Activation of Emotion Information in Text Among Younger and Older Adults

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The ability to represent emotions is an important capacity for the understanding of discourse. In the current literature, it is unclear whether older adults represent emotion information in the course of language processing, in particular as it relates to developing an adequate mental model of characters in narratives. We addressed this issue in two studies, one assessing emotion activation at the word level and the other at the mental model level. In the first experiment, subjects performed a lexical decision task in which words were drawn from both logic- and emotion-based categories. For both category types, priming was evident for young and old. In the second experiment, subjects read passages with emotion information that was consistent or inconsistent with the implied emotional tone. Both age groups showed an increase in reading time in response to inconsistent emotion information, indicating that the protagonist's emotional state was represented while reading. Results of these studies generally suggest age preservation in the activation of emotion information in language processing.

KEY WORDS: Emotion; discourse understanding; inconsistency; lexical decision; reading time; recall.

The capacity to represent emotions and the emotional states of other people is important not only for navigating through our personal lives, but also in creating an adequate representation of the texts we read. Attention has been recently paid to the more global aspects of text representation in terms of a "situation model" or "mental model" (e.g., Morrow, Bower, & Greenspan, 1989; van Dijk & Kintsch, 1983). Such research suggests that, as we read, we build a holistic mental representation of the situation that may consist of an integrated spatial configuration of characters and landmarks (Bower & Morrow, 1990) as well as a protagonist's goals (Albrecht & O'Brien, 1993) or emotional states (Gernsbacher, Goldsmith, & Robertson, 1992). Mental models are derived and updated from information from the text as well as world knowledge and inferences about the referent situation. Such a representation is critical for text comprehension text. However, some recent literature on the experience of emotion raises the possibility that, as we age, the emotional states of a text's protagonist may be less likely to be activated in the mental model. We considered the applicability of these issues to the domain of discourse processing by investigating whether there are age-related declines in the activation of emotion information.

There is some debate in the literature as to the nature of emotional experience and expression in late life. On the one hand, there is evidence to suggest that the nature of emotions is preserved or enhanced. For example, Levenson, Carstensen, Friesen, and Ekman (1991) asked younger and older adults either to create facial expressions associated with certain emotions or to relive life events that would be expected to engender certain kinds of emotional experiences, and measured consequent physiological change (in terms of heart rate, finger temperature, skin conductance, and somatic activity) and ratings of subjective emotional experience. These manipula-
tions produced characteristic physiological changes that were distinctive to particular emotional states with similar qualitative patterns evident for the two age groups; in addition, the two age groups showed similar sensitivity to the phenomenal experience of emotion. Older adults have even been shown to be more emotionally expressive when asked to describe an emotionally charged life event or when participating in a situation structured to elicit anger (Malatesta-Magai, Jonas, Shepard, & Culver, 1992). One piece of recent evidence of particular relevance in the present case is that older readers have been found to recall relatively more of the emotional content of excerpts from novels (Carstensen & Turk-Charles, 1994), suggesting that this material is indeed available. Against this backdrop, we investigated the availability of emotion information at both the word and discourse levels in language processing. In the first experiment, we used a lexical decision task in which the target words were drawn from either logical (Bat-tig & Montague, 1969) or emotion-based (de Rivera, 1977) categories. In this task, target words from the logical categories were primed by words from within the same (e.g., accountant–teacher) or from a different (e.g., newspaper–teacher) superordinate category. Related primes typically facilitate processing of target words relative to unrelated primes and a well-replicated finding in the cognitive aging literature is that aging does not bring a qualitative change in such semantic priming tasks (e.g., Burke, White, & Diaz, 1987). Based on this literature, we would not expect to find age differences in the logic-based prime effects. In addition, an analogous task was created for emotion words based on de Rivera's (1977) six-di-

mensional model of emotion structure. This structure was used to generate related and unrelated word pairs. If older adults are less reactive to emotional experience than the young, they would be expected to show less reliable emotion-based prime effects in this task.

In a second experiment, we examined the activation of emotion information in a discourse processing task. In the literature on language understanding, there is increased recognition that effective narrative discourse serves the function not only of conveying a proposition-based representation of information, but also of "transporting" us into another world, a world that evokes from us a variety of "participatory responses" depending on both cognitive and emotional involvement with the text (Gerrig, 1993). Gernsbacher, Goldstein, and Robertson (1992) showed evidence that protagonists' emotional states are, in fact, represented on-line during reading. In their task, subjects read passages that implied, but did not explicitly state, the emotional experience of the protagonist. Each passage ended with a statement of a character's emotion that was either consistent or inconsistent with the implied emotional tone of the passage. Gernsbacher et al. found that subjects' reading times for inconsistent target sentences were significantly longer than those for the consistent sentences, suggesting that young readers represent the emotions of characters as they read. If the activation of emotion concepts is diminished with age, then it would be expected that, for older subjects, the difference between the reading times of consistent and inconsistent target sentences would be less than it would be for younger subjects. That is, if older readers are less likely to represent spontaneously a character's emotional state as part of the mental model for the text, then they would presumably be less likely to perceive the incongruity and would, therefore, fail to show the increment in the inconsistent condition.

In sum, we addressed the question of age differences in how young and older adults cognitively activate emotional information in two ways. First, we assessed word-level emotion activation through a lexical decision task using both logical and emotional