

# Harry Potter provides window into the DNA of behavioral genetics

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Harry Potter, the hero of J. K. Rowling's seven fantasy novels, is a chip off the old wizarding block when it comes to quidditch, the fictional sport played by rival houses at Hogwarts, the school for wizards and witches. Like his father before him, Harry is a master of the game. Perhaps his skill is in his DNA.

The question of how genetics help shape the shared behavior pattern between a parent and a child, such as the athleticism between orphaned Harry and his father, James, is one of the topics Lei Yu, professor of

genetics in the School of Arts and Sciences, discusses with the 20 students enrolled this semester in his 10-week Byrne Seminar, "Harry Potter and Behavioral Genetics."

For the past several years, first-year Rutgers students – mostly science majors and all Harry Potter fans—have been learning from Yu and the popular J.K. Rowling novels about the scientific approaches used for studying behavioral genetics.

"Because of the richness of the characters and the many families in the Harry Potter books, there are so many examples of physical resemblances and behavior similarities among family members," Yu said. "The scientific question that we look at is whether these behavioral characteristics are due to genetic inheritance or because they live under the same roof. It's the age-old question: 'is it nature or nurture?'"

Yu says studying [behavioral genetics](#) through the tales of Harry Potter books is providing students with an introduction to college-level science and giving them a better understanding of how scientists think and apply scientific approaches to their research.

"They are taught how to spot certain patterns in behaviors that allow them to come up with a hypothesis as to whether the behavioral characteristics are genetically influenced," said Yu. "They also have to ask themselves whether it is the environment because these characters are living under the same roof."

At the beginning of the course, Yu explains what behavioral characteristics are, and asks students to pick a parent-child pair from the seven Potter novels and identify a behavior the parent-child pair share that might be genetic. The students engage in animated discussions about their chosen example, in order to come up with a class-consensus example. This semester they had to decide if it would be the athleticism

of the Potters or the compulsive behavior of the Blacks – the family of pure-blood wizards.

The Blacks won out, as many students in this year's class are deeply intrigued by the family's compulsiveness of carrying things to extreme, even though various members of the family displayed this compulsion in vastly different ways — from the maternal patriarch's disdain of anyone NOT of 'pure blood', to Sirius Black's devotion to Harry Potter's wellbeing. The next step was to design an experiment that would support or refute the hypothesis that the Blacks' compulsive behavior was genetically based. Last year's class—which selected the Potter family's athleticism to study—decided to use mice for determining the heritability of athleticism. Students, guided by Yu during class discussion, designed an experiment to first train the mice to run straight on a track and not to run back and forth, as mice are prone to do. Then mice would be bred selectively for differences in running speed, and the results would be analyzed to establish whether the behavior was genetic.

For this year's experiment, the students have just begun to define the research design, which Yu said he will help guide during the rest of the semester. Students are full of enthusiasm and ideas. Megan Coakley suggested using mice of different colors for easy tracking of their parentage – "black, white and something in between" – and offer food to these mice to see if some show compulsive eating. Naweed Karimi recommended breeding mice for their compulsiveness tendencies.

First, however, students realized that they needed to define compulsive behavior. Elizabeth McGinley said she thought the behavior needed to be repetitive. "Like addiction?" asked Mrudula Chakravarthy, a biomedical engineering major from Dubai.

"Yes!" Yu said. "Addiction is often a paradigm for compulsive behavior. In fact, [compulsive behavior](#) is one of the defining characteristics of

addiction. An alcoholic or drug addict can't stop himself."

For many of Yu's students, the Harry Potter class leaped off their computer screens as they built their semester schedules. Most of them had been reading the Potter novels since they were children. Harry's struggles with adolescence and his burden of being different was something they could identify with.

"The fact that we can all quote Harry Potter speaks for itself," says Stevyn Fernandes. "This seemed to be the most interesting class Rutgers had to offer, period. In fact, I built my schedule around it."

For Yu, who specializes in genetics and addiction, he is as enthusiastic for the class subject and the Harry Potter novels, as he was when he first started teaching the course.

"I realize that different age groups read Harry Potter books for different things," said Yu. "I figured that if I was to choose a literary series as a backdrop to draw examples of behavior patterns, Harry Potter series is as good as any I can think of. Based on the students' enthusiastic participation, Harry Potter books and the science of behavior genetics is clearly a winning combination."

Provided by Rutgers University

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