Variables

NAME:

The following excerpt came from the article "Impact Protection Potential of Mammalian Hair: Testing the Pugilism Hypothesis for the Evolution of Human Facial Hair" by E.A. Beseris, S.E. Naleway, and D.R. Carrier posted on https://academic.oup.com/iob/article/2/1/obaa005/5799080.

Because facial hair is one of the most sexually dimorphic features of humans [meaning males and females differ] and is often perceived as an indicator of masculinity and social dominance, facial hair has been suggested to play a role in male contest competition. Some authors have proposed that the beard may function similar to the long hair of a lion's mane, serving to protect vital areas like the throat and jaw from lethal attacks. This is consistent with the observation that the mandible, which is superficially covered by the beard, is one of the most commonly fractured facial bones in interpersonal violence.

We hypothesized that beards protect the skin and bones of the face when human males fight by absorbing and dispersing the energy of a blunt impact. We tested this hypothesis by measuring impact force and energy absorbed by a fiber epoxy composite, which served as a bone analog, when it was covered with skin that had thick hair (referred to here as "furred") versus skin with no hair (referred to here as "sheared" and "plucked").

We covered the epoxy composite with segments of skin dissected from domestic sheep, and used a drop weight impact tester to collect force versus time data. The hair of the sheepskin samples was prepared in three separate conditions: sheared (n = 20), plucked (n = 20), and furred (n = 20). Sheared samples were trimmed with manual sheep shears to approximately 0.5 cm in length. Sheared samples were included to test whether the presence of hair roots in the skin influenced the results. Plucked samples had all hair fibers removed, including the roots. Furred samples were not manipulated in any way, and had an approximate hair length of 8 cm. Of note, these three conditions result in different total volumes and masses of hair and were chosen to best represent states that would occur in human males (i.e., full beard, trimmed beard, and hairless).

The test involves dropping a blunt striker (diameter approximately 3 cm, mass = 4.70 kg), from a known height [7.4 cm] toward a material sample mounted on an anvil. [Picture is provided on the next page.] A velocity detector was also used to measure the instantaneous velocity (m/s) of the striker head at the time of impact. [Calculations were performed to find the energy each sample absorbed.]

We found that fully furred samples were capable of absorbing more energy than plucked and sheared samples. For example, total energy absorbed was 37% greater in the furred compared to the plucked samples. These differences were due in part to a longer time frame of force delivery in the furred samples. These data support the hypothesis that human beards protect vulnerable regions of the facial skeleton from damaging strikes. 1. What is the population?

2. What is the sample?

3. What is the explanatory variable?

4. What is the response variable? [One is given here; others are detailed in the full study.]

5. Discuss any lurking variables that could throw off the results of the study.

6. Overgeneralization of the results of a study can lead to disappointing results when we expand the treatment to the entire population. Discuss this as it relates to beards.

