# Smartphone Text Input Method Performance, Usability, and Preference With Younger and Older Adults

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**Objective:** User performance, perceived usability, and preference for five smartphone text input methods were compared with younger and older novice adults.

**Background:** Smartphones are used for a variety of functions other than phone calls, including text messaging, e-mail, and web browsing. Research comparing performance with methods of text input on smartphones reveals a high degree of variability in reported measures, procedures, and results. This study reports on a direct comparison of five of the most common input methods among a population of younger and older adults, who had no experience with any of the methods.

**Method:** Fifty adults (25 younger, 18–35 years; 25 older, 60–84 years) completed a text entry task using five text input methods (physical Qwerty, onscreen Qwerty, tracing, handwriting, and voice). Entry and error rates, perceived usability, and preference were recorded.

**Results:** Both age groups input text equally fast using voice input, but older adults were slower than younger adults using all other methods. Both age groups had low error rates when using physical Qwerty and voice, but older adults committed more errors with the other three methods. Both younger and older adults preferred voice and physical Qwerty input to the remaining methods. Handwriting consistently performed the worst and was rated lowest by both groups.

**Conclusion:** Voice and physical Qwerty input methods proved to be the most effective for both younger and older adults, and handwriting input was the least effective overall.

**Application:** These findings have implications to the design of future smartphone text input methods and devices, particularly for older adults.

**Keywords:** touch screen, keyboard, mobile devices, voice recognition, age, shape writing

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*HUMAN FACTORS*
Vol. 57, No. 6, September 2015, pp. 1015–1028
DOI: 10.1177/0018720815575644


## INTRODUCTION

Smartphone devices have secured 70% of the American mobile subscriber market share (Nielsen, 2013; comScore, 2014). Nearly all users report that they use their device to send text messages (90.5%), e-mails (77.8%), and access social networking (65.3%) (comScore, 2013).

The rapid adoption of smartphones has created a fiercely competitive market, and vendors offer a variety of form factors and features from which users can choose. In a recent survey, consumers identified the top three considerations when choosing a phone as the service network, the operating system, and the cost of the device (comScore, 2013). One commonly overlooked, but important, feature is the text input method(s) available on the device. Given the prevalence of text messaging, e-mail, and social networking, reliable and accurate text input is critical. Consequences of poor input method usability have been the source of user frustration as well as a source of public entertainment, as illustrated in *Damn You, Autocorrect!* (Madison, 2011) and on websites, such as autocorrectfail.org.

The balance between portability and functionality has resulted in many challenges to create text input methods for smartphones. Many phones are thin, lightweight, and utilize touch screen technology for input. Some popular examples of touch screen text entry methods include the onscreen Qwerty keyboard input, shape-writing recognition (e.g., Trace, ShapeWriter, Swiftkey, Swype), handwriting recognition (e.g., DioPen and Graffiti), and voice recognition (e.g., Dragon Dictation). Other phones are bulkier but offer a Qwerty keyboard with physical buttons in addition to a touch screen for typing and navigation. Figure 1 shows examples of these input methods.

An examination of the literature shows wide variability in the results comparing performance