

2016

The Nature and Nurture of Sports Performance

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THE NATURE AND NURTURE OF SPORTS PERFORMANCE (UNIV 291)

An Experiment of One



According to runner-philosopher **George Sheehan**, we are all an “experiment of one”. We make choices and record their effects. This post summarizes the results of my recent “experiment of one” teaching *The Nature and Nurture of Sports*

Performance at Virginia Commonwealth University (VCU).

Goal

I designed this course as part of the **VCU Great Bike Race Book**, which was a series of 1-credit pass/fail courses offered during the **Union Cycliste Internationale (UCI) World Road Championships hosted in Richmond** September 19-27, 2015. The idea behind the Great Bike Race Book was that these 1-credit courses would be a way for students to use digital tools to stay academically engaged during the week of the UCI Championships when the physical VCU campus was closed.

The specific goal of my course was for students to learn how scientists go about disentangling the genetic and environmental influences on sports performance. The framing question for the course was “Are world class athletes born or raised?”

Method

Instructors were given carte blanche when it came to course structure. Our only real directive was to incorporate tools (e.g., VCU’s Word Press-fueled **“Rampages”** online publishing platform) to enhance learning through digital fluency. I chose blogging and twitter as the digital mediums for the course, and spread the assignments across a 3-week period. Below are descriptions of the assignments developed for the course, along with a few words about their rationale.

- **Introductory blog post:** Students introduced themselves and described why they signed up for the course. The goal here was twofold: First, since this course was all online, I wanted a chance to get to know the students and their motivations before jumping into “real” assignments. Second, this assignment served as a dry-run to make sure that everyone understood how to post to the course site
- **Content-related blog posts (2: here and here):** Prior to the race week, I wanted students to become familiar with the ways that scientists try to disentangle genetic and environmental influences. I also wanted them to be familiar with some of the other well-known (and controversial) claims about where expertise comes from (e.g., the 10,000 hours rule, popularized by author Malcolm Gladwell). In order to do this, students were assigned 2 sets of readings, videos, and podcast clips. They were then asked to respond to each set of materials via blog post.
- **Interview-based blog posts (2):** During the week of the Road World Championships, students conducted two interviews where they asked their interviewee to explain his/her beliefs about genetic and environmental influences on sports performance. Students were then asked to blog about their interviewee’s perspective vis a vis the course content. The goal here was to get students to reflect on how to evaluate “armchair theories” in view of evidence.
- **Daily Challenges (respond to at least 4):** During each day of the Road World Championships, I tweeted a “challenge” meant to get students thinking about themes related to the course. The goal was to stimulate students’ curiosity about course topics in a light way, and to encourage them to do a little internet sleuthing or interact with others to enhance their learning. An illustrative challenge is below.



Jessica Salvatore
@j_e_salvatore

Follow

team [#natnur](#) connect with a UCI athlete via twitter. Ask them something you're curious about, e.g., what they attribute their success to.

11:01 AM - 23 Sep 2015 · Richmond, VA

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Students also had the requirement to publicize their blog posts via twitter, and interact with their fellow classmates via twitter by providing feedback, asking a follow-up question, etc.

Results

Students came to the course from a variety of different backgrounds. We had biology majors, psychology majors, and exercise science majors. Some students were **accomplished athletes themselves**, while others wondered out loud in their introductory blog posts **why they never saw much success in sports**.

The course materials for the **first content-related blog post** included a video of panel discussion from MIT's Sloan Sports Analytics Conference on "Developing the Modern Athlete"; an introductory book chapter on using family-based studies to estimate genetic and environmental influences; a scientific article on the degree to which genetics constrain individuals' physiological response to an exercise program; and an NPR clip entitled "How likely is it, really, that your athletic kid will turn pro?" Students really seemed to resonate with the idea that athletic success goes beyond biology. For example:

*I believed initially that –bottom line -an athlete was born with their natural talents but I believe that opinion has been altered somewhat after the viewing of the readings and media for the assignment. [. . .] During the MIT Sloan Sports Analytics Conference many of the speakers at the Malcolm Gladwell-moderated panel agree that these “naturals” can have natural ability that set them at a greater par on the field/court, however, they all mention that this can be detrimental to the athletes when hitting the pro athletic field/court. With this mindset of having this natural upper hand, the athletes can be swayed into neglecting to focus and lead to lower levels of development in mental toughness or fortitude as compared to those who may not be born with these characteristics and must continually refine their talents/performance through training. – **Mark Hairston***

*Going back to the idea of natural talent/ability, the panel shared their thoughts on natural ability hindering athletes. The panel agreed that often times, “natural athletes” become bored with the sport and training fast. Once they realized their natural ability, these athletes felt as if they didn't need to train hard, which ultimately led to their demise. – **Taylor Wray***

Other students were quick to point out that the mental component of athleticism needs to be paired with physical prerequisites in order for someone to go from good to great:

*There is most definitely a certain sense of prerequisites for a certain sport such as body composition, recovery rate, speed of muscle building, height, or even length of legs. – **Natalie Linton***

*After reading these articles, watching the panel, and listening to the NPR talk, I realized that most successful professional athletes have the same things in common: a healthy balance of both nature and nurture. Successful athletes are born with the tools they need to prevail, and then they are nurtured to learn how to use their tools. – **Alina Nguyen***

Students seemed to be particularly interested in the mental edge that made some athletes great, and so I was able to adapt the set of materials for the **second blog post** accordingly. They included an excerpt from McDougall's "Born to Run"; Diana Nyad's TED talk "Never Ever Give Up". To expose students to information about how scientists "find genes" for athleticism, I also included an introductory book chapter on gene identification and a scientific article on genes associated with physiological response to exercise. As part of this blog post, I asked students to reflect on whether they would want to be tested for "athlete genes" if such a test were available.

Some people were curious about what their predispositions might be:

*You can become skilled in anything but to become great at something you must have passion and passion isn't a skill that can be taught. [. . .] You have to test multiple traits both mentally and physically to decide if someone has what it takes to become a true athlete. I would probably get tested simply because I am a very curious person. – **Jessica Turner***

*I thought about whether or not there could possibly be a gene for athletic performance. I've always found gene testing to be very interesting and I've even thought about doing it in the future. Sometimes I wonder for myself whether or not I have genes for athletic abilities or where I even got my athletic abilities from because my dad didn't play sports in school and my mom said she liked playing sports like soccer and softball but she didn't consider herself an athlete. – **Victoria Hall***

Others raised questions about how one might go about identifying "sports genes" and the difficulty of disentangling physiological and psychological processes.

Physical strength is just as necessary as the mental for these feats. However, I'm not quite sure there's a way to disentangle the aspects of these two strengths, other than within our

genetic code. Perhaps we can use a combination of allelic association and linkage (tracing the inheritance of a DNA marker and a disorder within families) as well as separating subjects who have mental toughness and physical toughness to separate these “sports” genes. In fact, a recent study suggests that there are several inherited genes that contribute to cardiorespiratory fitness improvement with regular exercise. Maybe there are other genes that specifically contribute to mental determination and grit that are separate from these oligogenes. – Faria Rahman

With 20,500 human genes, the task of identifying “sports” genes is a difficult one. I believe genetic testing for “sport” genes could be interesting, but would it really change the mindset of a couch potato? I believe couch potatoes are usually set in their ways and believe that sports are too difficult to attempt. But who knows, maybe genetic testing for these “sports” genes could lead to a healthier nation! – Taylor Wray

It was interesting to see how students’ interviews with parents, friends, and random race spectators intersected with the course content as part of the interview-based blog posts.

I started the interview asking “Do you think that some people are born to be great athletes or that with hard work any of us could be competing in this race?” She answered “both”. Even if you are born a great athlete, it is not going to get you anywhere if you don’t work at it.” I found that responses very true. It doesn’t matter if you have these great genes to be fit, athletic and overall better at sports. Working hard and pushing yourself can be the difference why there are famous athletes. – Sabrina Barillas

Talking about the UCI bikers explicitly, nurture plays a huge role in their success. Of course, you start with the love for the sport and the passion to pursue the sport, but there’s a certain point where love and passion stop. My relative stated that biking, especially at an elite level, is very expensive. – Alina Nguyen

She thinks it’s all about the work you put in and the food you put in. Nature just gives you the body in her opinion. Nurture involves what you do to it. All athletes believe in hard work and hard training just like Diana Nyad. – Natalie Linton

I started with the simplest question “ is an athlete born an athlete or trained to be one,” her answer was no; I think they are born to be. She then continued to tell me that they inherited it in their genes from their parents and grandparents. In our class readings we have read about

a couple research projects. In one of them, they found 39 SNPs that can explain almost 50% of the variation in the response to an exercise program. Which means that not everyone responds the same to the same exercise program. – Angela Sutton

The daily challenges ended up being the place where students' own curiosity could really shine. Below is an exchange between students, which led one of them to find a scientific article about exercise-induced changes in gene expression in rats.



Faria Rahman

@rhmnf2

Follow

@jess_turnerrr Maybe with the future of epigenetics we can learn to change our gene expression to become a true athlete!

#natnur #vcubrb

12:03 AM - 22 Sep 2015

2



Jessica Salvatore @j_e_salvatore

22 Sep 15

@rhmnf2 @Jess_turnerrr Can you find evidence that exercise changes gene expression by searching pubmed.gov? Let us know!



Faria Rahman

@rhmnf2

Follow

@j_e_salvatore @Jess_turnerrr yeah! This cool article studies its effect on rat brains during exercise: 1.usa.gov/1Lv2386

9:37 PM - 22 Sep 2015

2

I thought students' responses to the daily challenges were especially fun to follow because students could use the challenges as an opportunity to find out more about cycling, the UCI races, and the racers themselves. There are dozens of additional examples, but I'll curb my enthusiasm and select just a few.



Mark Hairston

@MARRK_Anthony

Follow

UNIV 291 #natnur link to Road Cyclist Andrew Talansky's life story andrewtalansky.blogspot.com #vcubrb

2:04 PM - 27 Sep 2015

1



Taylor
@wraytb

[Follow](#)

could blood analysis testing benefit amateur cyclists? find out here: bit.ly/1VigPQq #vcubrb #natnur

8:35 PM - 26 Sep 2015

Can amateur cyclists benefit from blood a...

If you are training hard and feeling abnormally fatigued, you may have an underlying identifiable via blood test. Is this form of cyclingweekly.co.uk



Taylor @wraytb

24 Sep 15

@L_MSmall @StyleWeekly @atstewart996 I love how RVA is becoming more & more bike friendly! it is much safer for riders! #vcubrb #natnur



Austin Stewart
@atstewart996

[Follow](#)

@wraytb check out this link, bit.ly/1jfOFKj. In the mess of a recent hit & run bikers say RVA is not as safe as it could be..#natnur

8:59 PM - 24 Sep 2015

Is Richmond a Bike-Friendly City?

While they mourn the death of Lanie Kruszewski, the 24-year-old killed in a hit-and-run on River Road two Sundays ago, cycling
styleweekly.com

1

Conclusions

Teaching this course was very much an experiment of one. I had taught online courses before as a graduate student at the University of Minnesota, but those would best be described as “Online Teaching 1.0” because students simply read out of a textbook and submitted assignments that I then graded. *The Nature and Nurture of Sports Performance* was very much “Online Teaching 2.0”, and pushed me to get up to speed on ways to integrate interactive digital technologies and student-generated content to enhance learning. Here are some thoughts on how that process went, as well as some notes on what I will do differently next time.

- I was initially very nervous about the class getting out of control. How would I manage/monitor students’ twitter posts? What if someone said something offensive in their blog? By having students post to twitter using our course hashtag #natnur it was easy for me to follow along with the conversation. With the help of the VCU **Academic Learning Transformation Lab** I was able to set up our course blog such that I reviewed students’ posts before they were published to the course website.
- I was also initially worried that I wouldn’t get to “know” my students. But after their first two blog posts and numerous exchanges over twitter I felt like I got to know their personalities and some of the recurring themes in their posts.
- The fact that this was a 1-credit pass/fail course allowed students to experiment with these new technologies and interact with me and one another in a low-stress way. Students were highly responsive to feedback that I gave them, and I saw vast improvement in the quality of their blog posts over the course of these three weeks.
- Because the students and I were not meeting in person to clarify directions, I quickly learned that being very specific in the assignments led to the best product.
- I would add a meta-assignment at the beginning of the course where students blog about what makes a good blog post. I had included a link to “how-to” resources for blogging, but I think that having an assignment that requires students to reflect on how to create engaging content that reflects their understanding of the course themes would have been beneficial.
- I’m still trying to think through additional ways to encourage student-student interaction. A lot of students directed their twitter posts to me, and in the future I would like students to interact with one another more: to inform one another, challenge one another, and to encourage one another. One possibility to address this would be to create online “teams” within the course so that students have a manageable number of people with whom they are expected to interact.

About the Author

Jessica E. Salvatore, Ph.D. is an Assistant Professor in the VCU **Department of Psychology**. She also happens to come from a family of endurance athletes, and is a distance runner herself.



Links to exemplary student work from “The Nature and Nurture of Sports Performance”:

- <http://rampages.us/naturenurture/2015/09/14/perfect-natureperfect-nurtureperfect-athlete/>
- <http://rampages.us/naturenurture/2015/09/14/initial-impressions/>
- <http://rampages.us/naturenurture/2015/09/14/memoirs-of-a-gymnast-nature-vs-nurture/>
- <http://rampages.us/naturenurture/2015/09/14/activity-set-1-initial-impressions/>
- <http://rampages.us/naturenurture/2015/09/22/word-on-the-street-certain-sports-require-heart-and-some-may-require-a-little-extra/>
- <http://rampages.us/naturenurture/2015/09/22/word-on-the-street/>
- <http://rampages.us/naturenurture/2015/09/22/these-athletes-are-no-joke/>
- <http://rampages.us/naturenurture/2015/09/22/interview-1-4/>
- <http://rampages.us/naturenurture/2015/09/22/interview-1-2/>
- <http://rampages.us/naturenurture/2015/09/26/its-all-about-heart/>
- <http://rampages.us/naturenurture/2015/09/25/nature-or-nurture/>



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