Don’t Shoot the Messenger: Memory for Misspellings in Context

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Abstract Misspellings in sentences are usually easy to understand by readers due to top–down influences. Although top–down processing allows for fluent reading of misspelled items, the nature of their representations in memory is not known. If representations of misspellings are distinct from representations of correctly spelled words, their influence should be seen in later recognition decisions. In this set of experiments, participants read words and misspellings embedded in sentences and were later given a recognition test. The sentences contained semantically biased or neutral contexts. In Experiment 1, misspellings were created by removing a single letter (e.g., *drwaye*). In Experiment 2, the recognition items probes were presented in uppercase letters (e.g., *DRVEWAY*) to reduce the visual similarity between study and test items. In Experiment 3, the misspellings were created by substituting visually similar letters (e.g., *driweway*). In contrast to the previous experiments, in Experiment 4, participants were explicitly told about the memory test to see how response strategies affect performance. Overall, the results indicate that people retain surface feature information about misspellings which seem to inform their memory judgments, and that the processing of this information cannot be strategically controlled.

Keywords Memory · Language · Psycholinguistics · Misspellings · Word perception · Episodic memory · Top–down processing · Context effects

Introduction

Individuals are able to read and comprehend sentences with ease due to the influence of top–down contextual information. Syntactic knowledge, semantic context, and other supporting information generate strong expectations, allowing the person to read fluently even when the visual stimuli are degraded or ambiguous. A sentence that contains a misspelling can still be easily read, as long as the misspelling is not disruptive to the overall structure of
the word. Context can even encourage the perceptual “restoration” of misspellings during lexical processing. That is, a misspelling (messge) may be perceived as being correctly spelled (message). Even without context, top–down effects can be quite powerful. An astonishing demonstration of top–down perceptual restoration occurred in April 2009, when Washington Major League Baseball team players wore jerseys emblazoned with “NATINALS” for three innings before the error was noticed (Associated Press 2009).

Processing Misspellings in Context

People normally encounter misspellings within the context of a sentence. Given that context effects can be quite robust, top–down influences may change how misspellings are initially processed and subsequently stored in memory. Context effects on the perception of physically ambiguous words have been observed in both the auditory and visual domains. In the classic phonemic restoration studies (Warren and Warren 1970; Samuel 1981), listeners heard a sentence with one phoneme replaced with a cough or a tone. The participants did not detect the missing phoneme and perceived the word as intact. Phonemic restoration is also observed when the biasing context follows the target with the missing phoneme (Warren and Sherman 1974). The “correcting” influence of context has also been observed in the perception of visually ambiguous stimuli. Rueckl and Oden (1986) used stimuli that contained ambiguous letters (e.g., an item that is between ‘r’ and ‘n’). When these visually ambiguous words were presented in sentences, participants reported seeing different words depending on the biasing context (e.g., The card player had a pair/pain in his hand). Potter et al. (1993) reported similar results with pseudowords embedded in sentences. When the stimuli were presented using Rapid Serial Visual Presentation, participants reported seeing words (e.g., dream) when they had actually seen visually similar pseudowords (e.g., droam). The authors proposed that the effect arises because sentence context constrains lexical access and the closest lexical candidate is ultimately activated.

Although the processing of misspellings in context has not been directly studied, it seems logical that misspellings and visually ambiguous pseudowords would be processed in a similar manner. Neither misspellings nor ambiguous pseudowords would be expected to have strong pre-existing lexical representations. However, they both share visual features with their word counterparts. Sentence context should activate corresponding lexical candidates and the shared visual features should provide a processing advantage for the correctly spelled word allowing the misspelling (or pseudoword) to be recognized as a word.

Connectionist models are often used to explain the processing of ambiguous stimuli because they assume that word processing is interactive, whereby each type of lexical code (e.g., orthographic, phonologic, semantic) is used in combination to facilitate recognition (e.g., Grainger and Jacobs 1996; McClelland and Rumelhart 1981; Van Orden and Goldinger 1994). In the original Interactive-Activation (IA) model, aspects of words were represented as patterns of activation among nodes at all levels (McClelland and Rumelhart 1981). In visual word recognition, activated surface feature information (e.g., shapes) sends activation to letter representations, which then feed activation forward to associated lexical representations. Active lexical representations will inhibit any letters inconsistent with their spellings. For example, if the word CAT is seen with an ambiguous central letter (e.g., an item that could be either an A or an H), lexical feedback will activate “A” and inhibit “H” at the letter level. In this way, word recognition results from parallel excitatory and inhibitory processes occurring across levels. Later models modified or expanded the role of orthography, phonology, and semantics (e.g., Grainger and Jacobs 1996; Van Orden and Goldinger 1994; Van Orden et al. 1988). Connectionist models naturally account for fluent corrections of misspellings.