

Cursive handwriting instruction



Executive Summary

The ability to produce (write) or interpret (read) written text is central to human communication. Words and sentences can be constructed by handwriting (print/manuscript, cursive), typing, and/or other digital tools (e.g., speech-to-text technology). Compared to typing, handwriting practice has stronger positive impacts on reading, writing and memory. While there is limited research directly comparing cursive and print handwriting, there is evidence that cursive writing can preferentially increase the speed and fluency of writing and reading for some students, especially those with handwriting difficulties (e.g., dyslexia, dysgraphia and developmental control disorder). Missouri currently does not require students to read or write in cursive; however, twenty-one states specifically mandate cursive handwriting instruction in some form. [House Bill 108](#) would require Missouri's public school districts to provide cursive writing instruction by the end of the fifth grade and administer a proficiency test for reading and writing cursive.

Highlights

- Relative to typing, handwriting instruction while children are learning to read and write can improve literacy (e.g., identifying letters, spelling, reading).
- Most existing research on the learning benefits of cursive writing relies on measuring patterns of activation in specific regions of the brain. Additional research is needed to connect brain activity to learning gains from cursive writing.
- In some cases, individuals with handwriting difficulties have demonstrated improved fluency and legibility after cursive instruction. However, the benefits of cursive writing do not fully raise proficiency to match individuals without handwriting difficulties.

Limitations

- Most cursive handwriting studies have been performed using students and schools outside the United States where the most common type of handwriting is cursive or a print-cursive hybrid. While we expect that some elements of teaching strategies will translate across countries, cultural/regional differences in writing and education may not be universally applicable.
- In addition to visualizing what parts of the brain are activated during cursive handwriting, additional research is needed to establish a causal relationship between cursive writing and improved literacy and/or academic performance.
- There are limited to no studies evaluating the efficacy of cursive handwriting as an intervention for handwriting difficulties compared to other literacy interventions.

Research Background

Value of handwriting instruction

Handwriting is usually a central component of learning to read and write.^{1,2} Handwriting requires the coordination of visual and motor skills with higher level processes (e.g., spelling, linguistics, organization, attention).³ The ability to quickly and easily form letters allows the writer to direct their mental resources toward more complex tasks related to composition (e.g., creativity, organization of argument/story, grammar).⁴ There is also some evidence that handwriting can promote future recall (e.g., via note-taking) for older children and adults.⁵

Comparing handwriting and typing: A significant portion of written communication is currently performed on computers, tablets and smartphones (e.g., email, text, word processing). However, handwriting remains the preferred or available method for some forms of communication (e.g., in-class work, some assessments, note-taking, completing forms).

In older preschool students (~5 years old), handwriting practice is associated with improved letter recognition and reading ability compared to students taught using typing or tracing strategies.⁶⁻⁸ A potential explanation for this finding is that handwriting activates brain regions associated with letter processing and reading.⁷ These studies often evaluate handwriting instruction using print, but not cursive, and suggest that the distinct motor skills required for handwriting may explain some of the observed differences in performance. However, additional research is needed to establish a causal relationship between brain activation during cursive writing and improved literacy and/or academic performance

Cursive handwriting

Literacy: There is no consensus about the relative difficulty of reading and writing cursive compared to print handwriting. The specific elements of cursive writing (e.g., connection between letters, rhythm) can be difficult for some learners, but may provide benefits for others. Compared to typing, cursive writing has been associated with specific patterns of electrical activity in the brain which have been associated with learning and reading in children and adults.⁹ Again, the absence of functional tests corresponding to measures of brain activation make it difficult to understand the direct relationship between cursive writing and the related brain activity.

Handwriting challenges (e.g., dyslexia): The ability to coordinate several cognitive and motor functions to construct legible handwriting, especially under time constraints, is impaired in individuals with dyslexia and developmental coordination disorder (DCD).^{10,11} Motor difficulties are associated with developmental dyslexia, and both spelling hesitancy and motor impairments have been shown to contribute to this association. While cursive handwriting has been associated with improved fluency in students with handwriting difficulty, the complexity of a word's

spelling appears to have a much stronger impact on handwriting.¹² Additionally, the benefits of cursive writing do not fully raise proficiency to match individuals without handwriting difficulties.

Cursive handwriting is primarily distinguished from print handwriting because of the continuity between letters in a word. For this reason, cursive has been successfully used as a strategy to improve handwriting fluency in individuals with disabilities and other handwriting challenges. Handwriting typically depends on visual tracking, which may be difficult or impossible in visually-impaired/blind individuals. Because of the continuity between letters in a word, cursive writing is taught alongside assistive technology (e.g., digital pens with audio & haptic feedback) to teach writing to blind learners.¹³ Additional technologies (e.g., eye tracking) can be utilized to support students with limb loss or paralysis.¹⁴ Writing instruction using the computer has also been identified as a possible avenue to improve spelling and handwriting in dyslexic and dysgraphic students.¹⁵

Handwriting instruction in Missouri public schools

Missouri does not currently have any statewide cursive writing standards or instructional requirements. The [Missouri Learning Standards](#) for K-5 English & Language Arts include grade level expectations for producing legible, handwritten text ([Language Standard 1B](#)). By the end of kindergarten, students are expected to be able to print upper- and lower-case letters; legible printing is emphasized during first grade, including spacing words and sentences appropriately. Beginning in second grade, legible handwriting is expected as a core component of demonstrating the ability to communicate using the conventions of the English language. Keyboarding skills, or typing, is also part of writing standards beginning in second grade ([Writing Standard 1D](#)).

Other states with cursive instruction requirements

Twenty-one states (including AR, FL, GA, IN, IL, MS, NC, TN, TX) currently have some statutory requirement for cursive handwriting instruction, usually during elementary school, many of which were enacted in the last decade. It is difficult to directly assess the effectiveness of these programs on student outcomes as the academic outcomes measured are not specific to handwriting instruction and are influenced by several additional factors (e.g., learning environment, student motivation). Additionally, the tradeoff between the potential benefits of cursive handwriting and the instructional time that is being diverted from other instruction has not been explored.

References

1. Dinehart, L. H. (2015). Handwriting in early childhood education: Current research and future implications. *Journal of Early Childhood Literacy*, 15(1), 97-118. <https://doi.org/10.1177/1468798414522825>.
2. James, K. H. (2017). The Importance of Handwriting Experience on the Development of the Literate Brain. *Current Directions in Psychological Science*, 26(6), 502-508. <https://doi.org/10.1177/0963721417709821>.

3. McClelland, M. M., & Cameron, C. E. (2019). Developing together: The role of executive function and motor skills in children's early academic lives. *Early Childhood Research Quarterly*, 46, 142-151. <https://doi.org/10.1016/j.ecresq.2018.03.014>.
4. Volman, C., Schendel, B., & Jongmans, M. (2006). Handwriting Difficulties in Primary School Children: A Search for Underlying Mechanisms. *The American Journal of Occupational Therapy : Official Publication of the American Occupational Therapy Association*, 60, 451-460. <https://doi.org/10.5014/ajot.60.4.451>.
5. Horbury, S. R., & Edmonds, C. J. (2021). Taking Class Notes by Hand Compared to Typing: Effects on Children's Recall and Understanding. *Journal of Research in Childhood Education*, 35(1), 55-67. <https://doi.org/10.1080/02568543.2020.1781307>.
6. Longcamp, M., Zerbato-Poudou, M.-T., & Velay, J.-L. (2005). The influence of writing practice on letter recognition in preschool children: A comparison between handwriting and typing. *Acta Psychologica*, 119(1), 67-79. <https://doi.org/10.1016/j.actpsy.2004.10.019>.
7. James, K. H., & Engelhardt, L. (2012). The effects of handwriting experience on functional brain development in pre-literate children. *Trends in Neuroscience and Education*, 1(1), 32-42. <https://doi.org/10.1016/j.tine.2012.08.001>.
8. Kiefer, M., Schuler, S., Mayer, C., Trumpp, N. M., Hille, K., & Sachse, S. (2015). Handwriting or Typewriting? The Influence of Pen- or Keyboard-Based Writing Training on Reading and Writing Performance in Preschool Children. *Advances in Cognitive Psychology*, 11(4), 136-146. <https://doi.org/10.5709/acp-0178-7>.
9. Ose Askvik, E., van der Weel, F. R. (Ruud), & van der Meer, A. L. H. (2020). The Importance of Cursive Handwriting Over Typewriting for Learning in the Classroom: A High-Density EEG Study of 12-Year-Old Children and Young Adults. *Frontiers in Psychology*, 11. <https://doi.org/10.3389/fpsyg.2020.01810>.
10. Barnett, A. L., & Prunty, M. (2021). Handwriting Difficulties in Developmental Coordination Disorder (DCD). *Current Developmental Disorders Reports*, 8(1), 6-14. <https://doi.org/10.1007/s40474-020-00216-8>.
11. Gosse, C., & Van Reybroeck, M. (2020). Do children with dyslexia present a handwriting deficit? Impact of word orthographic and graphic complexity on handwriting and spelling performance. *Research in Developmental Disabilities*, 97, 103553. <https://doi.org/10.1016/j.ridd.2019.103553>.
12. Arfé, B., Corato, F., Pizzocaro, E., & Merella, A. (2020). The Effects of Script and Orthographic Complexity on the Handwriting and Spelling Performance of Children With Dyslexia. *Journal of Learning Disabilities*, 53(2), 96-108. <https://doi.org/10.1177/0022219419892845>.
13. Plimmer, B., Reid, P., Blagojevic, R., Crossan, A., & Brewster, S. (2011). Signing on the tactile line: A multimodal system for teaching handwriting to blind children. *ACM Transactions on Computer-Human Interaction*, 18(3), 1-29. <https://doi.org/10.1145/1993060.1993067>.
14. Lorenceau, J. (2012). Cursive Writing with Smooth Pursuit Eye Movements. *Current Biology*, 22(16), 1506-1509. <https://doi.org/10.1016/j.cub.2012.06.026>.
15. Berninger, V. W., Nagy, W., Tanimoto, S., Thompson, R., & Abbott, R. D. (2015). Computer instruction in handwriting, spelling, and composing for students with specific learning disabilities in grades 4-9. *Computers & Education*, 81, 154-168. <https://doi.org/10.1016/j.compedu.2014.10.005>.