Review Article

Neuroscience and Psychiatry: Open Access

Learning Educational Psychology Enhances One's Understanding of Neuroscience, but it does not diminish One's Belief in Neuromyths

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Received: 28-Jan-2023, Manuscript No. npoa-23-87722; **Editor assigned:** 31-Jan-2023, Pre-QC No. npoa-23-87722 (PQ); **Reviewed:** 14-Feb-2023, QC No. npoa-23-87722; **Revised:** 16-Feb-2023, Manuscript No. npoa-23-87722 (R); **Published:** 23-Feb-2023; DOI: 10.37532/npoa.2023.6(1).09-10

Abstract

However, their enthusiasm for the brain frequently outpaces their comprehension of the brain. We propose that educational psychology can function as a link between educational practice and fundamental neuroscience and psychology research. A sample of South Korean pre-service teachers' beliefs about neuromyths and neuroscience were compared to those of those who had taken an educational psychology course. Taking a course in educational psychology was found to increase one's understanding of neuroscience, but it had no effect on one's belief in neuromyths. We think about how these and other study findings could be used to change educational psychology courses and textbooks to make it easier to understand neuroscience.

Introduction

The brain is malleable—it responds to stimuli from the environment—teachers play a crucial role in shaping its structure and function through instruction [1]. A lot of teachers are hopeful that learning more about the brain will help them plan and deliver lessons. However, educators' enthusiasm for the brain frequently outpaces their knowledge of the brain. They lack knowledge of neuroscience: a comprehension of the structure and function of the brain, the operation of neuroimaging techniques, and the scope of the application of neuroscience research in educational settings. In order to evaluate instructional recommendations and commercial products that are said to be based on neuroscience research, neuroscience literacy is essential. Neuromyths flourish in the absence of neuroscience literacy [2]. These are incorrect extrapolations from neuroscience findings to controversial educational concepts like the existence of learning styles, the use of physical exercises to "integrate" hemispheric function during learning, the ability of "brain games" to make people smarter, and instruction targeting the left and right hemispheres. The first is how to best connect educational practice and neuroscience research [3]. The second is how educators can improve their neuroscience literacy and reduce their belief in neuromyths so that they can evaluate "brain-based" instruction more accurately and comprehend how students learn. We propose that educational psychology's mediational function can provide answers to both questions. Brier argued that the conceptual gap that exists between neuroscience and education is one of the reasons why neuromyths persist, and that this gap should be bridged in the best way possible. He suggested using cognitive psychology as an intermediary field to solve this issue [4]. Educational practice is based on the findings of neuroscience research, which in turn is based on the findings of cognitive psychology research in this model; see. Over the past two decades, this educational neuroscience model has made steady progress: Graduate programs have been established, journals have been published, and professional societies have been established. But progress has been slow, and the bottleneck is easy to see: Between neuroscience and cognitive psychology, an impressive divide has been built, which thousands of cognitive neuroscientists cross every day. Additionally, educational psychology is well-positioned to reduce teachers' belief in neuromyths and increase their neuroscience literacy [5]. An educational psychology course is typically included in teacher preparation programs. Concepts relevant to neuroscience

from cognitive and developmental psychology are covered in this course. Importantly, it also introduces the scientific method, which may be unfamiliar to many pre-service educators but is necessary for comprehending how to validly reason from theoretical hypotheses to experimental results and ultimately to practical applications [6]. Psychology courses outperform chemistry courses when it comes to reasoning about research methods and drawing statistical inferences from noisy data. Therefore, even if it provides little or no direct coverage of neuroscience, taking an educational psychology course may increase neuroscience literacy and reduce neuromyths belief.

Assessing neuromyths belief and neuroscience literacy

Measures of neuroscience literacy and neuromyths belief have been attempted in the past. A survey was designed and administered to Brazilian citizens by [7]. Reading popular science magazines and newspapers was linked to greater neuroscience literacy. Higher levels of neuroscience literacy were also influenced by prior education, with graduates scoring 30% higher than those with only high school degrees. Despite this, neuromyths were prevalent across all educational attainment levels. For instance, the neuromyths that "We use only 10% of the brain" was believed by 59% of participants with college degrees. The brain-as-computer metaphor, the relationship between emotion and reasoning, and the effect of physical exercise on brain activity were also common neuromyths [8].

Materials and Method

Materials

Survey of neuroscience knowledge we created a survey of neuroscience knowledge; see S1 Appendix. There are two parts to it. The first section measures neuromyths belief and neuroscience literacy. 47 of the 60 items were adapted from previous surveys of neuromyths belief and neuroscience literacy. The surveys provided the majority of items. Items used in previous studies to test belief in neuromyths about learning styles and multiple intelligences were deliberately left out [9]. Since these ideas come from psychology, it's possible that people have misconceptions about psychology rather than neuroscience. By consulting recent introductory neuroscience textbooks, we wrote additional articles about neuroscience research on topics like synaptogenesis, myelination, and glia cells, emotional processing through the use of cognitive enhancers and neuroimaging methodologies [10].

Discussion

The current study went one step further and focused on pre-service teachers to see if taking an educational psychology course changed pre-service teachers' neuroscience literacy and belief in neuromyths. This hypothesis was supported by the study, but its limitations were also revealed. While taking a course in educational psychology decreased belief in neuromyths, it did increase neuroscience literacy. The information sources participants reported consulting did not influence these findings. The implications of these findings, the limitations of the current study, and potential directions for future research are all discussed in this section.

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