by Andre Garcia, AGI

Subjective Scoring and Genetic Evaluations

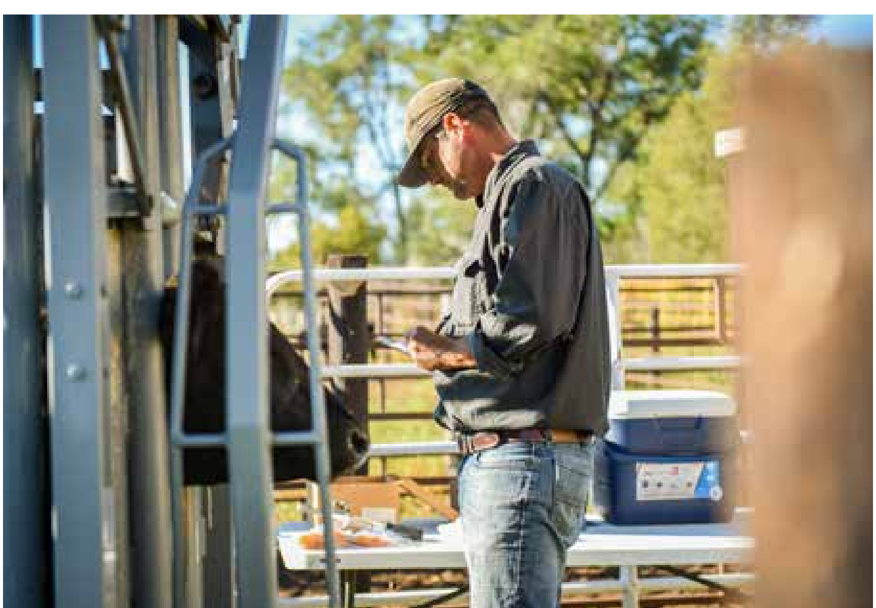
When we talk about data collection, often one of the first things that comes to mind is, 'What kind of equipment do I need to measure it?'

Classic examples would be a scale to weigh the animals or a tape to measure scrotal circumference. Yet there are other types of data for which the measuring tool is the human eye, and we become the judges of that data point.

For instance, when recording foot scores, breeders have a reference score guide. They have to look at the animal's feet and score that animal on the worst foot for a combination of foot angle and claw set. This context brings up the question of subjectivity in the measurement, because that record is subject to the individual judgement and interpretation of the scorer.

To illustrate the concept of subjectivity in these measurements and understand what it means, let me ask you a question. How do you differentiate between restless or nervous when you are scoring an animal on docility?

The thought process we go through to establish that baseline is subjective. It can be slightly different for every person, even though most would agree on the difference between a docile vs. an aggressive animal. This is the nuance with a subjective measurement. They can be influenced by personal opinions and beliefs. Even when we do our best to follow scoring guides and not let our opinion influence our assessment, a level of unconscious bias is always present that we cannot fully eliminate.



How to deal with subjectivity in statistics

Subjective data is certainly harder to deal with from a scientific and statistical standpoint, but it is still very useful and helps us develop great selection tools.

Several strategies are used to account for the subjectivity in those measurements, which allow for the creation of useful tools. First, we need clear, consistent and easy-to-use recording guidelines, to ensure everyone has the same baseline. Second, we need to be honest in the scoring process, and score animals for what they are and not for what we would like them to be. Third, we need to control for the observer/scorer effect, by having the same person consistently scoring all the animals in a contemporary group.

These strategies allow us to gather and combine the data recorded by many breeders in different parts of the country into a national cattle evaluation through statistical models.

From concepts to practice

Now that we have the concept of subjective measures and what things we need to pay attention to when handling this type of data, the next

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question is how to move towards practical implementation with nationwide data recording, making sure we account for all those factors.

Two big questions arise when we talk about developing expected progeny differences (EPDs) from subjective records. The first one is how to handle that subjectivity in the measurements themselves; and second, how to control for the environmental variation.

For the first question, we need to make sure we have a robust database that is based on clear and consistent scoring guidelines.

At the American Angus Association, those guidelines are carefully put together, and they can be found online or in a handy pocket book. Be sure to reach out and let us know if you need one.

Additionally, several videos, webinars and other resources about those scoring guides and on how to score animals for the various traits are available at the Angus University website (*angus.org/University*).

Another key aspect here is consistency on data recording. Back to the question of how to differentiate between restless and nervous for a docility score, you need to make sure you are consistent and score all the animals with the same criteria and follow the guidelines. Doing this ensures even if your definition of restless vs. nervous is a little bit different from someone else's, all the animals in that contemporary group are consistently scored with the same criteria.

Let's put the second question of how to address the environmental variability into context. A couple of helpful examples to understand how the environment influences foot scores and hair shedding phenotypes.

For example, different soil conditions will influence hoof health and will potentially affect a foot score, and different weather patterns will affect the rate of hair shedding of animals in different regions. Clearly, those sources of variation in the phenotypes are not due to genetics, and therefore we need to take them into account when the EPDs are calculated.

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Before explaining how we do that in our genetic evaluations, I want to pose a question. Does this environmental variability affect the subjective/score traits only? If we think about soil conditions, weather patterns, management differences, it all sounds familiar, doesn't it? The reason for that is because these and many other environmental sources of variation affect all traits, and not only the subjective scores.

To account for those environmental differences, we go back to contemporary groups. Having good contemporary groups allows us to account for all those non-genetic effects in the calculation of EPDs. That is why having a good contemporary group structure is essential for any trait in the genetic evaluation, subjective or not..

The American Angus Association publishes EPDs on several traits out of the national cattle evaluation, that are based on those subjective records such as calving ease, docility, foot scores and hair shedding, which was released in May 2022.

This is possible because Angus breeders have done a great job in building a robust database of phenotypic records from more traditional traits such as calving ease, with now more than 1.8 million records — to more recent and newer traits such as docility (more than 370,000 records), foot scores (more than 155,000 records for each angle and claw set) and hair shedding (more than 20,000 records).

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