

Neuromyths in Education

*It's time to bust these widely held
myths about the brain*

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By Steve Masson and Jérémie Blanchette Sarrasin

RECENT STUDIES HAVE SHOWN that teachers often believe in common misconceptions about how the brain works.¹ These neuromyths can be problematic for education, as they may cause teachers to use educational practices that are not entirely compatible with their students' brain function. This article presents and discusses the three most prevalent neuromyths. The first myth pertains to learning styles; the second relates to the notion of being "left- or right-brained"; and the third concerns coordination exercises that improve brain function.²

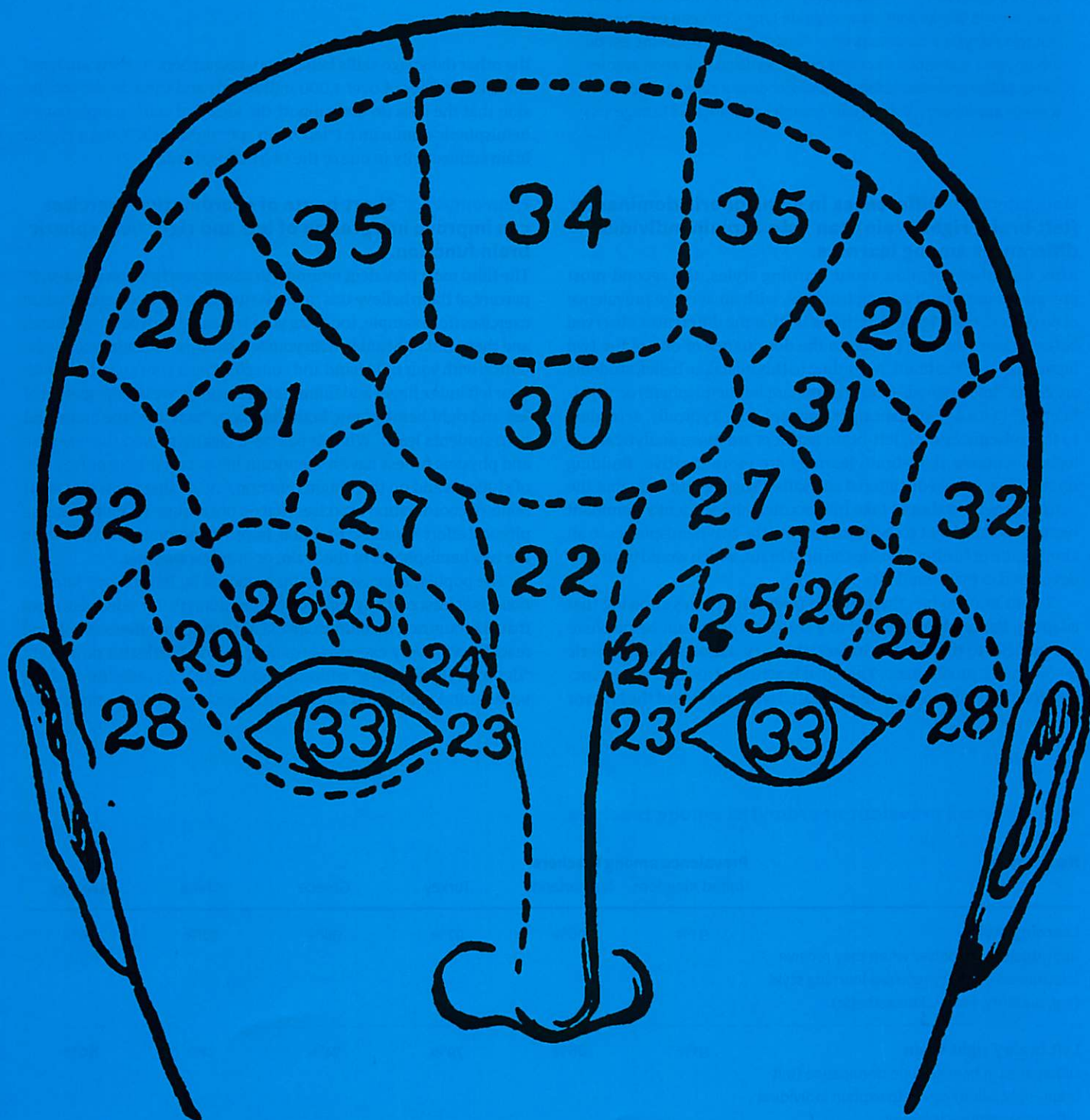
Neuromyth 1: Individuals learn better when they receive information in their preferred learning style.

The most prevalent neuromyth in education is the idea that students have different learning styles; in other words, that their ways of learning are fundamentally different and require different educational practices. In the European and Asian countries where this has been studied, on average, 96 percent of teachers believe this neuromyth (see Figure 1 on page 30). The belief that brain function differs greatly from one student to the next, and

consequently that some students are "visual" learners while others are more "auditory" or "kinesthetic" learners, is often implicit in this notion of learning styles.

Although the notion of learning styles has been omnipresent in education literature for years, surprisingly few studies have investigated whether adapting teaching methods to learning styles actually improves learning. Remarkably, those that used a sound methodology obtained results that counter the idea that teaching methods adapted to a student's learning style are beneficial.³

Current studies have not examined every possible learning style, and it is possible that we will eventually discover learning styles that teaching should be adapted to. In the meantime, however, while some students may prefer visual, auditory, or kinaesthetic learning, there is no credible scientific data to suggest that there is any benefit in teaching them using their preferred learning style. (Of course, good teachers find a variety of ways to engage students with the material they are learning; this is not what is being discussed here. What has been refuted is the notion of attempting to match teaching to individual students' supposed learning style.)



EN BREF

Cet article a pour objectif de mettre en lumière les trois mythes sur le fonctionnement du cerveau les plus fréquents chez les enseignants. Le premier de ces mythes est de croire que les élèves apprennent mieux si l'on adapte l'enseignement à leur style d'apprentissage préféré (visuel, auditif ou kinesthésique). Le deuxième est de penser que certains élèves sont davantage de type « cerveau gauche » et d'autres de type « cerveau droit ». Finalement, le troisième est de croire que la réalisation de courts exercices de coordination avec les élèves puisse optimiser le fonctionnement de leur cerveau et les aider à mieux apprendre. (Voir l'article complet en français à la page 32.)

Neuromyth 2: Differences in hemispheric dominance (left brain, right brain) can help explain individual differences among learners.

After the misconception about learning styles, the second most prevalent neuromyth among teachers, with an average prevalence of 80 percent (see Figure 1), is the belief that the differences observed between learners may be due to the dominance of one of the two hemispheres of the brain. According to this mistaken belief, students are either “left-brained” (with a dominant left hemisphere) or “right-brained” (with a dominant right hemisphere). Typically, according to this misconception, left-brain learners are more analytical and logical, whereas right-brain learners are more creative. Building on this idea, some educational specialists suggest not only that the teaching method should take into account the student’s dominant hemisphere, but that it should also bring the two hemispheres to an equilibrium or further develop the right brain, which would be underdeveloped in many students.⁴

To our knowledge, there are no scientific studies showing that adapting the teaching method to a student’s dominant hemisphere is beneficial to the learner. In fact, the very notion of hemispheric dominance is problematic. Though it is actually true that some functions or cognitive abilities are associated with one side of the brain or

the other (language skills being one), researchers recently analyzed the brain images of over 1,000 individuals and came to the conclusion that the data do not support the idea that some people have a hemispheric dominance (“left brain” or “right brain”) and a greater brain connectivity in one of the two hemispheres.⁵

Neuromyth 3: Short bouts of coordination exercises can improve integration of left and right hemispheric brain function.

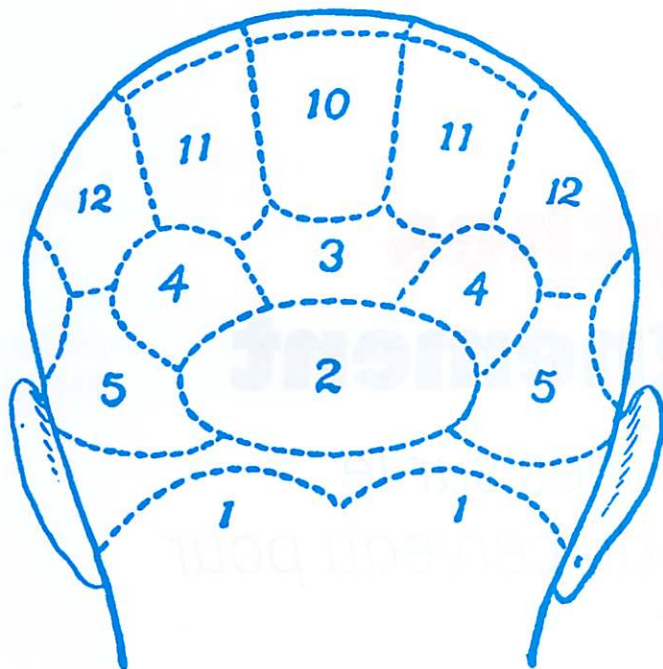
The third most prevalent neuromyth among teachers (on average, 77 percent of them believe this myth) is that short bouts of coordination exercises (for example, touching your left ankle with your right hand, and then your right ankle with your left hand, or touching your belly-button with your right hand and your chest near your collarbone with your left index finger and thumb, etc.) can improve the integration of left and right hemispheric brain function, “activate” the brain, and help students learn. While it has been clearly proven that exercise and physical fitness have a significant impact on the cognitive skills of students and on their brain function,⁶ no studies show that short bouts of coordination exercises that do not require relatively intense physical effort “awaken” the brain, improve communication between the two hemispheres of the brain, or improve learning.⁷

The popular exercise program proposed by *Brain Gym® International* is at least partially based on this neuromyth. Introduced in more than 87 countries, including Canada, this program offers schools and teaching staff very expensive training and materials that promise to “dramatically improve” concentration, memory, grades (in reading, writing, and math), and attitudes. The problem with the program is

Figure 1: Most prevalent neuromyths among teachers

Neuromyth	Prevalence among teachers					Average
	United Kingdom	Netherlands	Turkey	Greece	China	
Learning styles Individuals learn better when they receive information in their preferred learning style (e.g. auditory, visual, kinaesthetic).	93%	96%	97%	96%	97%	96%
Left brain / right brain Differences in hemispheric dominance (left brain, right brain) can help explain individual differences among learners.	91%	86%	79%	74%	71%	80%
Coordination exercises Short bouts of coordination exercises can improve integration of left and right hemispheric brain function.	88%	82%	72%	60%	84%	77%

NOTE: The data for the U.K. and NL comes from a study conducted by Dekker et al. (2012) and that for other countries from Howard-Jones (2014).



Brain images of over 1,000 individuals... do not support the idea that some people have a hemispheric dominance (“left brain” or “right brain”).

not only that Brain Gym’s exercises are not supported by any credible empirical studies,⁸ but also that the rationale behind this approach has long been invalidated by research.⁹

IT’S NOT SURPRISING that the neuromyths discussed above are widely believed. As recently as a couple of years ago, the notion of learning styles, the idea of hemispheric dominance, and the belief that coordination exercises can improve learning were not considered neuromyths. Today, however, these ideas are known to be false. It is therefore time to turn to more effective teaching methods that are better adapted to the brain function of students, and to give up these neuromyths that place students in restrictive categories (such as visual learner or right-brained, etc.) that, in addition to being unfounded, can bias the way students perceive themselves as learners. **EC**

NOTES

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- 2 S. Masson, “Les apports de la neuroéducation à l’enseignement: des neuromythes aux découvertes actuelles,” *Approche neuropsychologique des apprentissages chez l’enfant* 134 (2015): 11-22.
- 3 See T. J. Landrum and K. A. McDuffie, “Learning Styles in the Age of Differentiated Instruction,” *Exceptionality* 18, no. 1 (2010): 6-17; H. Pashler, M. McDaniel, D. Rohrer, and R. Bjork, “Learning Styles: Concepts and evidence,” *Psychological Science in the Public Interest* 9, no. 3 (2008): 105-119.
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- 8 K. J. Hyatt, “Brain Gym®: Building stronger brains or wishful thinking?” *Remedial and Special Education* 28, no. 2 (2007): 117-124; J. Stephenson, “Best Practice? Advice provided to teachers about the use of Brain Gym® in Australian schools,” *Australian Journal of Education* 53, no. 2 (2009): 109-124.
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