

# First smartphone app that predicts GPA created

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Dartmouth researchers and their colleagues have built the first app that automatically predicts college students' GPA based on smartphone data that tracks their study, party and other habits. Credit: Dartmouth College

If you're a college student wondering how your study and party habits will affect your GPA, wonder no longer. Dartmouth researchers and their colleagues have built the first app that automatically predicts college students' grade point average based on their smartphone data.

The findings offer new ways to improve students' performance, providing real-time feedback on their studying, partying, sleeping, exercising and other conscious and unconscious behaviors to help them stay on track academically.

Dartmouth computer science Professor Andrew Campbell, senior author of the SmartGPA study, will present preliminary findings on May 27 in a keynote [address](#) at the International Conference on Web and Social Media (ICWSM-15) in Oxford, England. The full findings will be presented Sept. 7-11 at the ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp 2015) in Osaka, Japan.

The SmartGPA app builds on the researchers' earlier StudentLife study, which created the first smartphone app that automatically reveals [college students'](#) mental health, academic performance and behavioral trends.

A PDF of the [SmartGPA study](#) and a [short video](#) are available here. A PDF of the StudentLife study is available [here](#). Further information on both the SmartGPA and StudentLife projects is available [here](#).

"Many cognitive, behavioral and environmental factors impact student learning during college," says Campbell, senior author of both the SmartGPA and StudentLife papers. "Our SmartGPA results show there are a number of important study and social behaviors automatically inferred from smartphone sensing data that significantly correlate with term and cumulative GPA."

The researchers installed the SmartGPA app on the smartphones of 30

Dartmouth undergraduate students and monitored them across a 10-week academic term. The app uses automatic sensing data on the phone and in the cloud and machine learning algorithms around the clock to infer higher level behaviors, including partying (frequency and duration) and studying (duration and focus). It also tracks behavioral changes for the students, such as class attendance, sleep, physical activity and sociability (i.e., face to face conversation and indoor and outdoor mobility). The app works behind the scenes with no user input.

The results show the app, along with periodic self-reports from students, can predict their GPA within 17 hundredths of a point against their cumulative GPA from their transcripts. The results are statistically significant even for a small cohort. The computational model uses no prior knowledge of students' academic performance, such as SAT scores and IQ.

The findings show that the most predictive behaviors between higher and lower performers are:

- Higher performers experienced an increase in stress levels up to the midterm period followed by a gradual decrease to the end of the term;
- In terms of sociability (i.e., the amount of face to face conversations), higher performers had shorter conversations during the early evening and night later in the term;
- As the term proceeded, higher performers spent more time studying;
- High performers were more conscientiousness about their behavior;
- High performers had higher levels of positive mood at the end of term.

"College life is complex," Campbell says. "Students have to balance

going to classes and performing well academically with competing demands for their time and energy, but there is no general agreement on why students with similar academic capability at the same institution do better or worse than one another. Furthermore, it is not clear which behavioral patterns significantly contribute to the individual differences in the academic achievement among students.

"In our previous StudentLife study, we used simple averages of all student behaviors over the term and presented a number of correlations with performance based on this approach. The SmartGPA study goes much deeper in our analysis of [academic performance](#) and proposes time series analysis of each student's data streams to best understand the individuals' differences between high and low performers. As part of our analysis, we proposed novel methods to assess behavioral changes experienced by [students](#) and a simple model to predict GPAs with great accuracy."

Provided by Dartmouth College

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