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Comprehension and Validation of Text Information

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During everyday discourse experiences, people use their prior knowledge not only for interpreting and enriching text content, but also for evaluating the plausibility or truthfulness of what they read. Consider, for example, a future voter perusing newspaper articles on a political topic, scientists reading journal articles in their areas of expertise, or an individual looking up information about a medical condition on the Internet. All of these instances illustrate a reader engaging in knowledge-based evaluation, which involves consideration of the validity of communicated information (and may be subsumed under the concept of *validation*; Singer, 2013). The overarching consideration for this special issue concerns identifying and understanding how the comprehension and validation of text information are related to one another.

Despite the fact that comprehension and validation seem to co-occur during many discourse experiences, validation has only recently attracted the attention of text comprehension researchers. This relative lack of interest may be due, in part, to the popularity of two-step models of comprehension and evaluation in psychology. The core assumption of these models is that information must be comprehended first *before* it can be validated in a separate and subsequent step of information processing (Connell & Keane, 2006). This second step of validation is often described as voluntary, optional, and cognitively effortful (Gilbert, 1991). This two-step model perspective suggests it makes reasonable sense to separately investigate comprehension processes without considering the possibility that readers might use their prior knowledge to evaluate the truth or plausibility of information. However, recent developments in psycholinguistics and text comprehension research suggest that comprehension and validation are more closely intertwined than traditionally assumed by two-step models. For example, psycholinguistic experiments involving the measurement of event-related potentials indicate that violations of world

knowledge are detected as quickly as semantic anomalies (Hagoort, Hald, Bastiaansen, & Peterson, 2004), suggesting that some form of validation can take effect as soon as meanings are assigned during sentence comprehension. Moreover, readers seem to regularly validate text information against activated prior knowledge during reading (Singer, 2006). Similarly, readers routinely detect inconsistencies in a text, provided that the relevant information is (re-)activated by memory-based processes (O'Brien, Rizella, Albrecht, & Halleran, 1998). These and similar findings have led some researchers to propose that comprehension and validation are actually two critical, integrated components of a single process or activity (Richter, Schroeder, & Wöhrmann, 2009; Sperber et al., 2010; Wyer & Radvansky, 1999). According to this view, validation is not deferred to a subsequent step of information processing (at least not completely), but is part and parcel of situation model construction *during* comprehension.

Recent years have witnessed a steep increase in interest as to how readers deal with inconsistent, inaccurate, or disputed information during reading (see for example, Rapp & Braasch, in press). Appeals, even implicit ones, to aspects of the comprehension-validation relationship have contributed to a better theoretical understanding of these issues. For example, multiple documents often convey conflicting or even contradictory perspectives on the same content domain (Perfetti, Rouet, & Britt, 1999). This makes it difficult if not impossible for readers to construct adequate situation models of the perspectives without evaluating the validity of each document's content and the trustworthiness of those sources. The literature on conceptual change is another case in point. Many studies have identified the difficulty associated with modifying learners' inaccurate beliefs, even when information directly refutes a learner's misconceptions (Chinn & Malhotra, 2002; Hynd & Guzzetti, 1998). There is emerging evidence that validation plays a role when learners hold fast to such misconceptions. In particular, the perceived plausibility of text information and the integration of this information into a mental

representation of the text content seem to be strongly related (Lombardi, Sinatra, & Nussbaum, 2013; Schroeder, Richter, & Hoever, 2008). To give a final example, readers can make sense of argumentative texts only if they evaluate them according to validity criteria such as plausibility of the claims, argumentative strength, and relevance (Shaw, 1996). In many cases, readers of arguments readily evaluate the plausibility or acceptability of claims and reasons (Shaw, 1996), and these evaluations occur very quickly when strong beliefs are held toward the claims (Voss, Fincher-Kiefer, Wiley, & Silfies, 1993). This illustrates that validation can be fast and efficient under certain circumstances.

But despite these examples of validation during reading, individuals are frequently unable to report inconsistent information in texts (Baker, 1989; Otero & Kintsch, 1992) and are remarkably susceptible to the false information provided in them (e.g., Gerrig & Prentice, 1991; Marsh & Fazio, 2006), suggesting that validation fails under certain circumstances. Emerging research has shown that the susceptibility to false information is reduced when readers strategically scrutinize a text for inaccuracies (Rapp, Hinze, Kohlhepp, & Ryskin, in press) or when the false information is implausible (Hinze, Slaten, Horton, Jenkins, & Rapp, in press). These projects indicate that validation does not always prevent readers from acquiring inaccurate information, and that under certain circumstances, validation can actually be enhanced as a function of instruction goals and strategies. Theoretical accounts of validation thus must specify the conditions under which validation succeeds or fails. And that is precisely what the contributions to this special issue seek to do, as they elucidate the interactive relationship between comprehension and validation from different perspectives. In the next section of this introduction, we briefly outline the nature of the contributions and how they relate to considerations of this interactive relationship.

Isberner and Richter (this issue) present the view that comprehension and evaluation can occur during routine, nonstrategic reading activity. Their demonstrative method relies on a novel application of the classic Stroop paradigm, revealing that readers exhibit an effect of the validity of text content on subsequent, ostensibly unrelated tasks. This indicates that spontaneous evaluations that occur during reading can have downstream consequences on subsequent tasks. Perhaps most importantly, their work indicates that such effects emerge most prominently when readers are engaged in semantic processing, setting up important preconditions for outlining the nature of routine validation.

Cook and O'Brien (this issue) demonstrate in three experiments that validation processes depend on the strength of associations between information in a narrative and a reader's world knowledge. They utilize the now classic inconsistency paradigm, which relies on slowdowns as an indicator of the difficulty that readers exhibit with potentially contradictory text content, or as a function of discrepancies between content and prior knowledge. Based on the findings, Cook and O'Brien propose the RI-Val model that specifies how memory-based processes (resonance, R), integration (I) and validation (val) act in concert during text comprehension. This contribution offers a substantial advance in offering a single model connecting processes that are, as mentioned above, traditionally considered separately rather than in concert.

While readers often readily notice discrepancies, in some instances, they seem to behave as if they do not, even relying on inaccurate information for subsequent tasks. Rapp, Hinze, Slaten, and Horton (this issue) focus on just such a typical case in which validation seems to fail. However, they go beyond the extant research by showing that readers' reliance on inaccurate information is modulated by the story context. Unrealistic story settings (as offered in fantasy or science-fiction stories) were less likely to encourage reliance than were more mundane settings consistent with the real world. These findings offer insights into conditions that support

successful validation, and also point to novel possibilities as to how critical evaluation of information may be fostered.

Lombardi, Seyranian, and Sinatra (this issue) introduce additional critical variables into this line of work. They examine how readers' perceptions about the credibility of a source can influence expectations about the plausibility of explanations. They specifically motivate their work towards evaluating readers' responses to the kinds of controversial scientific arguments found in everyday newspapers and blogs; specifically, causes of climate change. By taking this step towards identifying the ways in which evaluation can be linked to the persuasive power of text content, their work embodies application-based considerations for the interplay of comprehension and validation.

With a similar interest in the real world consequences of validation, Stadtler, Scharrer, Skodzik, and Bromme (this issue) examine how readily readers remember conflicts that may appear across multiple scientific documents. Their goal is to identify how different kinds of instructional tasks might encourage or discourage the noticing of conflicts, and the degree to which such conflicts might be remembered in subsequent recapitulations of what was read. Their work also has important real world implications, given the regularity with which controversial scientific topics engender heavy debate and discussion, with a sometimes surprising neglect with respect to evaluation of the validity and evidence underlying claims offered by particular sides in such arguments.

Steffens, Britt, Braasch, Strømsø, and Bråten (this issue) address effects of validation on the comprehension of scientific arguments. They report data showing that arguments overstating empirical results (i.e., causal claims supported only by correlational evidence) were recalled less well than were more appropriate arguments. In contrast, arguments that understated results were actually recalled equally well as appropriate arguments, possibly because these arguments were

reprocessed more frequently than were arguments with overstatements. These results illustrate that argumentative inconsistencies can prompt different types of processing strategies which, in turn, differentially affect comprehension outcomes.

Wittwer and Ihme (this issue) are interested in the kinds of validations that might occur with respect to science explanations. In addition, they consider whether reading skill might influence the degree to which readers judge the adequacy of such explanations. Their data indicate that less skilled readers are influenced by the semantic overlap offered in explanations, while more skilled readers are influenced by the causal connections inherent in the explanations. By this account, examinations of comprehension and validation would do well to consider how different forms of text content and organization differentially inform the evaluations that arise during reading experiences.

Singer and Doering (this issue) focus on individual differences in routine validation processes. Their project examines whether working memory capacity and the ability to access world knowledge during reading can modulate validation processes. The findings they report for individual differences in knowledge access are particularly noteworthy. Low-access readers exhibited processing difficulty for false affirmative sentences and for true sentences involving a negation (a pattern resembling intentional sentence verification). In contrast, high-access readers exhibited difficulty for false sentences regardless of whether the sentences were negated, suggesting an efficient, non-strategic validation process that takes effect even before the negation operator is processed.

Finally Kendeou (this issue) provides overview and commentary on each of the above contributions. The overview offers insightful connections across the findings, while also laying out a variety of issues to be considered in future work for the field.

Each of the contributions contained in this special issue further fleshes out our contemporary understandings of whether and how readers engage in validation and comprehension during reading. As such, the findings have important implications not just for classic models of text comprehension and discourse processing, but also for educational interventions that seek to encourage critical thinking and evaluation. Future research in this area, as derived from the current projects and work cited therein, should seek to explore applications that support readers' successful comprehension of discourse content, and for informing (and potentially revisiting and revising) prevailing and classic two-step accounts of text processing.

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