Behavior studies: Mistakes to miracles.

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Introduction

Small animals, especially rodents are easy to handle and breed, they have smaller gestation periods, they produce larger litter as compared to large animals, they are cost-effective as they require less space in terms of housing and maintenance. All these factors make rodents an obvious choice for experiments. Along with these advantages, there are some drawbacks of using rodent models. They are extremely sensitive to senses (light, touch, feel, smell) that gives a very narrow window of error to experimenters. This makes rodents a poor choice for behavior studies.

There are many factors governing animal behavior. Some of these factors are under the control of an experimenter whereas some are not. Although these animals are housed in a barrier facility in segregation to the outer world, the behavior of the same animal is different during different times of the day (cardinal cycle), animals behave differently in different seasons (fall, spring), animals experienced natural calamities (i.e. earthquake) shows the difference in behavior. Different types and intensity of noise and vibrations due to ongoing construction or renovation nearby the behavior room might also affect normal animal behavior. There are some other factors that are under the control of the experimenter and very few pay attention to these factors. Rodent behaves differently when housed together vs. housed individually, changes in intensity of light in the room, changes in room temperature due to bad AC or heat, changes in water temperature of the pool in which rodents are performing, reflection of the surface of wall of the chamber in which they are being tested can alter rodent behavior. These are the well-known and most discussed factors that alter rodent behavior.

There are certainly other factors that are underappreciated and rarely discussed, most of the experimenter tend to ignore them but are extremely important in behavior studies. According to a study conducted by Dr. Mogil and his team, shows mice respond to pain differently in presence of female experimenter Vs. male experimenter. They further demonstrated that mice can sense the presence of a male (humans and other animals too) by the smell and stress out. They further investigated that Presence of researcher is not necessary only the shirt was worn by the researcher overnight also produces the same results. In conclusion, mice are extremely sensitive to a sense of smell.

Unlike animals, we humans are different and we prefer to wear new clothes and a fair amount of fragrances of perfumes, toiletry products to appear presentable to go to work on a daily basis. All these different products and clothes are an important part of our daily lives, without which we might be socially awkward and looked down upon. These products with different fragrances and outfits of different prints and patterns can negatively affect rodent behavior. For us humans, they are just pleasant fragrances but for animals, they are scents of different intensity and different origin. Anything novel to animals in their native environment is an additional factor for them that can induce stress.

Animal behavior is usually performed in different phases first being habituation followed by training and then actual testing. Unknowingly, the experimenter performs training wearing a set of fragrances (perfume, deodorant, makeup, body wash, hair gel, shampoo, conditioner etc.) and clothes (e.g. solid white shirt). The following day (testing phase) according to his/her daily routine experimenter while getting ready for work, changes the scents (by changing the perfume and adding or removing one toiletry product) and also changes the cues (clothes, pattern of the outfit for e.g. from solid white to stripes/plaid) and hopes to get expected results. For us, it is perfectly normal to change clothes and fragrances but for rodents, changes in scents and cues it's entirely novel environment.

To better understand the actual behavior changes resulting from an experimental therapy (for e.g. a novel drug), an experimenter has to blend in the native environment of the rodents just like wildlife photographers they blend into the environment using a camouflage or using tree-trunk-cameras to avoid disturbance in the native environment of a wildlife they are filming [1]. As an animal behavior experimenter, one should try to blend in the environment of the rodents and avoid as many variable factors between habituation-training and testing as possible for e.g. avoid using products that have fragrances OR using the same products with fragrances and same clothes for all the phases of a behavior experiment.

All these factors are not necessarily induced by experimenter only; it can be anyone, a technician changing the cages or cleaning the room where behavior is being performed, another experimenter working in different shift using the same room can carry different set of scents and these scents tend to be trapped in the room as there is minimal airflow.

Similarly, changes in the intensity of light between different phases of behavior also affect the results [2]. A dim light, blinking light, poorly lit corner of the chamber etc. also contributes towards alteration in animal behavior. An excellent behavior experimenter is mindful of all the variable factors that can affect animal behavior and possess the ability to convert mistakes to miracles.

References

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