

Discourse Processes



ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/hdsp20

Introduction to the Special Issue on Emotions in Reading, Learning, and Communication

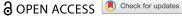
Catherine M. Bohn-Gettler & Johanna K. Kaakinen

To cite this article: Catherine M. Bohn-Gettler & Johanna K. Kaakinen (2021): Introduction to the Special Issue on Emotions in Reading, Learning, and Communication, Discourse Processes, DOI: 10.1080/0163853X.2021.1899369

To link to this article: https://doi.org/10.1080/0163853X.2021.1899369

9	© 2021 The Author(s). Published with license by Taylor & Francis Group, LLC.
	Published online: 24 Mar 2021.
	Submit your article to this journal 🗷
hh	Article views: 311
Q	View related articles 🗹
CrossMark	View Crossmark data ☑







Introduction to the Special Issue on Emotions in Reading, Learning, and Communication

Catherine M. Bohn-Gettler oand Johanna K. Kaakinen ob

^aCollege of Saint Benedict, St. John's University; ^bDepartment of Psychology, University of Turku, Turku, Finland

ABSTRACT

In our current era, learners are confronted with many and varying sources of information, such as news media, books, websites, social media, scientific articles, communicative interactions, and more. In addition, individuals must learn from such sources, making it important to critically examine the factors underlying learning from text and discourse. Importantly, the valence and activation of readers' emotions can influence the quality of readers' processing, which could help or hinder the learner's ability to understand and learn from text related to important issues. Although theoretical and empirical work documents the role of emotions in learning and motivation, readingand discourse-specific models are needed. At present, the literature examining reading presents conflicting findings related to the influence of emotion on textual processing. However, asproposed in the Process, Emotion, Task (PET) framework, the discrepant findings related to reading processes may be explained by interactions between specific reader emotions and the type of task. Hence, examining both emotions and features of the text are critical when considering how to support readers' ability to comprehend, evaluate, and learn from text. This article introduces a special issue of Discourse Processes that brings together experts engaging in empirical studies on how emotion influences learning and processing for varying text types in different contexts. Our goal is to further work toward developing a more cohesive understanding of the influence of reader emotions in supporting learning, comprehension, processing, and conceptual change and to draw important connections to the broader fields of text and discourse, learning, and motivation. Such connections are critical for improving learning experiences across a variety of settings and enhancing the relevance of discourseprocessing research.

Emotions are prevalent in everyday reading, learning, and communication. For example, feelings of threat may arise when we interact with texts or individuals presenting information that conflicts with our beliefs. Emotional details, which are interesting but irrelevant to the main ideas in a text, can capture a reader's attention and distract from learning the main ideas of a text. As another example, works of literature and art are designed to evoke particular emotional responses such as suspense and empathy. In short, emotions play a critical role during text and discourse experiences.

Theoretical and empirical work documents the role of emotions in learning and motivation (Pekrun, 2017), and there have been attempts to explain the interplay of cognitive and emotional processes underlying literary art experiences (Jacobs, 2015). However, it is also critical to account for emotion in reading and discourse-specific models to more fully understand the ways in which different emotions influence processing and learning as situated in reading and discourse experiences. Therefore, this special issue of Discourse Processes focuses on how emotions influence learning and nonliterary text processing.

In the past, much of the literature on text and learning experiences presented what appeared to be disjointed or conflicting findings related to the influence of emotion on learning and processing texts. For example, some studies documented how positively valenced emotions could facilitate processing and/or learning relative to negatively valenced emotions (Bohn-Gettler & Rapp, 2011; Ellis, Ottaway et al., 1997; Scrimin & Mason, 2015; Von Hecker & Meiser, 2005). Other work presented evidence of negative emotions facilitating performance relative to positively valenced emotions (Storbeck & Clore, 2005; Trevors et al., 2018). In response, Bohn-Gettler (2019) proposed the Process, Emotion, Task (PET) framework, arguing that the seemingly discrepant findings related to reading processes may be a function of a lack of precision when accounting for the specific process, emotion, and type of task under investigation. Increasing clarity when examining emotions is critical when considering how to support individuals' abilities to comprehend, evaluate, and learn from discourse experiences.

This special issue of *Discourse Processes* takes an important step toward understanding the ways in which emotions influence text comprehension, learning, and communicative experiences. In this issue, we bring together experts conducting empirical studies on how emotion influences learning and processing for varying text types in different contexts, with the important goal of developing a more cohesive understanding of the influence of reader emotions in supporting comprehension, learning, and knowledge revision. The authors and discussants draw important connections to the broader fields of text and discourse, learning, and motivation. In this introduction to the special issue, we first define emotions and how they are experienced, and we describe the type of methods researchers often employ to study emotions. We then bridge theories of emotion with theories of discourse processing, highlight how the papers in this special issue align, and describe areas worthy of future investigation.

Conceptualizing and measuring emotions in the context of discourse processing

To understand how emotions might impact processing and comprehension of text and discourse, we first need to define the term *emotion*. In psychology, *emotion* is often defined as the experiential, physiological, and behavioral responses to personally relevant or important events (Mauss & Robinson, 2009). The experience of joy, for example, is accompanied by a physiological response indicating arousal of the autonomic nervous system (ANS) and observable behavior such as smiling. Emotional responses are thought to be relatively short-lived, and they often are distinguished from *moods*, which typically are longer-lasting and not necessarily related to any specific event. *Affect* refers to a physiological state that underlies both emotional responses and moods (Russell, 2003).

Discrete versus dimensional views of emotion

Psychological emotion theories differ according to whether they define emotions as discrete categories or as states that can be described on dimensions (typically, two or more). The discrete views posit that there are basic emotion categories (such as anger, fear, disgust, sadness, happiness, and surprise), which show a unique and universal pattern of experiential, physiological, and behavioral reactions (e.g., Ekman & Cordaro, 2011). However, these views have been criticized for their dependency on verbal labels, and some researchers claim that emotion categories refer to abstract, context-specific categories rather than universals (Betz et al., 2019; Hoemann et al., 2019).

According to the dimensional views, emotions can be described according to two (or more) dimensions, such as valence or pleasantness (negative-positive) and activation (calming-arousing; e.g., Posner et al., 2005). Fear, for example, could be described as a highly arousing and very negative emotion, which differs from boredom and which is slightly negative and very low in arousal. Recently, it was suggested that there are dozens of distinct varieties of emotion and that emotional experiences would be best described when mapped into a continuous multidimensional space (Cowen et al., 2019). According to this view, emotional experiences could be characterized by gradients, ranging, for example, from calmness to esthetic appreciation to awe.



Emotions and discourse processing

The emotional experiences during discourse processing are influenced by the context, text, and characteristics of the reader, listener, or learner. When reading literary text for pleasure, a reader may experience evaluative, esthetic, narrative, or even self-modifying feelings (e.g., Kneepkens & Zwaan, 1994; Miall & Kuiken, 2002; Oatley, 1995). On the other hand, when reading expository text to acquire knowledge, achievement and epistemic emotions may emerge (Pekrun, 2017).

According to the Control-Value Theory of Achievement Emotions (see Pekrun, 2006, 2017; Pekrun et al., 2007; Pekrun & Perry, 2014), emotions arise from appraisals of control and value of the learning activities and outcomes. Achievement emotions can be described according to three dimensions: (1) whether the focus is on the outcome (e.g., a good grade on an exam) or the activity itself (e.g., the pleasure of learning new things), (2) hedonic value (i.e., whether the emotion is pleasant versus unpleasant), and (3) activation (or arousal-i.e., the energy level of the emotion as activating vs. deactivating). The emotions induced by achievement expectations influence the use of processing and learning strategies, available cognitive resources, motivation, and self-regulation of learning, all of which are related to the learning outcomes.

Epistemic emotions refer to emotions that arise when there is a discrepancy of information, such as when a reader encounters information that contradicts their prior beliefs or knowledge or when different texts present inconsistent information (Muis et al., 2015; Pekrun et al., 2017). Depending on an individual's epistemic beliefs (i.e., beliefs about the nature of knowledge), information may induce either positive (curiosity, enjoyment), negative (confusion, anxiety, frustration), or neutral (surprise) activating or deactivating emotions, which impacts information-processing strategies. For example, information that contradicts a reader's prior beliefs may induce either a positive activating emotion of curiosity and careful reading of the text materials. In contrast, the negative activating emotion of confusion is associated with inconsistent effects on learning and processing (see D'Mello et al., 2014; Vogl et al., 2020, 2019). Comprehension of the controversy or revision of prior knowledge thus depends on the emotions experienced.

Experiential, physiological, and behavioral emotion measures

Different methodologies can be used to measure the experiential, physiological, and behavioral facets of an emotional response (Mauss & Robinson, 2009). How emotions are measured depends on the theoretical approach adopted. For example, if one is interested in the emotional dimensions of valence and arousal, measures that reflect those aspects of emotion are used. On the other hand, if the research question examines specific emotion categories, then one is likely to choose methodologies targeting emotion categories.

The experience of emotions is typically measured with self-reports, which may scope the different dimensions (e.g., valence and arousal) of the experienced emotion (e.g., SAM; Bradley & Lang, 1994). Some self-report measures focus on emotion categories, like positive and negative emotions (e.g., PANAS and PANAS-X; Watson & Clark, 1994; Watson et al., 1988), or on different types of arousal (e.g., energetic versus tense; UWIST Mood Adjective Checklist; Matthews et al., 1990). For example, Bohn-Gettler and McCrudden (this issue) used the PANAS-X (Watson & Clark, 1994) to measure positive emotions experienced before the reading task. Trevors (this issue) presented a list of emotion labels including positive emotions, negative emotions, and a neutral emotion and then used factor analysis to establish subscales of positive, negative, and epistemic emotions. These scales were then used to examine emotions induced by a refutation text.

There are also subjective measures designed to tap into specific types of emotions such as aesthetic emotions (Schindler et al., 2017), achievement emotions (Pekrun et al., 2011), or epistemic emotions (Pekrun et al., 2017). These scales include sets of emotion labels that are typical for aesthetic, achievement, or epistemic emotional experiences, and participants are asked to respond to how much of each emotion they feel. In the papers included in this special issue of Discourse Processes, the epistemic emotion scale (EES; Pekrun et al., 2017) was used to study reader responses to refutation texts (Jacobson et al., this issue) and seductive details (Mensink, this issue).

Finally, another way to measure emotional experiences is the emote-aloud paradigm (D'Mello et al., 2006), in which participants produce think-alouds focusing on their subjective experience. The think-alouds are then coded for the emotional content. A strength of this methodology in comparison to the specific emotion scales is that it does not restrict the response options to a predefined set of emotion words that might guide participant responses. However, this method relies on participants consistently and accurately reporting their subjective emotional experiences.

The physiological emotion measures tap into the activation of sympathetic and parasympathetic systems of the autonomic nervous system (ANS; Kreibig, 2010). For example, heart rate, skin conductance, and pupil size are sensitive to fluctuations in arousal (e.g., Bradley et al., 2008; Wang et al., 2018) and they have been applied to study emotional arousal during text processing (e.g., Kaakinen & Simola, 2020; Mason et al., 2018, 2020). Heart-rate variability (HRV), which is an index of cardiac vagal tone, has been linked with emotion regulation during learning-related activities (Mason et al., 2018; Scrimin et al., 2017, 2018).

Facial expressions are a behavioral manifestation of emotions and underlie the formulation of theories of basic emotions (e.g., Ekman & Friesen, 1978). An analysis of the activity of different facial muscles has been applied to automatically detect the expressions of different emotions from pictures and videos (Taub et al., 2020). These automated facial-analysis tools can be applied to track emotions during reading and learning tasks, as in Dever et al. (this issue). Also, other observable behaviors, such as head and body movements, can be tracked to examine the behavioral aspect of emotion (e.g., Ballenghein et al., 2019; Westlund et al., 2015).

Emotion induction versus organically evolving emotions

The effects of emotions on text and discourse processing can be studied by emotion induction or by observing emotions that organically emerge in the study context or during processing. In emotion induction paradigms, a specific emotion is induced in the participant prior to the experimental task. This can occur by presenting emotional stimuli, such as videos or music, or by asking participants to recall or imagine emotional events (see Siedlecka & Denson, 2019). Comparisons of processing and comprehension performance in different emotion induction conditions provide information on how a specific emotion impacts the processes underlying comprehension. One challenge with this approach is that even if the emotion induction is successful, it might not be long-lasting and the emotion can change during the experimental task, potentially mitigating the effects of the emotion induction.

Another approach is to observe emotions that spontaneously arise in the study context and to measure the emotion or the baseline emotional state of the participant and its association to processing and comprehension (Bohn-Gettler & McCrudden, this issue). Also, the emotional response induced by the materials or the task the participant is performing can be measured. For example, Jacobson et al. (this issue) and Trevors (this issue) studied emotional responses to refutation texts and Mensink (this issue) examined emotional responses during reading and recall of texts that included seductive details. Dever et al. (this issue) traced emotions arising during the use of a game-based learning environment. The challenge is that the emotional responses might vary as a function of the "baseline" emotional state of the participant, which should be kept in mind when interpreting the results of text manipulations.

Conclusion

Emotion theories do not currently present a unified view of the nature of emotions, and the theoretical framework adopted guides the methodological decisions for how emotions are measured during text and discourse processing. Despite their differing views, the theories are informative for understanding the ways in which emotions may influence cognition and learning, to which we now turn. In considering this, we specifically highlight how theories of emotion link with theories of discourse processing to situate the articles in this special issue within a cohesive framework.



Bridging theories of emotion with discourse processes

Classic and current work provide valuable insights for studying emotion in the context of discourse processes, providing meaningful ways of considering how to connect theory in cognition with emotion. All the papers included in this special issue are situated in cognitive theory, assuming that individuals build mental representations, called situation models, of texts and experiences (Johnson-Laird, 1983; Kintsch & van Dijk, 1978). Within these mental representations, concepts are connected via a semantic network in memory, in which the activation of a concept can lead to the coactivation of relevant information through a spread of activation (Kintsch, 1998; O'Brien & Cook, 2016; van den Broek et al., 1999). Through such processes, information is integrated into the mental representation and validated with prior knowledge (Cook & O'Brien, 2014; Kendeou, 2014; Richter, 2015; Singer, 2013) and individuals make inferences to fill in missing information (Graesser et al., 1994; Kintsch & van Dijk, 1978). These processes are subject to limitations in cognitive resources (Kintsch & van Dijk, 1978; Miller, 1956), features of the task, features of the text or materials, and individual differences (Bohn-Gettler & Kendeou, 2014; Snow, 2002; van den Broek & Kremer, 1999).

The PET framework

In an effort to connect the emotion and discourse-processing literature, Bohn-Gettler (2019) proposed the PET framework, arguing for the importance of increased specificity with regard to the process under investigation, the emotion being studied, and the specific task in which individuals are engaging. All the papers in this special issue take care to specify each of these components. For example, Jacobson et al. (this issue) and Trevors (this issue) examined epistemic emotions when engaging with refutation texts to combat misconceptions. Mensink (this issue) examined epistemic emotions that arose as a function of engaging with texts containing seductive details, and Dever et al. (this issue) studied the discrete and nondiscrete emotions that arose when interacting with a game-based learning environment. Bohn-Gettler and McCrudden (this issue) considered positive emotions as they interacted with reading goals and beliefs when thinking-aloud about a dualposition text.

Related to the *emotion* under investigation, the PET framework is grounded in research indicating that different emotions are associated with distinct processing patterns (Fiedler, 2000; Fiedler & Beier, 2014; Forgas, 1995; Pekrun, 2017; Pekrun & Stephens, 2012). For example, positive-activating emotions are associated with top-down and assimilative processing. Such assimilative processing occurs when individuals incorporate incoming information into existing mental representations—without making significant changes to the mental representations (Fiedler & Beier, 2014). Positive-activating emotions have also been found to be linked to open information searches that can facilitate flexible problem solving and creative processing (Bless & Fiedler, 1995; Fiedler & Beier, 2014; Gasper & Clore, 2002; Huntsinger et al., 2010; Isen, 2001; Isen et al., 1987; Storbeck & Clore, 2005).

Negative-deactivating emotions, in contrast, are associated with bottom-up, accommodative processing. Such processing is reflected in the changing of the structure of one's mental representation in response to incoming information (Fiedler & Beier, 2014). This is associated with a more incremental and local focus (Beukeboom & Semin, 2006; Fiedler & Beier, 2014; Sinclair & Mark, 1995; Von Hecker & Meiser, 2005). Hence, positive emotions may facilitate processing for tasks favoring top-down processing such as inferences and creativity; whereas, negative emotions may facilitate processing for tasks favoring bottom-up processing such as reproduction of content or a focus on local details (Bohn-Gettler, 2019). These processing patterns are examined in varying ways across the papers included in this special issue of Discourse Processes—for example, in Bohn-Gettler and McCrudden; Mensink; Jacobson et al., and Trevors (all this issue).

However, the influence of emotion on processing does not occur under all circumstances, and how emotion influences processing may also vary as a function of the task. Hence, the PET framework argues for the importance of considering the task under investigation (Bohn-Gettler, 2019). Emotions

are less likely to influence processing for tasks requiring reproductive processing—that is, directly accessing information from memory in a nontransformative manner. In contrast, tasks involving constructive processing, in which the transformation of content is required, are more likely to be influenced by emotion (Forgas, 1995). Some examples of constructive processing may include problem-solving, elaboration, and filling in missing information. In this context, some studies that do not find effects of emotions may be utilizing more-reproductive tasks as opposed to moreconstructive tasks (Bohn-Gettler, 2019). For example, Bohn-Gettler and McCrudden (this issue) found that positive emotions facilitated the adoption of inferential processing when thinking-aloud about belief-consistent text. These task-related hypotheses would benefit from validation in future research that directly compares different types of tasks to determine the relative influences of emotion.

Finally, how emotions influence *processing* may depend on which process is under investigation (Bohn-Gettler, 2019). For example, a relevant theory arising from the cognition literature is that all individuals possess limitations in their cognitive resources—particularly their working or short-term memory (Kintsch & van Dijk, 1978; Miller, 1956). Previous research documents how emotional information, especially negatively valenced or highly activating emotional information, is more salient than nonemotional information (Payne & Corrigan, 2007). Emotional information therefore utilizes more cognitive resources than nonemotional information, placing additional constraints on already limited cognitive resources (Meinhardt & Pekrun, 2003). This can influence attention/processing resources, challenges with inhibiting the production of task-irrelevant thoughts, and problemsolving strategies (Ellis & Ashbrook, 1988, 1989; Seibert & Ellis, 1991).

In line with resource-allocation theories, the PET framework (Bohn-Gettler, 2019) proposes that emotions (especially negative ones) can introduce additional constraints on cognitive resources that may interfere with text and discourse processing for constructive (but not always reproductive) tasks (Bohn-Gettler & Rapp, 2011; Ellis, Moore et al., 1997; Yang et al., 2013). However, the conditions under which emotions impose additional constraints on memory and how this influences performance is an area worthy of future investigation. Mensink (this issue) considers how seductive details contain emotional information, which draws attention away from content that is more informative and relevant to the main point of the text.

As an example of another process invoked in discourse experiences, Bower and colleagues theorized that emotions represent concepts within a semantic network, finding that experiencing an emotion or encountering emotional information activates emotion-related concepts through a spread of activation (Bower, 1981; Schwarz & Skurnik, 2003). For example, when learning content while experiencing a particular emotion, individuals are more likely to attend to, interpret, learn, and remember information congruent with their emotion (Bower et al., 1981; Mayer, 1986). They are also more likely to remember that content later when experiencing the emotion that was present when they initially learned the information (Bower et al., 1978; De l'étoile, 2002). As another example, individuals are more likely to interpret ambiguous information in a manner that is congruent with their emotions (Ferraro et al., 2003; Halberstadt et al., 1995).

Based on semantic network theories, the PET framework (Bohn-Gettler, 2019) hypothesizes that the experience of emotions can activate other emotion-relevant concepts within the semantic network, which can result in the congruency effects described above (Bower, 1981; Ferraro et al., 2003; De l'etoile, 2002; Schwarz & Skurnik, 2003). However, emotions may also influence the number of concepts in the semantic network deemed relevant in the service of comprehending a text or discourse experience. For example, negative emotions may constrain the number of concepts deemed relevant; whereas, positive emotions either maintain or broaden the number of concepts deemed relevant (Bohn-Gettler, 2019; Fiedler & Beier, 2014; Gasper & Clore, 2002; Serano et al., 2015; Srinivasan & Hanif, 2010). This is an area worthy of future testing and investigation. In this special issue, Mensink found that readers experiencing positive emotions were more susceptible to seductive details in a text, resulting in decreased recall for scientific content. Likewise, Bohn-Gettler and McCrudden (this issue) found that participants with higher positive emotions were more likely to spend more time reading task-irrelevant than task-relevant text, and to provide elaborations. Both studies suggest that positive emotions either increased the number of concepts deemed relevant or did not decrease what was deemed relevant.

An important component of reading and discourse experiences is that individuals integrate incoming information with their developing mental representation and then validate this information according to their prior knowledge to determine its likelihood and accuracy (Cook & O'Brien, 2014; Richter, 2015). In addition, individuals must often make inferences to fill in information that is missing from the text or communicative interaction (Graesser et al., 1994). The PET framework argues that positive emotions should generally facilitate such integration, validation, and inferential processes because of the flexible processing and broader activation associated with positive emotions—but only when assimilative processing is required (Bohn-Gettler, 2019). When accommodation is required, such as when working to overcome a misconception, negative emotions may facilitate integration and validation. Further, the nature of the task matters; such effects of emotion were seen only for tasks with a certain degree of ambiguity and that hence required more constructive processing (Bohn-Gettler, 2019; Bohn-Gettler & Rapp, 2011).

Jacobson et al. (this issue) and Trevors (this issue) demonstrate that negatively valenced emotions facilitating accommodation may not occur when the threat level is high enough to trigger assimilative processing to promote belief protection. Hence, how emotions influence processing may occur through different channels. In the absence of a threat to one's self-identity, positive emotions may be associated with assimilative processing and negative emotions with accommodative processing. However, feelings of threat could induce a top-down goal of belief preservation, overriding the traditional effects of emotion. This speaks to the importance of considering features of the task and context when studying emotions and processing (Bohn-Gettler, 2019). Future research should focus on understanding not only whether differential effects occur as a function of integration, validation, and inferential processes, but also on the conditions under which this occurs.

Conclusions

Studying emotions during discourse-processing experiences is complex and multifaceted, making it crucial for future research to be specific about the process, emotion, and task under investigation (Bohn-Gettler, 2019). The papers in this special issue attend to these issues, offering a more-coherent interpretation of the findings, while also helping to identify key challenges and areas of strength.

Because the field of emotions in learning and discourse processing is still in its early stages, the field is ripe for new research to identify and fill in gaps in our knowledge. As one example, although the PET framework (Bohn-Gettler, 2019) and the neurocognitive poetics model (Jacobs, 2015) offer hypotheses related to how emotions play a role during discourse processing and esthetic experiences, further connections between emotion and cognition need to be tested. It is important to understand how emotions influence overall processing, but it is critical to also consider how emotions can dynamically change during discourse experiences. Such work may require methodological innovations related to studying valence versus activation, and require emotion categories (e.g., Dever et al., this issue) to be tested in an ongoing manner through reading and communicative experiences.

To test hypotheses about how emotions emerge and impact discourse processing and comprehension, one should employ measures that reflect ongoing emotional and cognitive processing. For example, linking ANS measures of emotional arousal with processing measures (e.g., eye-tracking) would allow researchers to test hypotheses about how emotions impact attention allocation and processing to-be-learned information (see Mason et al., 2020). Measuring both processing and emotional changes as they co-occur would offer insights into how emotional and cognitive processes interact—for example, whether positive emotions facilitate integration and elaboration of information and whether negative emotions restrict the scope of processing (Bohn-Gettler, 2019). Moreover, combinations of measures tapping into the different facets of emotion (experiential, physiological, behavioral) and processing would be needed to fully understand the nature of varying emotional responses and the interplay of emotional and cognitive processes. Triangulating measures would



advance understanding of the link between the subjective experience of an emotion and its manifestation in physiology and behavior in different contexts.

There is an ongoing theoretical debate on the nature of emotions, which influences the methodological choices for how emotions are measured. For example, recent neuroscientific evidence suggests that different emotion categories engage distinct neural networks in the brain (see Nummenmaa & Saarimäki, 2019) and thus can be expected to exert different influences on cognitive processes. To advance understanding of the interplay of emotions and cognition during discourse processing, it would be helpful to specify which emotion is under investigation. Naturally, the choice of a priori emotion categories to be investigated depends on the theoretical view adopted, which might restrict the conclusions that can be made.

Another important avenue for research is to study emotions within the contexts and experiences of individuals. For example, Rouet et al. (2017) proposed the RESOLV model, which accounts for how readers approach texts with particular goals. These goals and experiences account for the contexts (social, communicative, physical) in which readers approach a text. Hence, they document how individuals engage in purposeful reading that is influenced by the task and the social and emotional contexts, which can change how readers process information. Making further connections to this type of work will expand the meaning and breadth of studying emotions within the field of discourse processing.

Relatedly, understanding how emotions play a role in interaction and communication is vital. Communicative interactions are complex and offer important opportunities for studying emotions (Clark, 1996; Clark & Brennan, 1991; Fox Tree & Clark, 2013). Diverse discourse experiences that involve varying forms of communication undeniably involve emotions and are worthy of investigation. Although the papers in this special issue focus on the reader and informative text, the findings provide useful points for deep consideration of how emotion may play a role when individuals collaborate, communicate their views and perspectives, build meaning, and understand ideas in other discourse interactions involving verbal discussion, nonverbal interactions, sign language, and more. For example, when learning in dyads or small groups, in what ways do the communicative interactions and contexts trigger emotions that could influence processing, learning, and communicative interactions? Or, the context of an online environment, whether it be a learning environment or even a social-media environment, can instigate emotions in different ways (e.g., Anderson et al., 2014; Kramer et al., 2014).

The study of emotion in discourse processing opens the door to understanding reading, learning, and communicating in a nuanced manner reflective of the complex contexts in which the activities occur. Although conducting such work presents challenges and complications, it also extends the relevance of the field of discourse processing to fields such as learning, behavior, emotion, and education. It is our hope that this special issue will inspire more research that builds interdisciplinary bridges and enhances our lives through improved communication, learning, and comprehension.

Disclosure statement

We have no conflicts of interest to disclose.

Funding

This work was supported by the Academy of Finland grant [334266] to Johanna K. Kaakinen.

ORCID

Catherine M. Bohn-Gettler http://orcid.org/0000-0002-8036-4466 Johanna K. Kaakinen (D) http://orcid.org/0000-0002-2970-826X



References

Anderson, A. A., Brossard, D., Scheufele, D. A., Xenos, M. A., & Ladwig, P. (2014). The "nasty effect:" Online incivility and risk perceptions of emerging technologies. Journal of Computer-Mediated Communication, 19, 373-387. https:// doi.org/10.1111/jcc4.12009

Ballenghein, U., Megalakaki, O., & Baccino, T. (2019). Cognitive engagement in emotional text reading: Concurrent recordings of eye movements and head motion. Cognition and Emotion, 33 1338-1460. https://doi.org/10.1080/ 02699931.2019.1574718

Betz, N., Hoemann, K., & Barrett, L. F. (2019). Words are a context for mental inference. Emotion, 19, 1463-1477. https://doi.org/10.1037/emo0000510

Beukeboom, C. J., & Semin, G. R. (2006). How mood turns on language. Journal of Experimental Social Psychology, 42, 553-566. https://doi.org/10.1016/j.jesp.2005.09.005

Bless, H., & Fiedler, K. (1995). Affective states and the influence of activated general knowledge. Personality and Social Psychology Bulletin, 21, 766-778. https://doi.org/10.1177/0146167295217010

Bohn-Gettler, C. M. (2019). Getting a grip: The PET framework for studying how reader emotions influence comprehension. Discourse Processes, 56, 386-401. https://doi.org/10.1080/0163853X.2019.1611174

Bohn-Gettler, C. M., & Kendeou, P. (2014). The interplay of reader goals, working memory, and text structure during reading. Contemporary Educational Psychology, 39, 206–219. https://doi.org/10.1016/j.cedpsych.2014.05.003

Bohn-Gettler, C. M., & McCrudden, M. T. (this issue). Effects of emotions, topic beliefs, and task instructions on the processing and -memory for a dual-position text. Discourse Processes.

Bohn-Gettler, C. M., & Rapp, D. N. (2011). Depending on my mood: Mood-driven influences on text comprehension. Journal of Educational Psychology, 103, 562-577. https://doi.org/10.1037/a0023458

Bower, G. H. (1981). Mood and memory. American Psychologist, 36, 129–148. https://doi.org/10.1037/0003-066X.36.2.129

Bower, G. H., Gilligan, S. G., & Monteiro, K. P. (1981). Selectivity of learning caused by affective states. Journal of Experimental Psychology: General, 110, 451-473. https://doi.org/10.1037/0096-3445.110.4.451

Bower, G. H., Monteiro, K. P., & Gilligan, S. G. (1978). Emotional mood as a context for learning and recall. Journal of Verbal Learning and Verbal Behavior, 17, 573-585. https://doi.org/10.1016/S0022-5371(78)90348-1

Bradley, M. M., & Lang, P. J. (1994). Measuring emotion: The self-assessment manikin and the semantic differential. Journal of Behavior Therapy and Experimental Psychiatry, 25, 49–59. https://doi.org/10.1016/0005-7916(94)90063-9

Bradley, M. M., Miccoli, L., Escrig, M. A., & Lang, P. J. (2008). The pupil as a measure of emotional arousal and autonomic activation. Psychophysiology, 45, 602-607. https://doi.org/10.1111/j.1469-8986.2008.00654.x

Clark, H. H. (1996). Common groud. In H. Clark (Ed.) Using language (pp. 92-121). Cambridge University Press.

Clark, H. H., & Brennan, S. E. (1991). Grounding in communication. In L. B. Resnick, J. M. Levine, & S. D. Teasley (Eds.), Perspectives on socially shared cognition (pp. 127-149). American Psychological Association.

Cook, A. E., & O'Brien, E. J. (2014). Knowledge activation, integration, and validation during narrative comprehension. Discourse Processes, 51, 26-49. https://doi.org/10.1080/0163853X.2013.855107

Cowen, A., Sauter, D., Tracy, J. L., & Keltner, D. (2019). Mapping the passions: Toward a high-dimensional taxonomy of emotional experience and expression. Psychological Science in the Public Interest, 20, 69-90. https://doi.org/10.1177/ 1529100619850176

D'Mello, S. K., Craig, S. D., Sullins, J., & Graesser, A. C. (2006). Predicting affective states expressed through an emotealoud procedure from AutoTutor's mixed-initiative dialogue. International Journal of Artificial Intelligence in Education, 16, 3-28. https://dl.acm.org/doi/10.5555/1434940.1434942

D'Mello, S. K., Lehman, B., Pekrun, R., & Graesser, A. C. (2014). Confusion can be beneficial for learning. Learning & Instruction, 29, 153–170. https://doi.org/10.1016/j.learninstruc.2012.05.003

De l'etoile, S. K. (2002). The effect of a musical mood induction procedure on mood state-dependent word retrieval. Journal of Music Therapy, 39, 145-160. https://doi.org/10.1093/jmt/39.2.145

Dever, D. A., Wiedbusch, M. D., Cloude, E. B., Lester, J., & Azevedo, R. (this issue). Scientific text comprehension during game-based learning: relationships between emotions, information-processing strategies, and prior knowledge Discourse Processes.

Ekman, P., & Cordaro, D. (2011). What is meant by calling emotions basic. Emotion Review, 3, 364-370. https://doi.org/ 10.1177/1754073911410740

Ekman, P., & Friesen, W. V. (1978). The facial action coding system. Consulting Psychological Press.

Ellis, H. C., & Ashbrook, P. W. (1988). Resource allocation model of the effect of depressed mood states on memory. In K. Fiedler & J. P. Forgas (Eds.), Affect, cogntion, and social behavior (pp. 25–43). Hogrefe International.

Ellis, H. C., & Ashbrook, P. W. (1989). The "state" of mood and memory research: A selective review. Journal of Social Behavior and Personality, 4(2), 1-21.

Ellis, H. C., Moore, B. A., Varner, L. J., Ottaway, S. A., & Becker, A. S. (1997). Depressed mood, task organization, cognitive interference, and memory: Irrelevant thoughts predict recall performance. Journal of Social Behavior and Personality, 12(2), 453-470.



- Ellis, H. C., Ottaway, S. A., Varner, L. J., Becker, A. S., & Moore, B. A. (1997). Emotion, motivation, and text comprehension: The detection of contradictions in passages. Journal of Experimental Psychology, 126, 131-146. https://doi.org/10.1037/0096-3445.126.2.131
- Ferraro, F. R., King, B., Ronning, B., Pekarski, K., & Risan, J. (2003). Effects of induced emotional state on lexical processing in younger and older adults. The Journal of Psychology, 137, 262-272. https://doi.org/10.1080/00223980309600613
- Fiedler, K. (2000). Toward an integrative account of affect and cognition phenomena using the BIAS computer algorithm. In J. P. Forgas (Ed.), Feeling and thinking: The role of affect in social cognition (pp. 223-252). Cambridge University Press.
- Fiedler, K., & Beier, S. (2014). Affect and cognitive processing in educational contexts. In R. Pekrun & L. Linnenbrink-Garcia (Eds.), International handbook of emotions in education (pp. 36-55). Taylor & Francis.
- Forgas, J. P. (1995). Mood and judgment: The affect infusion model (AIM). Psychological Bulletin, 117, 39-66. https:// doi.org/10.1037/0033-2909.117.1.39
- Fox Tree, J. E., & Clark, H. H. (2013). Communicative effectiveness of written versus spoken feedback. Discourse Processes, 50, 39-359. https://doi.org/10.1080/0163853X.2013.797241
- Gasper, K., & Clore, G. L. (2002). Attending to the big picture: Mood and global versus local processing of visual information. Psychological Science, 13, 33-39. https://doi.org/10.1111/1467-9280.00406
- Graesser, A. C., Singer, M., & Trabasso, T. (1994). Constructing inferences during narrative text comprehension. Psychological Review, 101, 371–395. https://doi.org/10.1037/0033-295X.101.3.371
- Halberstadt, J. B., Niedenthal, P. M., & Kushner, J. (1995). Resolution of lexical ambiguity by emotional state. Psychological Science, 6, 278-282. https://doi.org/10.1111/j.1467-9280.1995.tb00511.x
- Hoemann, K., Xu, F., & Barrett, L. F. (2019). Emotion words, emotion concepts, and emotional development in children: A constructionist hypothesis. Developmental Psychology, 55, 1830-1849. https://doi.org/10.1037/dev0000686
- Huntsinger, J. R., Clore, G. L., & Bar-Anan, Y. (2010). Mood and global-local focus: Priming a local focus reverses the link between mood and global-local processing. Emotion, 10, 722–726. https://doi.org/10.1037/a0019356
- Isen, A. M. (2001). An influence of positive affect on decision making in complex situations: Theoretical issues with practical implications. Journal of Consumer Psychology, 11, 75-85. https://doi.org/10.1207/S15327663JCP1102_01
- Isen, A. M., Daubman, K. A., & Nowicki, G. P. (1987). Positive affect facilitates creative problem solving. Journal of Personality and Social Psychology, 52, 1122-1131. https://doi.org/10.1037/0022-3514.52.6.1122
- Jacobs, A. M. (2015). Neurocognitive poetics: Methods and models for investigating the neuronal and cognitive-affective bases of literature reception. Frontiers in Human Neuroscience, 9. https://doi.org/10.3389/fnhum.2015.0018
- Jacobson, N., Sinatra, G. M., & Thacker, I. (this issue). Here's hoping it's not just text structure: The role of emotions in knowledge revision and the backfire effect. Discourse Processes.
- Johnson-Laird, P. N. (1983). Mental models: Towards a cognitive science of language, inference, and consciousness. Harvard University Press.
- Kaakinen, J. K., & Simola, J. (2020). Fluctuation in pupil size and spontaneous blinks reflect story transportation Journal of Eye Movement Research, 13(3). https://doi.org/10.16910/jemr.13.3.6
- Kendeou, P. (2014). Validation and integration: An integrated overview. Discourse Processes, 51, 189-200. https://doi. org/10.1080/0163853X.2013.855874
- Kintsch, W. (1998). Comprehension: A paradigm for cognition. Cambridge University Press.
- Kintsch, W., & van Dijk, T. A. (1978). Toward a model of text comprehension and production. Psychological Review, 85, 363-394. https://doi.org/10.1037/0033-295X.85.5.363
- Kneepkens, E. W. E. M., & Zwaan, R. A. (1994). Emotions and literary text comprehension. *Poetics*, 23, 125–138. https:// doi.org/10.1016/0304-422X(94)00021-W
- Kramer, A. D. I., Guillory, J. E., & Hancock, J. T. (2014). Experimental evidence of massive-scale emotional contagion through social networks. Proceedings of the National Academy of Sciences, 111, 8788-8790. https://doi.org/10.1073/ pnas.1320040111
- Kreibig, S. D. (2010). Autonomic nervous system activity in emotion: A review. Biological Psychology, 84, 394-421. https://doi.org/10.1016/j.biopsycho.2010.03.010
- Mason, L., Scrimin, S., Zaccoletti, S., Tornatora, M. C., & Goetz, T. (2018). Webpage reading: Psychophysiological correlates of emotional arousal and regulation predict multiple-text comprehension. Computers in Human Behavior, 87, 317-326. https://doi.org/10.1016/j.chb.2018.05.020
- Mason, L., Zaccoletti, S., Scrimin, S., Tornatora, M. C., Florit, E., & Goetz, T. (2020). Reading with the eyes and under the skin: Comprehending conflicting digital texts. Journal of Computer Assisted Learning, 36, 89-101. https://doi.org/10.1111/jcal.
- Matthews, G., Jones, D. M., & Chamberlain, A. G. (1990). Refining the measurement of mood: The UWIST mood adjective checklist. British Journal of Psychology, 81, 17-42. https://doi.org/10.1111/j.2044-8295.1990.tb02343.x
- Mauss, I. B., & Robinson, M. D. (2009). Measures of emotion: A review. Cognition and Emotion, 23, 209-237. https://doi. org/10.1080/02699930802204677
- Mayer, J. D. (1986). How mood influences cogition. In N. E. Sharkey (Ed.), Advances in cognitive science (pp. 290–314). Ellis Horwood Limited.



- Meinhardt, J., & Pekrun, R. (2003). Attentional resource allocation to emotional events: An ERP study. *Cognition and Emotion*, 17, 477–500. https://doi.org/10.1080/02699930244000039
- Mensink, M. C. (this issue). Emotional responses to seductive scientific texts during online and offline reading tasks. *Discourse Processes*.
- Miall, D. S., & Kuiken, D. (2002). A feeling for fiction: Becoming what we behold. *Poetics*, 30, 221–241. https://doi.org/10.1016/S0304-422X(02)00011-6
- Miller, G. A. (1956). The magical number seven, plus or minus two: Some limits on our capacity for processing information. *Psychological Review*, 63, 81–97. https://doi.org/10.1037/0033-295X.101.2.343
- Muis, K., Pekrun, R., Sinatra, G. M., Azevedo, R., Trevors, G., Meier, E., & Heddy, B. C. (2015). The curious case of climate change: Testing a theoretical model of epistemic beliefs, epistemic emotions, and complex learning. *Learning and Instruction*, *39*, 168–183. https://doi.org/10.1016/j.learninstruc.2015.06.003
- Nummenmaa, L., & Saarimäki, H. (2019). Emotions as discrete patterns of systemic activity. *Neuroscience Letters*, 693, 3–8. https://doi.org/10.1016/j.neulet.2017.07.012
- O'Brien, E. J., & Cook, A. E. (2016). Coherence threshold and the continuity of processing: The RI-Val model of comprehension. *Discourse Processes*, 53, 326–338. https://doi.org/10.1080/0163853X.2015.1123341
- Oatley, K. (1995). A taxonomy of the emotions of literary response and a theory of identification in fictional narrative. *Poetics*, 23, 53–74. https://doi.org/10.1016/0304-422X(94)P4296-S
- Payne, B. K., & Corrigan, E. (2007). Emotional constraints on intentional forgetting. *Journal of Experimental Social Psychology*, 43, 780–786. https://doi.org/10.1016/j.jesp.2006.07.005
- Pekrun, R. (2006). The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. *Educational Psychology Review*, 18, 315–341. https://doi.org/10.1007/s10648-006-9029-9
- Pekrun, R. (2017). Achievement emotions. In A. J. Elliot, C. S. Dweck, & D. S. Yeager (Eds.), *Handbook of competence and motivation: Theory and application* (pp. 251–271). Guilford Press.
- Pekrun, R., Frenzel, A. C., Goetz, T., & Perry, R. P. (2007). The control-value theory of achievement emotions: An integrative approach to emotions in education. In P. A. Schutz & R. Pekrun (Eds.), *Emotion in education. Educational psychology series* (pp. 13–36). Elsevier.
- Pekrun, R., Goetz, T., Frenzel, A. C., Barchfield, P., & Perry, R. P. (2011). Measuring emotions in students' learning and performance: The achievement emotions questionnaire (AEQ). *Contemporary Educational Psychology*, *36*, 36–48. https://doi.org/10.1016/j.cedpsych.2010.10.002
- Pekrun, R., & Perry, R. (2014). Control-value theory of achievement emotions. In R. Perkun & L. Linnenbrink-Garcia (Eds.), *International handbook of emotions and education* (pp. 120–141). Routledge.
- Pekrun, R., & Stephens, E. J. (2012). Academic emotions. In K. Harris, S. Graham, & T. Urdan (Eds.), APA educational psychology handbook: Vol. 2. Individual differences and cultural and contextual factors (pp. 3–31). American Psychological Association.
- Pekrun, R., Vogl, E., Muis, K., & Sinatra, G. M. (2017). Measuring emotions during epistemic activities: The epistemically-related emotion scales. *Cognition and Emotion*, 31, 1268–1276. https://doi.org/10.1080/02699931. 2016.1204989
- Posner, J., Russell, J. A., & Peterson, B. S. (2005). The circumplex model of affect: An integrative approach to affective neuroscience, cognitive development, and psychopathology. *Developmental Psychopathology*, 17, 715–734. https://doi.org/10.1017/S0954579405050340
- Richter, T. (2015). Validation and comprehension of text information: Two sides of the same coin. *Discourse Processes*, 52, 337–354. https://doi.org/10.1080/0163853X.2015.1025665
- Rouet, J.-F., Britt, M. A., & Durik, A. M. (2017). RESOLV: Readers' representation of reading contexts and tasks. Educational Psychologist, 52, 200–215. https://doi.org/10.1080/00461520.2017.1329015
- Russell, J. A. (2003). Core affect and the psychological construction of emotion. *Psychological Review*, 110, 145–172. https://doi.org/10.1037/0033-295X.110.1.145
- Schindler, I., Hosoya, G., Menninghaus, W., Beermann, U., Wagner, V., Eid, M., & Scherer, K. R. (2017). Measuring aesthetic emotions: A review of the literature and a new assessment tool. *Plos One*, *12*, e0178899. https://doi.org/10.1371/journal.pone.0178899
- Schwarz, N., & Skurnik, I. (2003). Feeling and thinking; Implications for problem solving. In J. E. Davidson & R. J. Sternberg (Eds.), *The psychology of problem solving* (pp. 263–290). Cambridge University Press.
- Scrimin, S., & Mason, L. (2015). Does mood influence text processing and comprehension? Evidence from an eye-movement study. *British Journal of Educational Psychology*, 85, 387–406. https://doi.org/10.1111/bjep.12080
- Scrimin, S., Patron, E., Florit, E., Palomba, D., & Mason, L. (2017). The role of cardiac vagal tone and inhibitory control in preschoolers' listening comprehension. *Developmental Psychobiology*, 59, 970–975. https://doi.org/10.1002/dev.21576
- Scrimin, S., Patron, E., Ruli, E., Pagui, C. E. K., Altoè, G., & Mason, L. (2018). Dynamic psychophysiological correlates of a learning from text episode in relation to reading goals. *Learning and Instruction*, 54, 1–10. https://doi.org/10.1016/j. learninstruc.2018.01.007
- Seibert, P. S., & Ellis, H. C. (1991). Irrelevant thoughts, emotional mood states, and cognitive task performance. *Memory & Cognition*, 19, 507–513. https://doi.org/10.3758/BF03199574



Serano, S. C., Scott, G. G., Yao, B., Thaden, E. J., & O'Donnell, P. J. (2015). Emotion word processing: Does mood make a difference? Frontiers in Psychology, 6, 1191. https://doi.org/10.3389/fpsyg.2015.01191

Siedlecka, E., & Denson, T. F. (2019). Experimental methods for inducing basic emotions: A qualitative review. *Emotion Review*, 11, 87–97. https://doi.org/10.1177/1754073917749016

Sinclair, R. C., & Mark, M. M. (1995). The effects of mood state on judgemental accuracy: Processing strategy as a mechanism. *Cognition and Emotion*, 9, 417–438. https://doi.org/10.1080/02699939508408974

Singer, M. (2013). Validation in reading comprehension. Current Directions in Psychological Science, 22, 361–366. https://doi.org/10.1177/0963721413495236

Snow, C. E. (2002). Reading for understanding: Toward an R&D program in reading comprehension. RAND Corporation.
Srinivasan, N., & Hanif, A. (2010). Global-happy and local-sad: Perceptual processing affects emotion identification.
Cognition and Emotion, 24, 1062–1069. https://doi.org/10.1080/02699930903101103

Storbeck, J., & Clore, G. L. (2005). With sadness comes accuracy; with happiness, false memory: Mood and the false memory effect. *Psychological Science*, 16, 785–791. https://doi.org/10.1111/j.1467-9280.2005.01615.x

Taub, M., Sawyer, R., Lester, J., & Azevedo, R. (2020). The impact of contextualized emotions on self-regulated learning and scientific reasoning during learning with a game-based learning environment. *International Journal of Artificial Intelligence in Education*, 30, 97–120. https://doi.org/10.1007/s40593-019-00191-1

Trevors, G. (this issue). The roles of identity conflict, emotion, and threat in learning from refutation texts. *Discourse Processes*. Trevors, G., Bohn-Gettler, C. M., Szydlo, T., & Kendeou, P. (2018). *Positive effects of negative emotions: The influence of readers' emotions on knowledge revision* [Paper presentation]. The Society for Text and Discourse, Brighton, UK.

van den Broek, P., & Kremer, K. E. (1999). The mind in action: What it means to comprehend during reading. In B. Taylor, M. Graves, & P.van den Broek (Eds.), *Reading for meaning* (pp. 1–31). Teachers College Press.

van den Broek, P., Young, M., Tzeng, Y., & Linderholm, T. (1999). The Landscape model of reading: Inferences and the online construction of a memory representation. In S. R. Goldman & H. V. Oostendorp (Eds.), *The construction of mental representations during reading* (pp. 71–98). Erlbaum.

Vogl, E., Pekrun, R., Murayama, K., & Loderer, K. (2020). Surprised–curious–confused: Epistemic emotions and knowledge exploration. Emotion, 20, 625–641. https://doi.org/10.1037/emo0000578

Vogl, E., Pekrun, R., Murayama, K., Loderer, K., & Schubert, S. (2019). Surprise, curiosity, and confusion promote knowledge exploration: Evidence for robust effects of epistemic emotions. Frontiers in Psychology, 10, 2474. https://doi.org/10.3389/fpsyg.2019.02474

Von Hecker, U., & Meiser, T. (2005). Defocused attention in depressed mood: Evidence from source monitoring. *Emotion*, 5, 456–463. https://doi.org/10.1037/1528-3542.5.4.456

Wang, C. A., Baird, T., Huang, J., Coutinho, J. D., Brien, D. C., & Munoz, D. P. (2018). Arousal effects on pupil size, heart rate, and skin conductance in an emotional face task. Frontiers in Neurology, 9, 1029. https://doi.org/10.3389/fneur.2018.01029

Watson, D., & Clark, L. A. (1994). The PANAS-X: Manual for the positive and negative affect scale - expanded form. University of Iowa. https://doi.org/10.17077/48vt-m4t2

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, 54, 1063–1070. https://doi.org/10.1037/0022-3514.54.6.1063

Westlund, J. K., D'Mello, S. K., & Olney, A. (2015). Motion tracker: Camera-based monitoring of bodily movements using motion silhouettes. *Plos One*, 10, e0130293. https://doi.org/10.1371/journal.pone.0130293

Yang, H., Yang, S., & Isen, A. M. (2013). Positive affect improves working memory: Implications for controlled cognitive processing. Cognition and Emotion, 27, 474–482. https://doi.org/10.1080/02699931.2012.713325