonhuman primates, like bonobos and lemurs, and this idea is no longer supported by many primatologists. The idea that primate behavior shows us what is natural for humans is problematic, because we are not chimpanzees or bonobos, but we can learn about our own origins from studying primate behavior. Research in primate behavior related to disability would allow for an interesting discussion about the social and medical models of disability and the "survival of the fittest" idea that surrounds much of the discussion and perceptions about disabled animals. By learning more about how disabled primates and their social group members adapt and react to disability, we can challenge our own ideas about disability in humans and learn more about primate behavior.

In this paper, I will go through current research about primates and disability and will discuss behavior changes in survival behaviors, like feeding and sexual reproduction, and social aspects of disability in primates. I want to make it clear that I am not arguing that these results show us what is "natural" for humans and that I am not comparing disabled animals to disabled people, a harmful and dehumanizing practice. I seek to challenge the "survival of the fittest" idea in animal populations, which is important in of itself and can add to the conversation about humans and disability, just as other aspects of primatology, like parenting and sex differences, have shaped the way we think about our own species and societies. By looking at the adaptive behaviors disabled primates and their affiliates make, we can shape our own perceptions of animal cognition and behavior and consider how we think about disability in humans.

Wild primates can become disabled in a variety of ways, including congenital limb malformations, injuries from falling or fighting with predators or other primates, illness, or from getting caught in poacher's snare traps (Cibot et al., 2016). These animals do not always die, contrary to what many people may believe about "survival of the fittest." Some groups of great apes have populations of individuals with severe injuries on their hands from snare traps with a

survival rate of over twenty percent (Byrne & Stokes, 2002). Often, these animals make changes to their survival behaviors so that they can still forage and feed efficiently and engage in other species-typical behaviors. In a similar vein, disabled people often feel that their disability fosters their creativity, as they have to make changes when an environment is not completely accessible (Hitselberger, 2013). Karin Hitselberger writes about how she constantly comes up with new solutions and has a huge amount of experience with thinking creatively and problem solving, as disability "breeds creativity" (Hitselberger, 2013). Of course, the changes humans and animals make are different, but it is interesting to note the similar underlying problem-solving that occurs. Behavioral modification is part of the natural world, and research on primates' behavioral modifications would also inform our knowledge about the behavioral modifications that disabled and nondisabled humans make.

Not all manually disabled primates make significant changes to their behavior, and instead modify the parts of the body that they use to perform the same behaviors. Byrne and Stokes (2002) observed the feeding behaviors in one gorilla and two chimpanzees with significant snare injuries to their hands. Chimpanzees and gorillas both eat foods that involve complex manipulation. Chimpanzees have to peel back old and rough leaves in order to get to the edible new leaves of a certain plant, while gorillas eat two types of plants that have leaves and stems covered in nettles, and avoid getting stung while eating. (Byrne & Stokes, 2002). The gorilla in this study went through the same steps for folding up the leaves as nondisabled gorillas, but she used different body parts due to her injuries. The chimpanzees also used their mouths and other limbs more than nondisabled chimpanzees did to take off the tough leaves (Byrne & Stokes, 2002). These results show that although the apes made minor modifications as to which body parts they used, their overall feeding behavior did not change despite their significant injuries and the dexterity required to eat these specific foods.

Another study looking at a larger population of chimpanzees found that disabled chimpanzees spent more time feeding from threes, did not hang from branches as much, and used larger substrate for support than nondisabled chimpanzees (Cibot et al., 2016). Disabled chimpanzees went as high into the trees as nondisabled chimps did. These results showed that disabled chimpanzees did make changes to their behaviors by grabbing onto larger tree branches and other substrates and by spending more time feeing, possibly due to less efficient feeding, but that they do not have significant consequences for their well-being overall. The authors noted that disabled chimpanzees seemed to pick branches that helped them with their specific disability. Nondisabled chimpanzees are often able to change their behaviors based on what is easier for them to do in their current environment, for example, they can walk on all four limbs or just two limbs depending on what they are doing and what the environment allows (Cibot et al., 2016). Disabled chimps also make these types of changes due to their impairment, but not just in certain environments like many nondisabled chimps. Every primate species is different, and results from other another study on Japanese macaques show more obvious behavioral modifications.

In a study on female macaques with congenital limb malformations, researchers found many differences along with many similarities in the behaviors of captive disabled and nondisabled monkeys (Turner, Fedigan, Matthews, & Nakamichi, 2012). Disabled monkeys did not beg for peanuts from tourists as much as nondisabled monkeys and did not use their hands as much in grooming. Disabled monkeys compensated for this by using their mouths or by pinching with both of their arms in order to groom conspecifics (Turner et al., 2012). Disabled macaques also scratched themselves and used their feet to scratch more than nondisabled monkeys did. Interestingly, disabled monkeys scratched themselves on objects in their environment, while this behavior was extremely rare for nondisabled monkeys (Turner et al., 2012). The monkeys spent

the same amount of time feeding and had the same feeding efficiency regardless of their ability. These results show that disabled females were able to adapt and perform all of their species-typical behaviors, including social behaviors (Turner et al., 2012). Although these monkeys were living in captivity and not the wild, their behavioral adaptations show that disabled animals can survive and live within a social group without issues by performing the same behaviors as nondisabled animals, but by using different body parts to do so.

Although there is a growing body of literature on primates and disability, there is not much research on how disability affects the social lives of primates. Turner et al. (2014) looked at the social consequences of disability in females in the same captive Japanese macaque population and found an overall neutral response to disability. Disabled females spent less time socializing and grooming and more time resting than nondisabled monkeys and had fewer social relationships and grooming partners (Turner, Fedigan, Matthews, & Nakamichi, 2014). The researchers posited that these differences in social behavior were a result of their behavioral adaptations due to their disability, requiring more rest time. Monkeys accepted the groom solicitations of disabled and nondisabled monkeys to an equal degree, meaning that monkeys were not more or less likely to reject a disabled monkey asking to be groomed (Turner et al., 2014). The findings from this study suggest that disabled monkeys were not treated more negatively by their social group nor were they cared for more than nondisabled monkeys, indicating a neutral response to disability (congenital limb malformations) overall. These results challenge the notion that animals immediately reject disabled members of their social group because they would be a burden on the group. These monkeys were able to engage in all of the species-typical social behaviors, like grooming, they just performed them in different ways by using different body parts than nondisabled monkeys did.

While there are few empirical studies on social behavior and disability, primatologists, especially those who study empathy, do make observations and data about disability, although the word "disability" is not used by many primatologists in their research. Frans de Waal, a primatologist well-known for his work on empathy in nonhuman primates, has made many observations about disability in relation to empathy but has not performed studies about disability like those discussed previously in this paper. Because his research is on altruism, most of his findings reflect how other animals treat disabled animals instead of focusing on how disabled animals themselves adapt their behaviors.

Many field researchers have observed chimpanzee groups in the wild slowing down in order to accommodate the walking speeds of social group members with an injury or bringing them food if they are unable to forage for themselves (de Waal, 2019). In de Waal's chimpanzee colony, one of the older chimpanzees, Peony, was unable to walk when her arthritis was particularly bad (de Waal, 2019). The other females in her social group would drink water and keep it in their mouths and would then go over to her and spit it into her open mouth. They also pushed her up onto elevated surfaces when other chimpanzees were grooming there so that she could take part in this crucial social behavior (de Waal, 2019). Similarly, de Waal also observed a wild chimpanzee who was unable to climb whose daughter would climb high into the trees to get fruit to bring back down for her mother to eat. These are very limited observations on just a few animals, but they support the idea that disability in primates does not mean that a disabled primate's conspecifics will reject it or leave it behind to perish. These instances are evidence that animals can anticipate or understand the needs of others and are able to help them achieve survival and social goals when an impairment limits their ability (de Waal, 2019).

This care has not been reported in chimpanzee mothers with congenitally disabled infants, as there have been only a few case studies about this relationship and no studies on how

the mothers cared for disabled offspring (Matsumoto, Itoh, Inoue, & Nakamura, 2016). In 2011, researchers observed a chimpanzee infant who was born with a congenital disability and her mother and compared her development to that of a nondisabled chimpanzee born in the same month. There were multiple characteristics that lead observers to believe that she was disabled, as she did not grip her mother as well as a nondisabled infant would, she had thinner hair and legs, empty-looking eyes, a half-open mouth, and had a large mass on her abdomen (Matsumoto et al., 2016). The two infants did not show many differences at six months old, but as she aged, the disabled infant did not grow or eat normally. Her mother adapted her walking behavior by walking on three legs instead of four so that she could support the infant with one arm. She also helped support her when climbing trees, which had a negative impact on the mother's feeding efficiency (Matsumoto et al., 2016). The mother also stopped fishing for ants in trees, a typical chimpanzee foraging behavior, because it involved hanging from one arm and fishing with the other, but one of her arms was always carrying her infant. She would often give the infant to her older daughter so that she could spend time eating, and older daughter played a significant role in the infant's care.

The infant did not grow normally and never ate solid food, and died from unknown causes when she was around twenty-three months old (Matsumoto et al., 2016). This case study shows how a mother chimpanzee modified her own behavior in order to care for a significantly disabled offspring. Again, this study only involves one animal so inferences about chimpanzees and disability cannot be made based on her behaviors, but this case provides evidence that chimpanzees will indeed care for their disabled young and will modify their own behaviors in order to do so. This chimpanzee mother did not immediately reject her infant, which has occurred in chimpanzees, but instead she recognized that it had different needs from her previous offspring and modified her behavior to suit these needs. This case study provides additional

support for the idea that "survival of the fittest" is not completely accurate, as animals that are "unfit" due to disability are cared for by their relatives and care is modified to fit their needs.

Another instance of primate disability that challenges the "survival of the fittest" idea involves Mozu, a Japanese macaque who had significant congenital impairments related to her hands and feet (Taylor, 2017). These extremities are very important to Japanese macaques, as they are an arboreal species, traveling through the trees due to heavy snow in their natural habitat. Mozu was unable to move in this way, and walked, crawled, and slid on the ground to travel two miles each day with her group. She lived to be almost thirty years old, raised five offspring, and had a high social standing in her group (Taylor, 2017). Mozu shows that disability is not necessarily a death sentence for primates, even if they are unable to engage in the most basic and seemingly essential species-typical behaviors, like climbing and jumping through trees. Although little information is provided about how Mozu's social group cared for and treated Mozu, based on her life outcome and Turner et al. (2014)'s findings about congenital limb malformations in Japanese macaques, they had a neutral response and she lived a fairly typical life for a macaque besides her locomotion methods.

Accommodative care or a neutral response have not been observed for all occurrences of disability, as Jane Goodall observed a strong disgust response in a group of chimpanzees after many fell ill with polio and many of their limbs were paralyzed (de Waal, 2019). These chimps were not able to move as nondisabled chimps did, and the nondisabled chimps were very alarmed. They would not touch or groom the chimps with polio, which is very uncommon (de Waal, 2019). This disgust response makes sense evolutionarily, as chimpanzees would want to avoid making contact with individuals that could give them a disease. It would be interesting to perform a study looking at how primates respond to different types of disability and if they are aware of its cause or if it is possible for them to acquire the same illness or impairment. This case

is important to note, as it shows that there are different responses to disability that may be different due to the nature of the disability and could provide interesting information about disgust responses in human to various stimuli.

De Waal also discusses mimicking behavior in chimpanzees, as nondisabled chimpanzees have imitated the modified behaviors of disabled chimpanzees (de Waal, 2019). One male chimpanzee injured his hand and was unable to walk normally, so he leaned on his bent wrist instead of on his knuckles. Younger chimps in the group imitated his walk, following behind him while walking on their wrists. Similarly, a male chimpanzee who was paralyzed in his hands and wrists was not able to scratch himself, so he started holding a plant with his foot and rubbing his body against it, a novel behavior (de Waal, 2019). The younger chimpanzees in his group started to scratch in the same way, even though it was not necessary for them as they were nondisabled and could use their hands. We can only make guesses about the reasons why the younger chimpanzees engaged in these imitation behaviors, but it could be curiosity due to the novelty of the behaviors (de Waal, 2019). These new behaviors and ways of moving were not completely rejected, as with the chimpanzees with polio, as the other chimpanzees seemed interested in them and mimicked them. This may show that difference due to disability is not an inherently positive or negative thing in primate social groups, it might just be differences that pique curiosity but do not have any concrete social consequences for the disabled primates.

Sunaura Taylor discusses some of the evidence that primates can recognize difference and disability by referencing a chimpanzee in de Waal's colony, Yereon in *Beasts of Burden*. Yereon's hand was injured in a fight with another adult male chimp, one of his rivals. This injury caused a limp that affected his gait. The researchers at the colony noticed that he would only limp when he was in the view of the chimpanzee that hurt him (Taylor, 2017). Although we do not know what Yereon's motives for this behavior were, it is possible that he wanted his rival to

feel bad for him and treat him less aggressively in the future. This anecdote shows that this chimpanzee was aware of differences in the body and possibly that these differences have social consequences in their social group. If Yereon had no awareness of this, he would not have limped only in the presence of his rival, because he would not gain anything from having his rival see him limp.

All of these results indicate that the "survival of the fittest" idea in relation to disability is not true, as disabled individuals adapt their behaviors and are able to perform species-specific behaviors and engage in normal social behaviors, and nondisabled individuals alter their behaviors to help and coexist with disabled individuals. Primatology research in empathy and altruism shows just how collaborative and dependent primate social groups are and that cooperation is essential, especially in social species, like most primates (de Waal, 2019). By considering how different primate species collaborate in that disabled individuals are often given the care or assistance that they need or are treated in the same way as nondisabled group members.

The current body of literature on disability in nonhuman primates pushes back on the "survival of the fittest" concept that nature and animals are ruthless, and that the weak will die out. Cooperation, collaboration, and empathy are all present in primate societies, just as they are in human societies. Although disabled nonhuman primates and disabled humans are incomparable in many ways, they are also similar, just as all humans share remarkable similarities to nonhuman primates in a vast number of behaviors and tendencies. Learning about nonhuman primate behavior challenges us to reconsider what we consider to be natural and what makes us human. Captive and wild primates do not always treat disability as an inherently bad thing, but there is also evidence that they are aware of disability in others, so a neutral response is not necessarily because a primate does not notice difference in a group member.

As in humans, disabled nonhuman primates modify their own behaviors in novel ways due to their impairments, and nondisabled primates also sometimes change their behaviors and perform unique care behaviors, like bringing food and water to disabled group members. More research about disability in the animal world is necessary in order to gain a deeper understanding about animal behavior and empathy and about how humans view empathy and creative behavior modifications in relation to disability. This body of literature is still growing, but the results and observations discussed here provide evidence for accommodating care behavior or a neutral towards disabled individuals in nonhuman primates and challenge the common conception that the natural world is a cold and unforgiving place that does not allow for disabled or "unfit" animals to live and flourish. Although the experiences of humans are very different from those of humans, we need to consider this when we make assumptions about the "fitness" and experiences of disabled humans, their caregivers, and their loved ones.

References

Byrne, R., & Stokes, E. (2002). Effects of Manual Disability on Feeding Skills in Gorillas and Chimpanzees. *International Journal of Primatology*, *23*(3), 539–554.

Cibot, M., Krief, S., Philippon, J., Couchoud, P., Seguya, A., & Pouydebat, E. (2016). Feeding Consequences of Hand and Foot Disability in Wild Adult Chimpanzees (Pan troglodytes schweinfurthii). *International Journal of Primatology*, *37*(4–5), 479–494. https://doi.org/10.1007/s10764-016-9914-0

de Waal, F. B. M. (2019). *Mama's last hug: animal emotions and what they tell us about ourselves* (First edition). New York: W.W. Norton & Company.

Hitselberger, K. (2013, August 5). How Disability Breeds Creativity. Retrieved May 10, 2019, from Claiming Crip website: http://www.claimingcrip.com/2013/08/how-disability-breeds-creativity.html

Lovell, A., Mason, T., Astbury, G., & Talbot, P. (2014). Disability Studies. In *SAGE Key Concepts series: Key Concepts in Learning Disabilities*. Retrieved from http://search.credoreference.com/content/entry/sageukkclern/disability_studies/0

Matsumoto, T., Itoh, N., Inoue, S., & Nakamura, M. (2016). An observation of a severely disabled infant chimpanzee in the wild and her interactions with her mother. *Primates*, *57*(1), 3–7. https://doi.org/10.1007/s10329-015-0499-6

Saini, A. (2017, July 20). Scientists assumed that patriarchy was only natural. Bonobos proved them wrong. Retrieved May 7, 2019, from Quartz website: https://qz.com/1033621/scientists-assumed-that-patriarchy-was-only-natural-bonobos-proved-them-wrong/

Sellers, B. (n.d.). *Primate Behaviour*. Lecture presented at the University of Leeds. Retrieved from https://www.leeds.ac.uk/chb/lectures/anthl_11.html

Taylor, S. (2017). *Beasts of burden: animal and disability liberation*. New York: New Press.

Turner, S. E., Fedigan, L. M., Matthews, H. D., & Nakamichi, M. (2012). Disability, compensatory behavior, and innovation in free-ranging adult female Japanese macaques (Macaca fuscata). *American Journal of Primatology*, *74*(9), 788–803. https://doi.org/10.1002/ajp.22029

Turner, S. E., Fedigan, L. M., Matthews, H. D., & Nakamichi, M. (2014). Social consequences of disability in a nonhuman primate. *Journal of Human Evolution*, *68*, 47–57. https://doi.org/10.1016/j.jhevol.2014.01.002