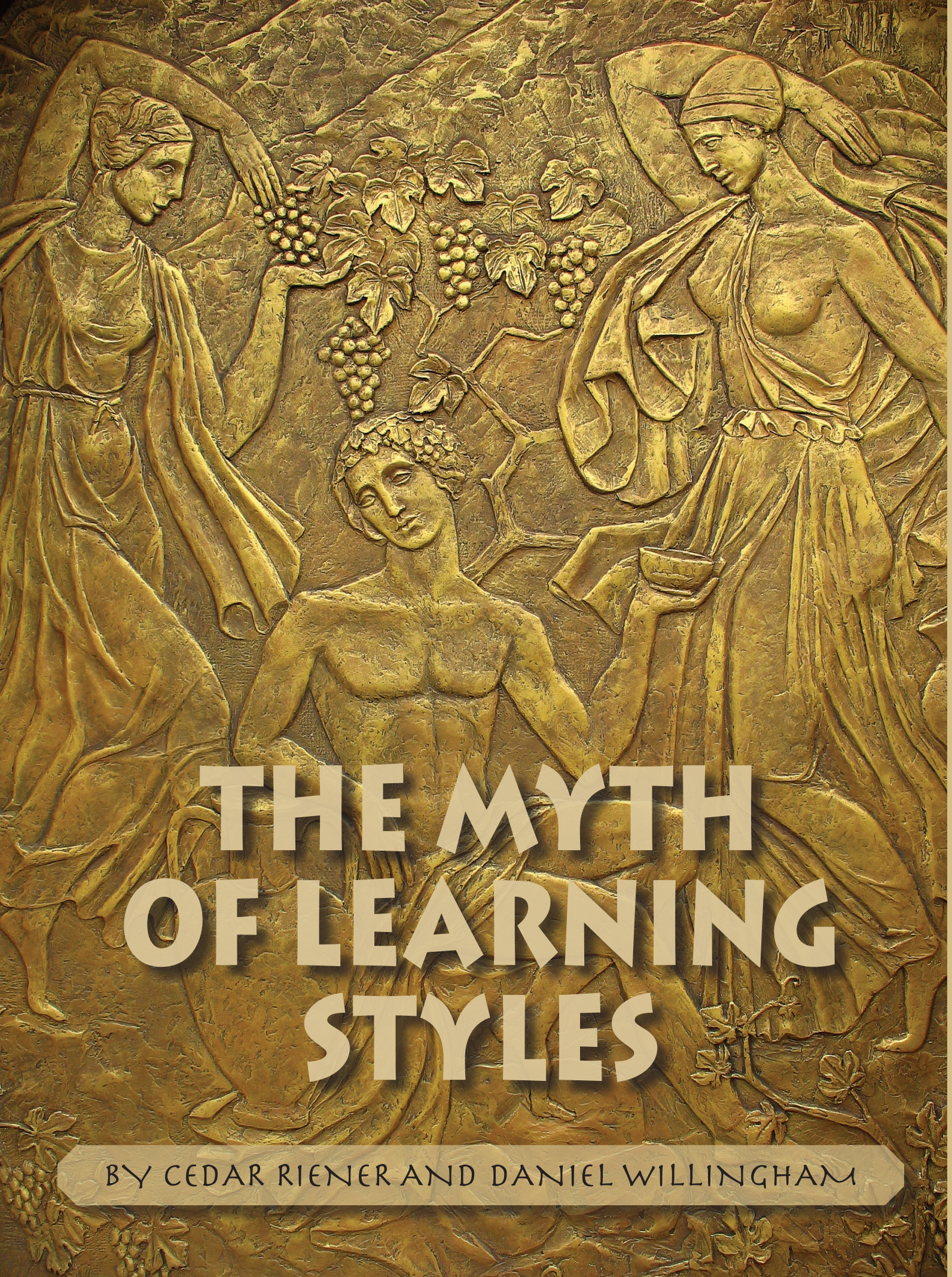

THE MYTH OF LEARNING STYLES

BY CEDAR RIENER AND DANIEL WILLINGHAM

There is no credible evidence that learning styles exist. While we will elaborate on this assertion, it is important to counteract the real harm that may be done by equivocating on the matter. In what follows, we will begin by defining "learning styles"; then we will address the claims made by those who believe that they exist, in the process acknowledging what we consider the valid claims of learning-styles theorists. But in separating the wheat from the pseudoscientific chaff in learning-styles theory, we will make clear that the wheat is contained in other educational approaches as well. A belief in learning styles is not necessary to incorporating useful knowledge about learning into one's teaching. We will then discuss the reasons why learning styles beliefs are so prevalent. Finally, we will offer suggestions about collegiate pedagogy, given that we have no evidence learning styles do not exist.

What is a Learning Style?

The claim at the center of learning-styles theory is this: *Different students have different modes of learning, and their learning could be improved by matching one's teaching with that preferred learning mode.* The way theorists have defined "modes of learning" has changed over the more than 50 years that this concept has been in vogue. Proposed modes have included dichotomies such as linear vs. holistic, impulsive vs. reflective, reasoning vs. insight, and visual vs. verbal.

The most popular current conception of learning styles equates style with the preferred bodily sense through which one receives information, whether it be visual, auditory, or kinesthetic (for some reason, no one claims that there are tactile or olfactory learners). We use this sensory definition of learning styles in the examples below, but our conclusions apply equally to other definitions.

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As you will see, the claim that the mode of presentation should match the preferred mode of learning subsumes several other claims, and it is worth unpacking the learning-styles concept in order to consider its constituent subclaims separately.

Which Claims of Learning-Styles Theorists are Correct?

We believe that some general assertions of learning-styles proponents have nearly universal consensus, based on a wealth of evidence. We begin by acknowledging the truth of these claims in order to differentiate them from other ones without support.

The first claim is this: *Learners are different from each other, these differences affect their performance, and teachers should take these differences into account.* This is true and recognized by educators and cognitive scientists alike. While many of those scientists seek to discover general principles of learning, we all acknowledge that there are differences among students. Understanding these differences and applying that understanding in the classroom can improve everyone's education.

We can find further agreement on some of the differences that matter for learning. First, whether we call it talent, ability, or intelligence, people vary in their capacity to learn different areas of content. One of the authors (Riener) has fraternal twin sons, and despite having most of the same experiences, one has learned to read earlier and the other is a better basketball player. This is clearly due to genetic differences in talent rather than a bizarre experiment in which the parents decided that one would be a basketball player and the other a professor. With educators under 6 feet tall for both parents and grandparents, they are both probably doomed to proceed to graduate school rather than to the NBA.

Second, and often intertwined with ability, students differ in their interests. If a student loves the piano, or basketball, or chess, or the biology of frogs, that student will no doubt learn material related to that subject faster than another one who does not share that fascination. We all agree that interest and attention are preconditions of learning and vary from student to student, depending on the subject.

Third, students differ in their background knowledge, and that difference influences their learning. This is obviously true in the sense that a large vocabulary allows one to read a wider variety of books. And it is further true in fields such as history: One can't hope to learn much about the causes and consequences of the American Civil War without knowing facts about the growth and separation of the colonies, the history of economic differences between the North and the South, political facts about our three branches of government, etc. But background knowledge is also quite important in things we think of as skills. For example, learning basic math facts is critical to the acquisition of later math skills.

Finally, some students have specific learning disabilities, and these affect their learning in specific ways. For example, there is considerable research on dyslexia and the strategies for addressing it. These strategies of course differ from those appropriate for those students on the autistic spectrum or those with hearing difficulties. In each of these cases, a specific difference in the student calls for individual diagnosis and attention.

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So in claiming that learning styles do not exist, we are not saying that all learners are the same. Rather, we assert that a certain number of dimensions (ability, background knowledge, interest) vary from person to person and are known to affect learning. The emphasis on learning styles, we think, often comes at the cost of attention to these other important dimensions.

What Do Learning-Styles Theorists Get Wrong?

The next claim is that *learners have preferences about how to learn that are independent of both ability and content and have meaningful implications for their learning.* These preferences are not "better" or "faster," according to learning-styles proponents, but merely "styles." In other words, just as our social selves have personalities, so do our memories.

Students do have preferences about how they learn. Many students will report preferring to study visually and others through an auditory channel. However, when these tendencies are put to the test under controlled conditions, they make no difference—learning is equivalent whether students learn in the preferred mode or not. A favorite mode of presentation (e.g., visual, auditory, or kinesthetic) often reveals itself to be instead a preference for tasks for which one has high ability and at which one feels successful.

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But even if we did identify preferences that were independent of ability, finding ones that are independent of content is a much trickier proposition. If I were to tell you "I want to teach you something. Would you rather learn it by seeing a slideshow, reading it as text, hearing it as a podcast, or enacting it in a series of movements," do you think you could answer without first asking what you were to learn—a dance, a piece of music, or an equation? While it may seem like a silly example, the claim of the learning styles approach is that one could make such a choice and improve one's learning through that choice, independent of content.

We all agree that some kids show more interest in math, some start their education more interested in poetry, and others are more interested in dodgeball. The proof that the learning-styles theorist must find is that for some sort of content—whether it be math, poetry, or dodgeball—changing the mode of presentation to match the learning styles helps people learn. That evidence has simply not been found.

Finally, we arrive at the critical and specific claim of learning-styles proponents: *Learning could be improved by matching the mode of instruction to the preferred learning style of the student.* Learning-styles believers do not make the claim that students sort neatly into sensory categories: One need not be purely visual, auditory or kinesthetic. But according to the theory, an educator should be able to improve the performance of those who have a strong preference for one of these sensory styles by matching instruction to their preference.

Failure to find any experimental support for matching the mode of instruction to a preferred learning style would simply leave us where we were at the end of the section above: Students have different interests, backgrounds, and abilities. And indeed, a recent review article in the journal *Psychological Science in the Public Interest* by a group of distinguished memory researchers sought to find evidence for this claim in particular. If you are visual, you should learn better with a visual presentation of information than with an auditory one. If you are auditory, you should learn better with auditory materials than with visual ones. Each of this pair of results is necessary to support this element of learning-styles theory. But experiments that tested this prediction with a variety of content material have not found support for it.

While such evidence of learning styles would serve as a proof that they exist, the lack of evidence does not prove definitively that they do not exist. However, in order to persuade us to devote the time and energy to adopt a certain kind of differentiated teaching, the burden of proof is on those who argue for the existence of that description of students' cognitive strategies. In other words, a good rule of thumb is that we should only bring ideas from the laboratory into our teaching if (1) we are sure that the laboratory phenomena exist under at least some conditions and (2) we understand how to usefully apply these laboratory phenomena to instruction. The first of these two conditions is not met for learning styles, and the first is obviously a precondition for the second.

Why Does the Belief in Learning Styles Persevere?

What are the reasons for this myth's perseverance? First, we think that a belief in learning styles persists because the more general claims (the ones we addressed above) are true. Learners do differ from one another. But many who believe in the myth do not consider the critical differences between styles and abilities. Teachers *should* take into account the differences in learners' abilities. And adjusting a lesson not just to be appropriately pitched at the students' level of ability but to take into account their background knowledge and interests is surely an important first step in fostering learning.

Second, a belief in learning styles fits into an egalitarian view of education: Everyone has value, according to the theory, and everyone has strengths. The corollary for some learning-styles theorists is that if you think that the theory is wrong, you must think that all students are identical—which is obviously untrue. Again, we agree that students differ and all students have value, but we do not need learning-styles theory to convince us of that.

Third, learning-styles theory has succeeded in becoming "common knowledge." Its widespread acceptance serves as an unfortunately compelling reason to believe it. This is accompanied by a well-known cognitive phenomenon called the confirmation bias. When evaluating our own beliefs, we tend to seek out information that confirms our beliefs and ignore contrary information, even when we encounter it repeatedly. When we see someone who professes to be a visual learner excel at geography and an auditory learner excel at music, we do not seek out the information which would disprove our interpretation of these events (can the auditory learner learn geography through hearing it? Can the visual learner become better at music by seeing it?)

Why Should College Educators Care?

We have addressed the direct costs of the learning-styles myth above, but there are considerable opportunity costs as well. The same research in cognitive science and education that has failed to find evidence for learning styles has offered many insights into how memory does work. *Mindset* (2006) by Stanford psychologist Carol Dweck is an excellent summary of the interesting ways that incentives—both carrots and sticks—as well as internal drives influence learning. And Henry L. Roediger and his associates at Washington University in St. Louis have demonstrated the value of testing for learning. Even the act of taking a test when one does not know the answers can support learning the correct answers faster and more effectively.

Of course learning is an enormously complex activity, and this is not the place to outline all of the basic research on learning. We seek only to emphasize that attention to learning styles, for which evidence has not been found, may lead educators to neglect research on learning for which there is solid scientific support.

Even though the belief in learning styles has influenced pedagogy in the schools far more than it has in higher education, we believe that there are several other reasons faculty might pay attention to the fact that researchers have failed to find evidence of learning styles, reasons that have important implications for the college classroom.

First, when we poll our undergraduate classes on the belief in a number of myths of popular psychology, the one that "people have their own learning styles" is typically endorsed by more than 90 percent of our students. This belief has the potential to shape and constrain the experience that students have in the college classroom. For example, if a student believes she is a visual learner and therefore disengages and daydreams when a lecturer turns off the PowerPoint and tells a story, this will prevent her from learning the concept through a compelling narrative. And while these beliefs may not have as direct an impact on performance reviews as they do in K-12 settings, a belief in learning styles occasionally shows up in student evaluations of teaching: "I am a visual learner, so the visual examples were good," or "I am an auditory learner, so more auditory content would have helped."

Second, learning-styles theory is sometimes offered as a reason to include digital media in the classroom. While including multimedia may be a good idea in general (variety in modes of presentation can hold students' attention and interest, for example), it is not necessary to tailor your media to different learning styles. We shouldn't congratulate ourselves for showing a video to engage the visual learners or offering podcasts to the auditory learners. Rather, we should realize that the value of the video or audio will be determined by how it suits the content that we are asking students to learn and the background knowledge, interests, and abilities that they bring to it. Instead of asking whether we engaged the right sense (or learning mode), we should be asking, what did students think about while they were in class?

Finally, when one has the opportunity in a smaller class to collect information about students and more specifically to tailor a lesson to that particular group of students, it is a waste of time to assess learning styles rather than, for instance, background knowledge. The latter can obviously be extremely useful. We often use prerequisites to ensure common background knowledge of students in a given class, but assessment at the beginning of a class can be an excellent reminder of how little of the prerequisite course content is easily recalled.

Assessment of student interest can also be a useful tool for deciding how to approach the material in a given class. Some indication can be gained by what majors are represented in the class, but more specific interests assessed through a brief questionnaire or class discussion can also be useful in certain situations, such as small or homogeneous classes.

So here is the punch line: Students differ in their abilities, interests, and background knowledge, but not in their learning styles. Students may have preferences about how to learn, but no evidence suggests that catering to those preferences will lead to better learning. As college educators, we should apply this to the classroom by continuing to present information in the most appropriate manner for our content and for the level of prior knowledge, ability, and interests of that particular set of students. C

Resources

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