Summary
This thesis examines the higher-order comprehension processes in reading with a focus on primary school children. A vast amount of literature has indicated that meaning is extracted from written text by mentally simulating the situation which is described. Most studies on this topic have focused on adult readers. Problems with reading comprehension, however, usually already arise in primary school. This specific age group (Grades 3 – 6) should, therefore, receive more attention. Because it is difficult to pinpoint the exact cause of many comprehension problems in children, this thesis was aimed at extending literature on different component processes of reading comprehension in general. Although different approaches and paradigms were used, all findings were explained within a situation model framework. More specifically, the first aim of this thesis was to investigate how mental simulation processes are used during reading and where potential problems arise. A variety of components of mental simulation processes, including individual differences, was studied (Chapters 2 – 3). Second, the importance of adequate assessment of multiple components of reading comprehension was indicated (Chapter 4). The third aim of this thesis was to investigate and, ultimately, improve reading comprehension strategies involved in constructing and updating a situation-based mental model of the text, with a specific focus on comprehension monitoring skills (Chapters 5 – 6). In order to bridge the existing gap between theoretical knowledge and practice, this thesis was concluded with the development and successful application of a new intervention in Grades 3 and 4.

**Chapter 1** outlines the theoretical background on reading comprehension from a situation model perspective. This chapter elaborates on three cognitive processes important for deep text comprehension that are covered by this thesis, namely mental simulation, inference generation and integration, and comprehension monitoring. Finally, a brief prelude to the empirical chapters of this thesis is given.

**Chapter 2** describes an empirical study in which mental simulation processes of adult and child readers were studied. The presented study is the first to (i) investigate whether intrinsic object size is mentally simulated during sentence comprehension, and (ii) study the potential influence of developmental factors on mental simulation by directly comparing adults’ and children’s mental simulation processing. Using a sentence-picture verification task, the results from this study showed that participants mentally simulated an object’s size that was implied in a sentence. This was evidenced by faster responses to pictures matching the implied object size than pictures mismatching the implied object size. Importantly, the magnitude of the match effect was equal across age groups, indicating that perceptual information—at least regarding object size—is equally important to adults and children for deriving meaning from text.
Furthermore, the results provide support for the argument that constructing mental simulations during sentence processing is presumably independent of developmental factors. The results contribute to refining and advancing knowledge with respect to the nature of mental simulations.

Chapter 3 describes a study that aimed at exploring the extent to which there are gender differences in children’s mental simulation processing (age range 8-13 years). In Experiment 1, the focus was on mental simulation during sentence processing using a sentence-picture verification task. The results indicated that only girls responded faster when pictures matched their mental simulation of the text, suggesting that girls’ mental simulation processes differ from those of boys. To provide converging evidence and exclude alternative explanations, Experiment 2 explored gender differences in mental simulation during word processing using a lexical decision task. Again, only girls’ performance improved when words were easily imageable. Together, the results from the two experiments indicated that concepts are represented differently across gender. Chapter 3 provides evidence for girls, but not boys, strongly depending on the construction of mental simulations during language-related tasks. Presumably, girls construct more coherent and vivid mental simulations than boys do by accessing their episodic memory and activating experiential traces more easily during reading. The findings of the presented study emphasize the importance of including gender into reading comprehension research.

Chapter 4 presents a critical discussion of a recent line of research aimed at developing a reading-based task to assess component processes of reading comprehension. The effectiveness of the component processes task was evaluated with a focus on inference and integration processes, by modelling the relative contributions of the different individual components (i.e., text memory, text inferencing, and knowledge integration) to reading comprehension. The confirmed path model indicated that the text-inferencing component assesses inferential processes that are not related to reading comprehension. Only the knowledge-integration component contributed directly to reading comprehension. Furthermore, both the text-inferencing and knowledge-integration statements appeared to be dependent on the readers’ ability to memorize explicit text information. It is, therefore, important that future research aims at further developing the component processes task, and the text-inferencing component specifically, to make the task a more efficient measure of reading comprehension components. The study presented in Chapter 4 aimed to contribute to the development of the component processes task with respect to both its content and its suitability for assessing primary school children. Compared to currently used general reading
comprehension assessments, the component processes task provides important advantages with its potential to explain individual differences in underlying component processes.

Chapter 5 describes a study investigating to what extent children monitor their own comprehension during reading. This was studied in narrative texts for four situational dimensions (i.e., emotion, causation, time, and space) using the inconsistency detection paradigm. Additionally, this study investigated whether children’s failure in detecting inconsistencies was due to problems with constructing a situation model or reactivating relevant information, or problems with validation of new information against prior information. To differentiate between monitoring processes related to availability and validation of information, the distance between two pieces of conflicting information was manipulated. The results indicated that monitoring processes varied as a function of dimension. Children were able to validate emotional and causal information, but not temporal and spatial information. It was even harder to monitor comprehension when relevant pieces of information were distant from each other. In this case, only emotionally charged information remained available for further monitoring processes. Although children seem to be able to engage in construction, reactivation, and validation processes, they do not do this for all types of situational information to the same degree. Therefore, the influence of different situational dimensions should be taken into account when studying and training children’s reading comprehension.

Chapter 6 presents an inconsistency-detection intervention aimed at supporting comprehension monitoring strategies to enhance reading comprehension. Built upon the findings of previous thesis chapters, a four-week training was developed and executed in Grades 3 and 4. The training was specifically targeted at situation model updating, evaluative and self-regulatory strategies, and metacognitive awareness. Effectiveness of the four-week training was evaluated in a pre- and posttest control group design by examining improvement in inconsistency detection, general reading comprehension, and reading motivation. The results showed that, compared to the control group, fourth graders’ inconsistency-detection performance significantly improved after the inconsistency-detection training. Third graders did not show a significant gain, suggesting that this age group may be too young for the presented training. General reading comprehension and reading motivation scores, however, were promising for all children receiving the inconsistency-detection training. The inconsistency-detection training was an effective means to enhance children’s use of
monitoring strategies required for constructing and updating a coherent situation model and to transfer these strategies to novel texts.

Chapter 7 discusses the empirical findings obtained in Chapter 2 through 6 in light of the aims of this thesis as outlined in Chapter 1. The main findings are discussed from a situation model perspective. To put the finding into a broader perspective, a hierarchy of situation model processes is proposed. Additionally, the fundamental findings presented in this thesis are discussed regarding their implications for the different reading comprehension elements (i.e., text aspects and reader characteristics). Findings from assessment and training studies are discussed according to their contributions to bridging the gap between theory and practice. Finally, this last chapter also elaborates on educational implications and presents suggestions for future directions.