

Think fast! LSU football, Vanderbilt baseball, World Series teams share an edge



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LSU football, the defending national champion.

Vanderbilt baseball, the defending national champion.

The two teams that just played in the World Series.

One of the greatest individual NFL draft classes in recent memory.

Talent and the development of that talent distinguish all of those groups. But the link that binds them is the understanding that talent can be assessed and nurtured beyond convention — that some long-labeled “intangibles” that separate elite athletes from others are actually quite tangible. The source of that understanding is in Nashville. It’s the creation of two former

Vanderbilt professors, one a former University of Tennessee runner, the other a former college baseball player, both of them experts in the brain with PhDs in neuropsychology and cognitive neuroscience. The co-founders of S2 Cognition.

Get used to hearing about an athlete's "S2 score." Maybe less about the Wonderlic.

"It's almost like cheating to me, to find this information out," Jack Marucci, LSU's director of athletic training, said of the data provided by S2 Cognition, started in 2016 by former Vanderbilt professors Brandon Ally and Scott Wylie.

"You get a report on a player and you shake your head and say, 'This is just what we thought,'" said Vanderbilt baseball coach Tim Corbin, whose team is going through the S2 battery of tests this week, about 45 minutes of exercises on a laptop that measure various cognitive abilities.

"I don't know exactly how they're using the information or what they're doing with it," said Joe Dillon, Phillies hitting coach and early S2 Cognition believer, of the impact on two teams he knows to be among the company's 10 MLB clients, the Dodgers and Rays. "But for everyone, this paints a better, clearer picture of a player. And as a coach, the clearer picture you have of your player, what he can and can't do, the more effectively you can coach and develop him."

And the less everyone has to hear about an athlete having a "nose for the ball" or "playing faster than her foot speed" or "just having it." The brain has a 40 time and a vertical leap and a bench-press max, too.

Joe Burrow, more than just a big arm

Watching the 2014 NFL Draft together, Ally and Wylie heard terms like that — "Yeah Mel, this player really sees the field" — over and over again and found themselves laughing in frustration. That may sound nerdy, but we're talking about two people who have spent most of their professional lives helping people battle degenerative brain diseases. That means measuring cognitive abilities and using that information to help people function better.

For example, Ally, in stops at Harvard, Boston University, Louisville and Vanderbilt, primarily worked with patients with Alzheimer's disease. His main area of expertise is visual memory, which is one of the first things that erodes in those who have the disease. Wylie, in stops at

Virginia, Louisville and Vanderbilt, worked primarily with patients with Parkinson's disease, focusing on motor function. Once all tests are completed and data available on a patient, the "cognitive rehabilitation" focuses on real-world activities.

"So if I have a patient who's struggling to drive, we're not giving him an iPad," Ally said. "We're putting him in a driving simulator until we're confident he's making the best decisions possible."

Working closely together at Vanderbilt starting in 2011, Ally and Wylie "would dork out" talking about the idea of similar tests and "rehabilitation" helping to diagnose and develop athletes. Both love sports, Ally running the 1500 at UT and Wylie playing baseball at Point Loma Nazarene University in San Diego before tearing his rotator cuff. After that 2014 draft, they did a whiteboarding session at Wylie's house to develop what a battery of cognitive tests for a football player would look like. Two years later, a part-time passion had become their own company and a departure from Vanderbilt, their families along for the ride on the pursuit of a dream.

"We didn't have to create these tests from scratch, we leveraged what was already understood about fast decision-making," Wylie said. "A lot of the same tests help us better understand how neurodegenerative diseases evolve and change, and we worked on how to use medicines and therapies to push around these systems and help people. So we took these tools to the other end of the spectrum."

To the sharpest of the sharp. Someone like, say, Joe Burrow, who led LSU to the national championship and won the Heisman Trophy last season, went No. 1 overall to the Bengals and will lead them Sunday against the Tennessee Titans. Everyone knows about his arm, his athleticism, his actual "intangibles" such as leadership. But did you know his S2 score is ridiculous?

S2 Cognition has grown into a company with nine full-time employees, including Ally (VP for business development) and Wylie (chief operating officer), and revenue in "the mid-seven figures," Ally said. It has been testing prospects for its NFL clients — just four teams at this point, the Saints, Colts, Cowboys and Bills — at the NFL Scouting Combine in Indianapolis since 2016. The S2 guys go to the Senior Bowl, pro days and wherever else they can go to try to test every member of each draft class. That's thousands of players in the database at this point, and Burrow's S2 score ranks in the 97th percentile.

Specific Burrow scores on the test, which he initially took at LSU and then asked to take again at the combine to see if he could improve his score (he did a bit), include these that are shared on the S2 site, s2cognition.com: instinctive learning, 97 percent; impulse control, 97 percent; visual learning, 94 percent; improvisation, 93 percent.

In basic terms, Burrow's brain processes information and operates his body exactly as a GM looking to invest in a franchise quarterback would hope. And that may be obvious to anyone who watches Burrow. But it's not so simple with some players. The S2 site also compares two actual, unnamed NFL safeties, one of whom was drafted in the first round and one in the fourth.

The first-rounder's dimensions: 6-2, 214 pounds, 4.36 in the 40. The fourth-rounder: 6-0, 201, 4.53. The first-rounder's S2 score: 22, including a 2 in spatial memory, a 3 in perception speed and a 40 in decision complexity. The fourth-rounder's S2 score: 85, including a 57 in spatial memory, a 64 in perception speed and a 97 in decision complexity. The first-rounder did not get a second contract in the NFL; the fourth-rounder got one at \$14.5 million a year.



From left, S2 Cognition's Ryan Wylie (Scott's brother), Harrison Hunter and co-founder Brandon Ally visit with Trevecca Nazarene men's basketball coach Omar Mance on Oct. 16, 2019. Mance's program has implemented S2's cognitive testing to help develop players. (Courtesy of S2 Cognition)

“There are 4.3 guys who play like 4.6 guys because of their decision-making, and 4.8 guys who play like 4.5 guys,” Ally said. “Scouts have known this for a long time, but we’re helping them put words to what they feel and see. We’re not out to usurp or get rid of the older scouts who have years and years of their own mental databases. We just want to give them the language to say, ‘This kid’s super instinctive, and here’s why.’”

The S2 site also includes a testimonial from Saints assistant GM Jeff Ireland, who has partnered with the company since the 2016 draft. Ally said he has been in the war room with NFL clients on draft night, though he does not have clearance to specify. But however exactly S2 was involved in the 2017 Saints draft, it was involved — and Marshon Lattimore, Ryan Ramczyk, Marcus Williams and Alvin Kamara count as another testimonial. Not that the cognitive evaluations of players are any kind of replacement for strength, speed, toughness, football skill or any other traditional measure.

But at the running back position, for example, Ally said elite backs suppress their impulses just 50 to 100 milliseconds faster than the lowest-performing backs.

“We had 10 guys go in the third round or higher last year,” said Marucci, who is in his 24th season at LSU. “They’re all elite or close to elite mental processors. It’s not an accident.”

And LSU was the first place to find that out.

A ‘significant piece’ of LSU’s championship run

S2 Cognition has grown by word of mouth, spreading to trusted friends from the Saints after the Saints got word from nearby LSU. CEO Tom Noland helped Ally and Wylie develop a business plan and line up investors. This is the first year the company has attempted any kind of marketing. For this story, Ally, Paul Phillips (director of baseball/softball development) and Harrison Hunter (assistant director of field operations) put me through a few of the cognitive tests in the baseball press box at Lipscomb University, where Phillips used to coach. It was simple but not easy. Each index finger rested on a button, trying to capture a fast-moving red dot (speeded target detection), or projecting where a glimpsed, moving object would end up higher on the screen (trajectory estimation), or responding with the right or left finger based on the color of flashing objects that popped up on either side (distraction control).

S2 has several college clients now, including Trevecca Nazarene University basketball in Nashville, and has had conversations with the Titans, the Nashville Predators and Nashville SC. The first call, when S2 was still a part-time endeavor, went from Ally to Tommy Moffitt. Moffitt is LSU's assistant AD for strength and conditioning, and he was Ally's strength coach at Tennessee in the 1990s. Moffitt invited Ally and Wylie to come give a presentation on the testing to Les Miles' football staff. Some, such as John Chavis, wanted nothing to do with it.

“But then you'll have someone like Dave Aranda,” Ally said of the former LSU defensive coordinator who arrived there in 2016, “who is like ‘Oh dude, yeah, let's sit down and have a conversation. Tell me more. Let's talk the same language.’”

The key was Marucci.

“I said, ‘Man, this is exactly what we need,’” Marucci said. “I was always obsessed with, ‘There's got to be some way we can measure these guys, their football IQ, their ability to process.’ Coaches are going to find who they like, who fits what they do, who's twitchy, who's explosive, whatever. But after that, you've got to go underneath the hood next. Find out how these guys look at stuff and process it.”

LSU hasn't just learned about its players through the S2 testing. It has used drills to work on weaknesses, changed positions at times and employed receivers and pass rushers on the left or right side based on results. Ed Orgeron, who replaced Miles in 2016, has embraced the data and its benefits. Marucci called it “a significant piece” in the program's rise to last season's national championship and record-tying supply of 14 players to the NFL Draft.

“This tells you how certain players learn, too,” Marucci said. “Some guys are more visual, need to watch more film. Some guys need more of the actual, applied activity to learn things. Some are more instinctive. We get information on how to coach them with this.”

Tim Corbin and a translation for ‘good wiring’ at Vanderbilt

That's what drew Corbin and Vanderbilt to it. And it took a coach to deliver the message. Phillips, who had a 15-year pro career that included MLB stints with the White Sox, Royals and Rockies, is a longtime friend of Corbin's. Phillips and Dillon were working together in the Marlins organization when they linked up with S2. Dillon was sold, he said, when he took

the battery of tests for baseball hitters. Wylie looked at the results and told Dillon he tested out as someone with no issues with velocity or spin, but likely struggles with changeups and split-finger fastballs.

“I was like, ‘How the heck does he know that?’” Dillon said. “He’d never seen me swing the bat once.”

Dillon took his S2 belief with him to jobs as hitting coach for the Nationals and now the Phillies. Phillips left the Marlins and joined the S2 staff in 2018. This was a major win for Ally and Wylie. Scientists explaining these tests to coaches is one thing. An actual coach who has played at the highest level is another. And while S2 has programs for nine sports — including basketball, hockey, soccer, lacrosse, golf and volleyball — it may be as strong in helping baseball and softball hitters as anything.

Phillips has countless stories of these tests and the resulting drills resulting in better hitters. Austin Nola, who took a huge jump on the S2 program, made his MLB debut with the Mariners in 2019 after more than eight seasons in the minors and is an S2 endorser. Phillips also has seen S2 scores provide large boosts to the draft stock of players — one, he said, jumped two rounds and made about \$500,000 more in signing bonus because of his scores. Phillips goes to the Dominican Republic annually and tests young prospects there as well.

“It’s amazing, we’ve had some 15-, 16-year-old kids absolutely dominate our evaluations,” Phillips said. “And it’s very easy for our teams, like, ‘We liked him before, and now we’re going to pick him for sure.’”

Corbin believes S2 testing could be a major factor in recruiting in years to come. For now, it has helped Vanderbilt target and individualize drills. Vanderbilt baseball was an elite program before this affiliation because of so many factors that have nothing to do with cognitive processing. But this is another edge, another way to hone the process. It has fleshed out the information on what Corbin has called “good wiring” — and test scores from stars such as JJ Bleday and Austin Martin have confirmed that Corbin diagnosis.

“And then, I won’t give you the name but we had a very talented player who was struggling with basically seeing the ball,” Corbin said. “His distraction control mechanisms were just not very good at all. He was distracted easily, he just had a hard time stopping his bat, he was really, really low in that area. We identified it, worked on it, but even now in pro baseball you can see where it’s a hindrance to him.”

Expansion vs. exclusivity

That's the other side of this, the elite athlete who has all the traditional measurables but scores poorly on cognitive testing and sees his or her stock plummet as a result. Baseball agents have expressed that reservation to Phillips about being tested and bombing.

“And we say, ‘Well, there’s 20 teams that won’t have any idea,’” Phillips said. “But if he nails it, 10 teams now have a chance to push him up their board like we’ve never seen them do before.”

S2 Cognitive has a rule that it will only partner with two teams in each MLB division and one team in each NFL division. That would mean a max of 12 MLB teams and eight NFL teams (of the 10 current MLB clients, only the Rays gave S2 Cognition approval to confirm their agreement). There are no such stated limits for college sports. Expansion appears inevitable, though it's always possible that current business partners will increase investment to slow it.





S2 Cognition co-founder Scott Wylie, seen here at a Dodgers game with his son, Law, believes much of the company's future is in evaluating and developing young athletes. (Courtesy of S2 Cognition)

“We’ve really only been doing this for five years, so the speed of adoption has surpassed our wildest expectations,” Wylie said. “We’ve been doing it deliberately, building relationships with some forward-thinking teams, and we’ve had some exclusivity pieces there. When we start knocking on the door to expand, we certainly get a little bit of pushback. I would say, though, that, we’ve invested in our relationships and there’s an understanding we have to grow and expand. They’re not always fun conversations.”

Asked if he’s concerned about S2 Cognitive spreading through major college football and diminishing LSU’s edge, Marucci answered: “Yeah, I know. The answer to your question would be yes. We’d like them to stay in the NFL market. But look, it’s their business model.”

And Ally and Wylie said the primary plan for expansion is in youth sports. Wylie’s 9-year-old son, Law, is a baseball, football, soccer and basketball player who has benefited from the testing. This, S2 Cognitive imagines, could be the case for millions of young athletes in this country and beyond. Don’t be surprised if future NFL combines are accompanied — in Wonderlic tradition — by the leaking of S2 scores.