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CHAPTER 7

The Science of Reading–Writing Connections

Young-Suk Grace Kim

The interconnection between reading and writing is a topic of great significance. Reading and writing, both fundamental components of literacy, go hand in hand as communicative acts involving written texts. Both activities involve meaning-making and print-related processes. Meaning-making encompasses accessing, activating, and retrieving information from prior knowledge; constructing mental representations; and integrating information (Kintsch, 1988). Additionally, reading and writing require print-related processes, such as accessing and retrieving orthographic knowledge and connecting it to sounds and meaning (Adams, 1990; Harm & Seidenberg, 2004). Although reading and writing processes are not identical, they share commonalities and utilize similar resources and skills; therefore, reading and writing skills should be related. Understanding the connections between reading and writing can shed light on how these skills develop, how they influence each other, and how they can be effectively nurtured in educational settings. In this chapter, I delve into the intricate relations between reading and writing, examining theoretical frameworks, empirical evidence, and the implications for future work as well as teaching and learning.

Theoretical Models of Reading–Writing Relations

Some theoretical models of writing acknowledge the integral role of reading within the writing process. For instance, the Hayes cognitive model of writing (1996) incorporates reading comprehension as a crucial component of the revision process. In this model, the writer engages in reading for text interpretation and reflection, addressing the cohesion and coherence of their written work. Similarly, the direct and indirect effects model of writing (DIEW; Kim, 2020a; Kim & Graham, 2022; Kim & Park, 2019) recognizes the significance of reading subskills (such as word reading, text reading fluency, and reading comprehension) in the writing process. These subskills are deemed essential for writing tasks involving source texts and for revision. However, while these theoretical models implicitly acknowledge the connections between reading and writing, reading–writing connections are not their primary focus and are not therefore explicitly specified.

An abundance of theoretical models exists for reading and writing, respectively, each stemming from different perspectives and traditions. However, considerably less atten-

tion has been placed on the shared processes and skills that underpin both reading and writing within a unified conceptual framework. To the best of my knowledge, only two theoretical models explicitly concentrate on exploring and explaining the interconnectedness between reading and writing: the shared knowledge model (Fitzgerald, 1990, 1992, 2013; Fitzgerald & Shanahan, 2000) and the interactive dynamic literacy model (Kim, 2020b, 2022a). The shared knowledge model as elaborated in Fitzgerald and Shanahan (2000) and Fitzgerald (2013) establishes a connection between reading and writing skills by identifying five types of shared knowledge and cognitive processes, as illustrated in the outer circle of Figure 7.1. These five types include metaknowledge; domain knowledge about content; knowledge about universal text attributes; procedural knowledge; and the sentiments, spirit, or disposition to participate. Metaknowledge encompasses understanding the functions and purposes of reading and writing, as well as the dynamics of interaction between read-

ers and writers. It also involves the monitoring of meaning-making, word reading and production strategies, and motivational factors. Domain knowledge refers to world and content/topic knowledge. Knowledge about universal text attributes encompasses graphophonics, which includes phonological awareness, grapheme awareness, and morphology, as well as an understanding of syntax and text structure. Procedural knowledge encompasses the ability to access, utilize, and generate knowledge in any of these areas, as well as the capacity to seamlessly integrate various processes (Fitzgerald & Shanahan, 2000). Finally, the sentiments, spirit, or disposition to read and write also plays a role in the individuals' reading and writing activities (Fitzgerald, 2013).

In addition, the model includes the transactional social, rhetorical situation between readers and writers, represented by the two-way arrows. Skilled readers think about the writer's perspective, and writers consider how to communicate effectively with readers. Later, Fitzgerald (2013) expanded the

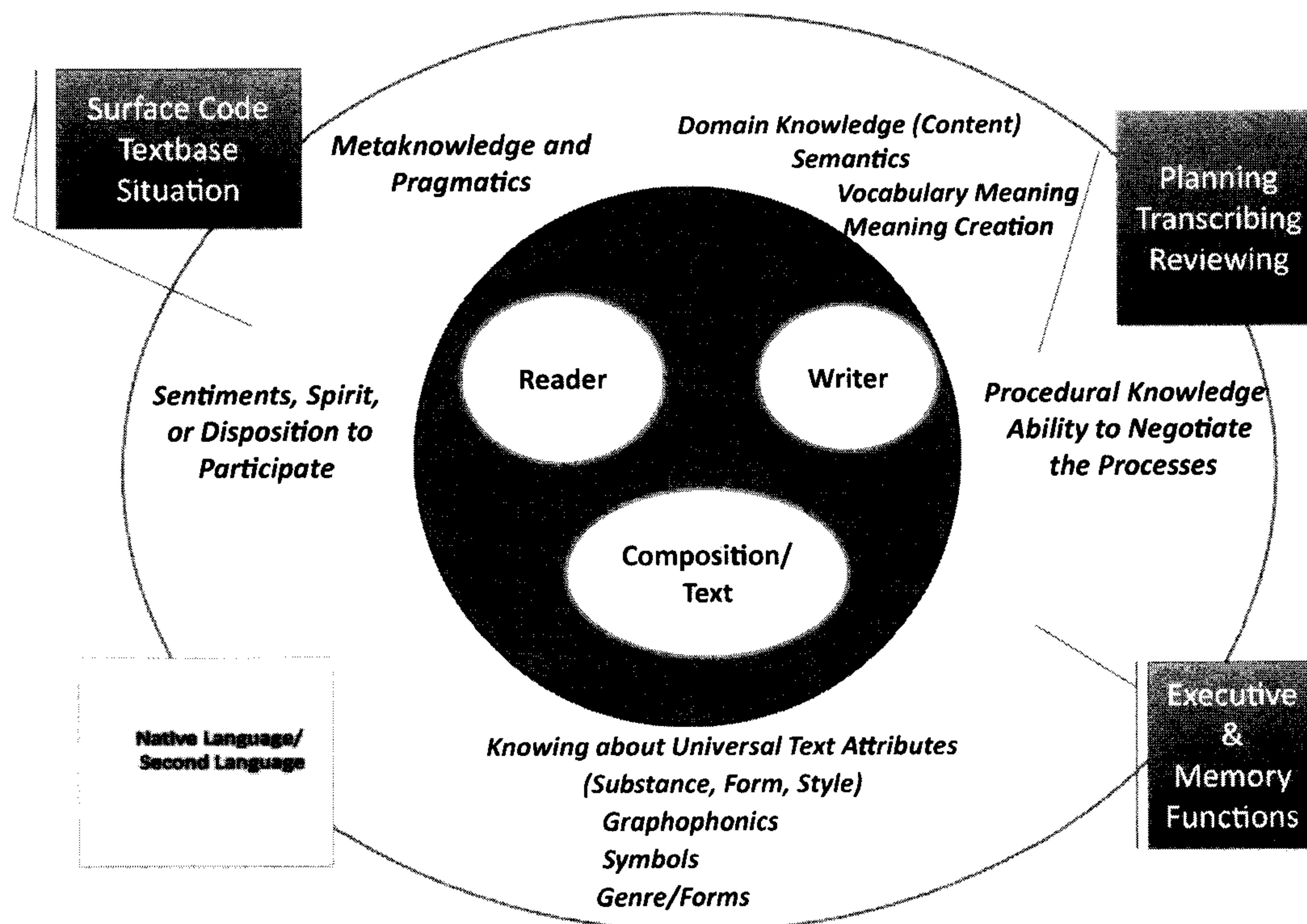


FIGURE 7.1. Transactional processes in the universe of reading and composing. Slightly adapted by Fitzgerald from Fitzgerald (2013). Reprinted with permission from the author.

model further by adding four constructs in the outer boxes in Figure 7.1. The mental representations, surface code, text base, and situation model are involved during the writing process of planning, text generation, and reviewing, which rely on the executive and memory functions. “Native Language/Second Language” references commonalities in shared processes and knowledge across languages, as well as ways in which common processes may be modulated when students are learning a new language or when students have advanced bilingual proficiency. Processes such as those contained in Figure 7.1 tend to be universal across various languages and writing systems (cf. Verhoeven & Perfetti, 2017, regarding universal processes in reading across languages). However, factors such as linguistic distance between languages (e.g., Zhang & Koda, 2013) and degree of familiarity with the new language writing system can impact the processes and their development. For example, speed of selected cognitive processes has been documented to be slower in second language reading (Fitzgerald, 1995), and adolescent students’ second language writing develop-

ment tends to lag behind their first language writing development (e.g., Albrechtsen et al., 2008).

The shared knowledge model posits that primary demands for the five types of knowledge change across developmental stages. For example, in the initial phase of literacy development (ages 0–5), a key aspect of metaknowledge is understanding the functions of reading and writing, and knowledge about universal text attributes focuses on phonological awareness and grapheme awareness. As children progress to the next stage (grades 1–2 or ages 6–7), metaknowledge evolves to include monitoring word production and meaning, as well as recognizing the interactive nature of readers and writers. In terms of knowledge about universal text attributes, this stage highlights grapheme awareness, morphology, and the syntax of sentences as prominent aspects.

The interactive dynamic literacy model, proposed by Kim (2020b, 2022a), hypothesizes that reading and writing skills rely on shared resources, skills, and knowledge, and have a dynamic and mutually supportive relation. Figure 7.2 provides a visual repre-

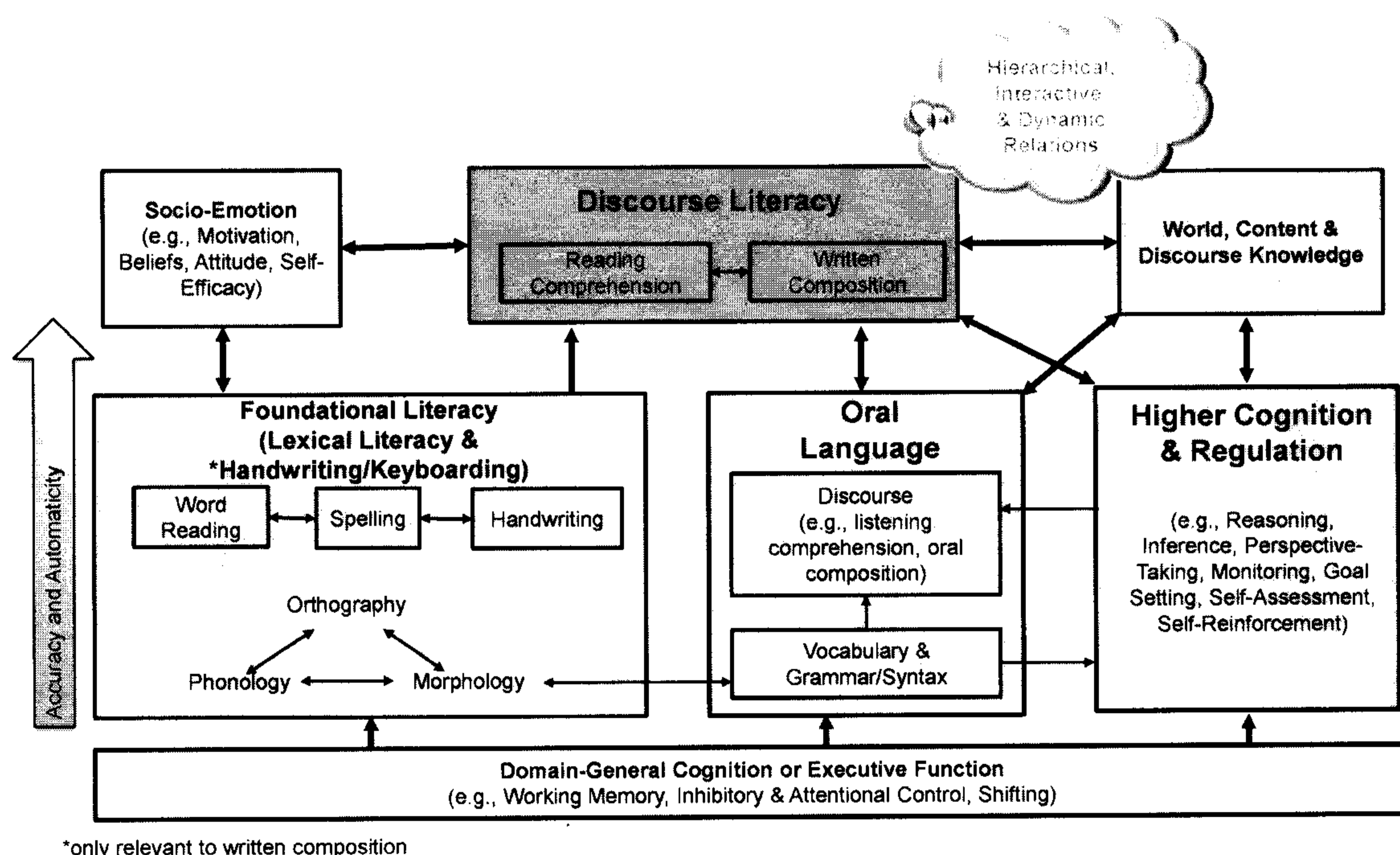


FIGURE 7.2. The interactive dynamic literacy model. Slightly modified representation from Kim (2020b).

sentation of the interactive dynamic literacy model (Kim, 2020b). This model delineates the shared skills and knowledge by breaking them down into reading and writing sub-skills or grain sizes (for a more comprehensive version, see Kim, 2022a).

Within the lexical literacy skills domain, word reading and spelling draw on phonological awareness, orthographic awareness (including knowledge of letters and letter patterns), and morphological awareness as well as domain-general cognitions/executive functions. Moving to discourse literacy skills, reading comprehension and written composition encompass a broader range of skills and knowledge outlined in Figure 7.2. This includes oral discourse skills (such as listening comprehension and oral composition); vocabulary; grammatical knowledge (including morphosyntactic and syntactic understanding); higher-order cognitive and regulatory skills (e.g., reasoning, inference, perspective taking, goal setting, monitoring, self-assessment, self-reinforcement); background knowledge such as world, content/topic, and discourse knowledge; socio-emotional factors related to reading and writing (e.g., attitude, anxiety, motivation, interest, self-efficacy, self-concept); and domain-general cognitive abilities or executive functions (such as working memory, inhibitory and attentional control, and shifting). In addition to these components, written composition requires fluency in handwriting or keyboarding skills.

An essential aspect of the interactive dynamic literacy model is its specification of the interdependent and interconnected nature of reading–writing relations. The model proposes three hypotheses that outline the structural relations among component skills and knowledge, as well as the relations between reading and writing: (1) hierarchical relations; (2) interactive relations; and (3) dynamic relations as a function of linguistic grain size, developmental phase, and measurement. The hierarchical relations hypothesis states that skills are hierarchically organized where higher-order skills are built on lower-order skills, and difficulties in lower-order skills have cascading effects on higher-order skills. This hypothesis highlights a series of direct and indirect relations among various skills and knowledge. Figure 7.3 is an alternative presentation of the interactive

dynamic literacy model, emphasizing the hierarchical relations hypothesis. In this illustration, the process of developing reading and writing skills is depicted as constructing a house or building. The roof represents reading comprehension and written composition, which are built on a foundation of other skills and knowledge. Text reading and writing fluency are depicted as beams, as they partially connect and mediate the relations between the component skills and reading comprehension/written composition. The two pillars symbolize the crucial and indispensable skills of lexical literacy and oral discourse as they provide essential support for text reading and writing skills (including text reading and writing fluency, as well as reading comprehension and written composition). If either of these pillars is absent, the entire structure collapses. Lexical literacy skills are built on print-related emergent literacy skills such as phonological, orthographic, and morphological awareness. Oral discourse skills, on the other hand, are built on higher-order cognitive and regulatory skills, as well as foundational oral language skills like vocabulary and grammatical knowledge. All of these skills rely on domain-general cognitive skills or executive functions. Furthermore, world, content, and discourse knowledge play a crucial role in oral discourse and text reading and writing skills. Additionally, socio-emotional aspects closely interact with lexical literacy and text reading and writing skills.

The interactive relations hypothesis posits that skills and knowledge have bidirectional developmental relations. For example, socio-emotions related to reading and writing undergo development simultaneous to experiences and skill development in lexical literacy (word reading and spelling) and discourse literacy (text reading and writing fluency, reading comprehension, and written composition). These relations occur in a cyclic manner, encompassing both virtuous and vicious cycles. Specifically, difficulties and negative experiences encountered during reading and writing tasks, such as struggles with word reading and spelling, exert an influence on individuals' attitudes and interest in reading and writing. Consequently, these attitudes and interests lead to reduced engagement in reading and writing activities, and this diminished engagement

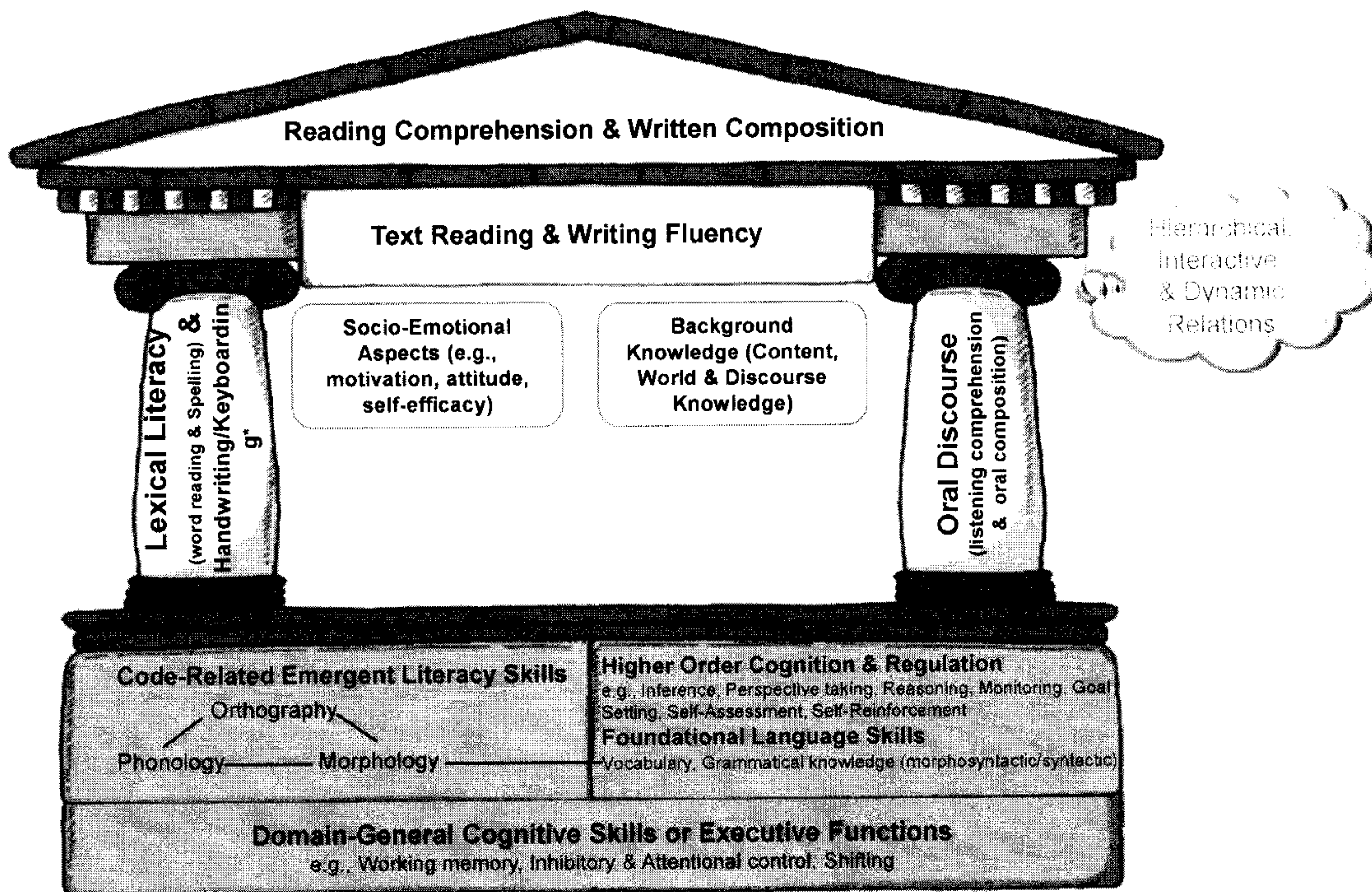


FIGURE 7.3. A heuristic representation of the interactive dynamic literacy model. Slightly modified from Kim (2017). Copyright © 2017 Young-Suk Grace Kim.

further negatively impacts the development of reading and writing skills. Ultimately, this reciprocal process feeds back into individuals' attitudes and interest in reading and writing.

The dynamic relations hypothesis proposes that the connections between language, cognitive skills, knowledge, and reading and writing are not uniform. Instead, these relations vary depending on factors such as linguistic grain size, developmental phase, and measurement. When considering linguistic grain size, the strength of the relations between reading and writing differs between the lexical level (word reading and spelling) and the discourse level (reading comprehension and written composition). This difference arises because the processes involved in word reading and spelling have greater similarity and draw on a more limited and constrained set of skills, including phonological, orthographic, and morphological awareness. In contrast, reading comprehension and written composition processes diverge to a greater extent and involve a broader range of skills and knowledge. As a result,

the connections between reading and writing are generally stronger at the lexical level compared to the discourse level. This distinction in linguistic grain size highlights the unique characteristics and skills associated with different levels of language processing.

The reading–writing relation also varies by developmental stage such that the relation is stronger during the initial phase of literacy development. This is primarily because both reading and writing in this phase heavily rely on lexical literacy skills. Furthermore, the reading–writing relation is also influenced by the characteristics of the measurement used to assess reading and writing skills. Reading comprehension and written composition are complex skills, and their measurement involves different tasks and evaluation aspects. Reading comprehension tasks, such as multiple-choice, open-ended, cloze, and retell tasks, vary in their reliance on language, cognitive, and decoding skills (Cao & Kim, 2021, Francis et al., 2006; Keenan et al., 2008). Written composition is typically assessed through production tasks that prompt individuals to generate written

texts, with or without source texts, which are then evaluated in various ways. Holistic scoring considers multiple aspects, including ideas, organization, language use, voice, spelling, and mechanics. Analytical scoring, in contrast, examines and assigns scores to each aspect separately. Other aspects such as text length or productivity, grammatical accuracy, and syntactic complexity are also commonly evaluated. According to the dynamic relations hypothesis, the relation between reading comprehension and written composition varies depending on the reading comprehension tasks utilized and the dimensions of written composition examined. For example, writing quality, which captures the coherence of ideas, is most strongly related to reading comprehension tasks that directly measure coherence of the situation model, rather than those that more readily tap decoding skills.

The hierarchical, interactive, and dynamic relations hypotheses highlight that the relation between reading and writing is multifaceted. Understanding these variations can contribute to a more nuanced understanding of the interplay between reading and writing skills.

Empirical Evidence

The exploration of reading–writing connections and educational efforts has a rich history, reviewed by Shanahan (2022). Previous research has delved into various aspects pertaining to reading–writing relations, including the magnitude, sources, and nature (including directionality) of their connections; the occurrence of difficulties in reading and writing; and the similarities and differences between the processes involved in reading and writing. The question of whether reading and writing skills are related has been examined through two lines of inquiry: experimental studies and correlational studies. Meta-analyses of experimental studies have revealed that writing can enhance reading skills (Graham & Hebert, 2010) and, similarly, reading can improve writing skills (Graham et al., 2018). Regarding the influence of writing on reading, engaging in activities such as writing about the materials students have read (effect size = 0.40 to 0.51), responding to a text (effect size =

0.77), and writing summaries of a text (effect size = 0.52) have been found to positively impact students' reading comprehension. Furthermore, teaching writing processes, text structure, and sentence construction has been shown to enhance students' reading comprehension (effect size = 0.18 to 0.27; Graham & Hebert, 2010). The instruction of spelling skills has also been found to improve word reading (effect size = 0.68; Graham & Hebert, 2010). Similarly, teaching reading has been shown to have positive effects on students' writing skills (effect size = 0.57), and students' reading experiences and interaction with written texts have been found to enhance their writing performance (effect size = 0.35; Graham et al., 2018). These findings from meta-analyses highlight the reciprocal relation between reading and writing, illustrating how improvements in one skill domain can positively impact the development of the other.

A substantial body of correlational research has established the existence of a relation between reading and writing skills, although significant variation has been observed in the magnitude of this relation. Recently, a comprehensive meta-analysis based on an extensive dataset of 395 studies, encompassing 2,265 effect sizes and 120,669 participants, revealed that reading and writing are overall strongly and positively related ($r = .72$; Kim et al., 2023). However, beyond this average estimate, the study identified systematic variations in reading–writing relations based on linguistic grain sizes/reading and writing subskills, developmental phases, orthographic depth and writing systems, and the specific reading and writing tasks employed. In particular, the relation between reading and writing was found to be stronger for lexical literacy skills, specifically word reading and spelling ($r = .82$), compared to discourse literacy skills such as reading comprehension and written composition ($r = .44$). Notably, the relation between word reading and spelling was even stronger ($r = .92$) when tasks had high reliability. Additionally, the reading–writing relation was observed to be stronger for primary grade students ($r = .82$) in comparison to university students and adults ($r = .69$). Furthermore, the relation between reading and writing was stronger in languages with alphabetic writing systems ($r = .83$) than in

languages with morphosyllabic writing systems (such as Chinese; $r = .71$). Regarding the specific measurement characteristics, the relation between reading comprehension and written composition varied depending on the measurement approach. The relation was found to be stronger when written composition was assessed by writing quality as opposed to writing productivity (text length). Similarly, the relation was stronger when reading comprehension was measured using multiple-choice, open-ended, and oral retell tasks compared to cloze tasks (Kim et al., 2023). These findings highlight that while reading and writing are indeed related, the nature of their relations is more nuanced than initially appears. Various factors, including linguistic grain size, developmental phase, orthographic depth/writing system, and measurement approach, moderate the strength of these relations. Thus, it is essential to consider these factors in order to fully understand the complex relation between reading and writing (Kim, 2022a).

Another line of research has focused on investigating the sources of reading–writing relations. The shared resources, skills, and knowledge described in the shared knowledge model (Fitzgerald, 2013; Fitzgerald & Shanahan, 2000) and the interactive dynamic literacy model (Kim, 2020b, 2022a) draw on theoretical models and extensive bodies of literature on reading and writing, respectively. Moreover, studies have explored predictors of word reading and spelling concurrently (e.g., Adams, 1990; Caravolas et al., 2001; Kim et al., 2013; National Early Literacy Panel, 2008; National Institute of Child Health and Human Development, 2000), with their findings aligning with the predictions of these theoretical models. However, the empirical evidence specifically examining the shared contributions of skills and knowledge to both reading comprehension and written composition is relatively limited. One recent exception is a study (Kim & Graham, 2022) that demonstrated the shared associations between multiple factors and both reading comprehension and writing outcomes. This study found that oral discourse skills (including listening comprehension, oral retell, and oral production); lexical literacy skills (word reading and spelling); higher-order cognitive skills (inference, perspective tak-

ing, and monitoring); oral language skills (vocabulary and grammatical knowledge); and domain-general cognitive skills or executive functions (working memory and attentional control) were all related to both reading comprehension and writing quality. In contrast, handwriting fluency specifically related to writing quality.

Another significant aspect regarding the reading–writing relation is the directionality of this relation—whether the relation is unidirectional, from reading to writing or from writing to reading, or if it is bidirectional. The interactive relations hypothesis of the interactive dynamic literacy model, as well as the findings from the meta-analyses of experimental studies conducted by Graham and Hebert (2010) and Graham et al. (2018), suggests the presence of bidirectional relations. However, results from correlational studies present a more mixed picture. Shanahan and Lomax (1986) investigated relations among various aspects of reading and writing skills using cross-sectional data from students in grades 2 and 5. They found that word analysis skills predicted spelling, which, in turn, related to reading vocabulary. Reading vocabulary was associated with vocabulary diversity in writing, and this diversity was linked to reading comprehension. While this study provided valuable insights, the use of cross-sectional data has limitations in addressing questions of directionality. Subsequent studies have utilized longitudinal data to shed light on this matter. Caravolas and colleagues (2001) followed British children from kindergarten (reception year) to grade 2 (Year 2) with four different times of assessment. Using path analysis, they found that phonological spelling at the outset of kindergarten predicted word reading in the middle of kindergarten, and in the subsequent assessments, word reading skill was predictive of later spelling. Ahmed and colleagues (2014) examined longitudinal data from grade 1 to grade 4, employing latent change score modeling. They investigated how performance status in reading and writing related to subsequent changes in skills of different linguistic grain size, including lexical skills (word reading and spelling), sentence skills (sentence reading comprehension and sentence writing), and discourse skills (passage comprehension and production). The findings indicated that

the directionality of reading–writing relations varied depending on linguistic grain size. Specifically, a reading-to-writing model provided the best fit for lexical and discourse skills, whereas a bidirectional model was more suitable for sentence skills. Another study by Kim and colleagues (2018) explored reading–writing relations using longitudinal data spanning grades 3–6. They employed bivariate growth modeling and found support for a reading-to-writing directionality. The initial status and growth rates of word reading predicted the growth rates of spelling. However, the status and growth rates of spelling did not predict the growth rates of word reading. Additionally, the initial status of reading comprehension predicted the initial status, but not the growth rates of writing, while the initial status of writing did not predict the status or growth rates of reading comprehension. In summary, experimental studies suggest that reading–writing relations are likely to be reciprocal. However, findings from correlational studies indicate that the directionality of these relations may differ depending on the linguistic grain sizes or specific reading and writing subskills being examined, and developmental phase. It should be noted that another potential factor that could influence the directionality is instructional context: The content of instruction, whether focused on reading or writing, might play a role in shaping the directionality of reading–writing relations. Although plausible, to my knowledge, there is little systematic investigation of the role of instructional environments on the directionality of reading–writing relations.

An important consequence of reading–writing relations is the co-occurrence of reading difficulties and writing difficulties (Kim, 2020b, 2022a). If reading and writing skills rely on shared skills and knowledge, which are hierarchically and interactively related, it is expected that reading and writing difficulties would co-occur (Kim, 2020b, 2022a). The interactive dynamic literacy model posits that this co-occurrence applies to all levels of linguistic grain size, such as the co-occurrence between word reading and spelling difficulties and handwriting difficulties, as well as the co-occurrence between reading comprehension difficulties and written composition difficulties (e.g., Berninger et al., 1994, 2008, 2015). Co-occurrence of

reading and writing difficulties is supported by recent meta-analytic findings, which demonstrated that children with reading difficulties often experience writing difficulties (Graham et al., 2021). Specifically, students with reading difficulties, when compared to those without reading difficulties, are more likely to exhibit lower writing quality (effect size = -0.95), shorter text length (effect size = -0.66), and poorer organization (effect size = -0.72), written vocabulary (effect size = -1.17), written sentence structures (effect size = -0.78), written syntax (effect size = -1.07), handwriting (effect size = -0.64), and spelling (effect size = -1.42 ; Graham et al., 2021). Moreover, the meta-analysis revealed that more severe spelling difficulties in the context of reading disabilities are evident in languages with greater orthographic depth (Graham et al., 2021).

The interactive dynamic literacy model further argues that if skills and knowledge are hierarchically and interactively related, multiple constraints and pathways can contribute to reading and writing difficulties, resulting in the co-occurrence of language difficulties (e.g., developmental language disorder) with reading and writing difficulties, as well as the co-occurrence of reading, writing, and language difficulties with impaired domain-general cognitive skills, including ADHD (see Kim, 2022a, for a review of evidence). In support of this hypothesis, a meta-analysis comprising 39 studies demonstrated that students with developmental language disorder exhibit lower writing quality (effect size = -0.92), shorter text length (effect size = -1.00), and poorer written vocabulary (effect size = -0.68), written grammar (effect size = -0.68), and spelling (effect size = -1.17) compared to students without developmental language disorder (Graham et al., 2020). These findings underscore the interconnectedness of reading and writing difficulties and their shared skills and knowledge, providing empirical evidence for the co-occurrence of these challenges.

While the evidence reviewed here confirms the relation between reading and writing, it also highlights that reading and writing are not identical skills. A meta-analysis conducted by Kim and colleagues (2023) demonstrates that reading–writing relations are not perfect. Consequently, not all indi-

viduals who experience reading difficulties will necessarily experience writing difficulties, and vice versa (Mayes & Calhoun, 2006). The dissociability between reading and writing skills should be considered, particularly in terms of linguistic grain size. The lexical literacy skills word reading and spelling are strongly related. Despite the strong relation, however, studies have shown that word reading and spelling skills are dissociable for students learning in shallow orthographies (e.g., Gangl et al., 2018; Moll et al., 2020; Papadopoulos et al., 2020; Torppa et al., 2017; Wimmer & Mayringer, 2002) and deep orthographies (Fayol et al., 2009; Furnes et al., 2019; Holmes & Quinn, 2009; Lee & Al Otaiba, 2017). This is likely because although both word reading and spelling tap lexical quality (Perfetti, 2007), spelling requires more precise and comprehensive knowledge compared to word reading (Ehri, 1997; Kim, 2022b). Let's take an example of the schwa sound (/ə/) in English, which is spelled in numerous ways including the individual vowel letters, *a*, *e*, *i*, *o*, *u*, vowel digraphs or teams, and the semi-vowel letter (*y*). In word reading, the primary task is to recognize the letters in a word and their associated sounds, such as the schwa sound found in words like *about* and *family*. In spelling, the primary task involves recognizing sounds (e.g., the schwa sound) and accurately identifying and retrieving the *specific* letter(s) and letter sequences that represent /ə/ (*about*, *family*, *bottom*, *supply*, *problem*, *analysis*, *ocean*, *famous*).

Dissociation in discourse skills, such as reading comprehension and written composition, is particularly pronounced (Kim, 2020b, 2022a). Reading comprehension and written composition involve distinct starting points and end products (Fitzgerald & Shanahan, 2000; Langer, 1986), which result in the utilization of cognitive processes, skills, and knowledge to a different extent. In reading, the starting point is decoding given words, and the reader's priorities lie in establishing an accurate and comprehensive representation of the text provided. The meaning-making processes in reading are guided by or constrained by the given text. On the other hand, in written composition, the starting point is the generation of ideas and their translation into written language. As a result, the writer's meaning-making

processes and priorities are centered around generating and presenting meaning in a coherent manner. Although both reading comprehension and written composition involve construction and integration of meaning (Kintsch, 1988), and passive and strategic meaning-making processes and activities, the nature of these processes differs between the two. In reading, the processes can be characterized as a "search for the meaning of the [given] text" (see Graesser et al., 1994, and Van den Broek et al., 2005, on their work on reading comprehension). In contrast, in writing, the processes can be characterized as an "effort to *generate and create* meaning." This critical distinction in starting points leads to variations in the extent of active and strategic meaning generation and meaning-making processes, as well as the utilization of associated knowledge, skills, and strategies (Fitzgerald & Shanahan, 2000; Kim, 2022a). For instance, a study conducted by Langer (1986) with students in grades 3, 6, and 9 revealed that students employed similar reasoning behaviors in both reading and writing. However, they differed in the patterns and frequency of employing these behaviors. In reading, their focus was on understanding and validating the connections between the text and the world, primarily based on the information provided in the text. In writing, they were more concerned with employing strategies to effectively convey their intended meaning and achieve their writing goals and sub-goals (Langer, 1986). In reading, attention to text features such as diction and wordiness is typically not as prominent unless there are issues or breakdowns in coherence. Conversely, in writing, these factors become significant considerations for the author (Hayes, 1996).

Directions for Future Work

Although substantial progress has been made in theory development and empirical research concerning reading–writing relations, there are still several areas that would greatly benefit from systematic investigation in future studies. One such area pertains to a theory-guided exploration of the nature of reading–writing relations. This includes a deeper understanding of the directional-

ity of these relations in relation to developmental phases, linguistic grain sizes, and instructional environment. As discussed earlier, the interactive dynamic literacy model proposes bidirectional relations between reading and writing, as well as variations in the strength of these relations depending on linguistic grain size and developmental phase (as reviewed above). To advance our understanding, it is crucial to examine the intersection between developmental phase, linguistic grain size, and instructional environment, and determine whether the directionality of reading–writing relations differs across these factors. For example, it is worth exploring whether the directionality varies for word reading and spelling versus reading comprehension and written composition, considering the different developmental phases of reading and writing and various instructional environments. These nuances can reveal valuable insights into the dynamic nature of reading and writing development.

Further research is necessary to enhance the generalizability of theoretical models of reading–writing relations and previous findings across diverse populations and subpopulations. Languages vary in oral and written language characteristics, including orthographic depth. It is essential to expand the scope of investigation to languages with distinct linguistic and orthographic features. For example, the structural relations proposed in the interactive dynamic literacy model are expected to apply universally to all languages and writing systems. However, the relative contributions of skills and knowledge are posited to vary depending on the linguistic and orthographic characteristics (see Kim, 2020b, 2022a). Recent meta-analytic findings have demonstrated that the strength of the reading–writing relation differs between languages with alphabetic writing systems and languages with morphosyllabic writing systems (Chinese; Kim et al., 2023). Additionally, another meta-analysis has highlighted the influence of orthographic depth on the severity of spelling difficulties for individuals with reading difficulties (Graham et al., 2021). To advance our understanding, future research should explore language- and writing-system-general, and language- and writing-system-specific aspects of reading–writing relations. This will contribute to a comprehensive understand-

ing of the complex interplay between reading and writing skills across different linguistic and orthographic contexts.

Furthermore, it is crucial to investigate important subpopulations, such as individuals with learning disabilities, as well as those learning to read and write in unfamiliar languages (e.g., L2 learners). Extensive research exists on individuals with reading and writing disabilities (e.g., meta-analysis by Graham et al., 2021), but the literature concerning L2 learners tends to largely focus on adults (e.g., Carrell & Connor, 1991; Cho & Brutt-Griffler, 2015; Pae, 2019) and studies on young writers are extremely limited in number. Future studies should address this gap by examining the unique challenges and factors influencing reading and writing development in L2 learners across developmental phases.

Another critical area for future research is the exploration of how reading–writing relations can aid in the identification and implementation of effective instructional approaches for individuals who struggle with reading and writing development, including those with dyslexia and difficulties in reading comprehension and written composition. Accurate and early identification of children at risk of developing reading and writing difficulties is essential for timely and targeted instructional interventions within the framework of multi-tiered systems of support (MTSS; Al Otaiba et al., 2014; Fletcher et al., 2020) and prevention models in reading (Catts & Hogan, 2021). While there is a substantial body of literature on the identification of individuals with reading disabilities, previous studies have not systematically considered writing skills. Given the interrelated nature of reading and writing and the co-occurrence of difficulties in both domains, an important question arises: Can information about students' performance in reading and writing improve the accuracy of identifying their specific difficulties in reading and/or writing? This line of research holds promise as it capitalizes on theoretical models and empirical evidence regarding reading–writing relations, although it is still in its early stages. One example of such work involves utilizing students' spelling data to enhance the accuracy of identifying students who struggle with reading (Kim & Petscher, 2023). In a longitudinal study

spanning from kindergarten to grade 2, Kim and Petscher (2023) found that students' spelling performance at the end of kindergarten improved the accuracy of identifying their reading difficulties in kindergarten and grade 1 beyond information solely based on word reading performance. This line of inquiry can be expanded to include discourse literacy skills (e.g., the relation of features of written composition to reading comprehension, Zagata et al., 2023; or how difficulties in reading comprehension can inform identification of students' needs in written composition).

Exploring the integration of reading and writing assessments for more accurate identification of individuals with reading and writing difficulties has the potential to inform targeted intervention strategies and provide a more comprehensive understanding of students' literacy profiles. By incorporating insights from theoretical models and empirical findings on reading–writing relations, future research can contribute to the development of evidence-based identification practices and instructional approaches that effectively address the specific needs of individuals with reading and writing difficulties.

Implications for Instruction

The extensive body of literature on reading–writing relations explored in this chapter highlights the potential for instruction that leverages these connections to yield a robust synergistic effect, enhancing both reading and writing skills (Kim, 2020b, 2022a; Langer & Flihan, 2000; Tierney et al., 1989). It is important to note that this perspective does not diminish the significance of targeted reading-specific and writing-specific instruction. Instead, it underscores the value of integrating and intertwining these skills in instruction, as both reading and writing involve the interaction between the mind and texts. By purposefully incorporating and blending reading and writing instruction, it is likely that we can foster the development of reading and writing skills, critical thinking abilities, overall learning outcomes, and knowledge acquisition. Indeed, empirical studies have demonstrated the benefits of teaching reading and writ-

ing together. Research reviews have shown that integrated instruction that encompasses both reading and writing yields improvements in both domains (see Shanahan, 2016, for a review). Furthermore, balanced instruction that attends to both reading and writing has been found to enhance reading performance (average effect size = 0.39) and writing performance (average effect size = 0.37; Graham et al., 2017). Incorporating reading and writing instruction synergistically not only nurtures writing skills but also promotes a deeper understanding of texts. By recognizing and embracing the interconnected nature of reading and writing, educators can employ instructional approaches that enhance students' overall literacy development and equip them with the necessary skills for success in both academic and real-world contexts.

Integrated reading–writing instruction refers to a purposeful and systematic approach to teaching reading and writing that fosters synergistic effects beyond individual instruction in reading or writing alone. This approach goes beyond simplistic practices, such as having students answer comprehension questions in short writing tasks. According to theoretical models and associated evidence, there are several key features that contribute to the effectiveness of integrated reading–writing instruction. First and foremost, integrated instruction should explicitly and systematically address shared skills and knowledge. In the realm of word reading and spelling, explicit instruction in phonological awareness, orthographic awareness, and morphological awareness is crucial (Caravolas et al., 2001; Kim et al., 2013; National Early Literacy Panel, 2008). For example, incorporating targeted spelling instruction and engaging students in word-building and word-sorting activities that focus on consonant digraphs like *th*, *sh*, and *ch* can effectively support the development and reinforcement of desired phonological and orthographic skills. Likewise, the explicit integration of morphological instruction in word reading and spelling, for example, the pronunciations/decoding and spelling of past-tense forms (*-ed*), can be beneficial (see Kim, 2022b, for further details).

In the domain of reading comprehension and written composition, integrated instruction should encompass various components,

such as oral language development, higher-order cognitive skills, regulation strategies, and background knowledge. This includes teaching self-regulation strategies for both reading and writing, such as clarifying, monitoring, visualizing, making connections, summarizing, evaluating, planning, goal setting, posing questions, and activating prior knowledge (Olson et al., 2022). Additionally, evidence-based practices involve incorporating writing opportunities within reading instruction or integrating reading materials into writing instruction (Graham & Hebert, 2010). A crucial aspect of integrated instruction is teaching students about text structure, as it plays a significant role in both reading comprehension and written composition. Instruction should explicitly introduce and identify different structural elements in texts during reading activities, and students should then apply this knowledge in their writing, whether it involves synthesizing information from reading sources (Harris et al., 2023; Kim et al., 2025) or writing in different genres that do not rely on reading source materials (Philipakos, 2022). Integrated instruction should not be limited to English language arts but extended across content areas. For instance, integrated reading and writing instruction can be implemented in social studies (Duke et al., 2022), science (Kim et al., 2025; Harris et al., 2023; Lammert & Hand, 2022), and math (Powell & Hebert, 2022), allowing students to apply their reading and writing skills across various subjects. Furthermore, with the advancement of digital tools for learning, it is important to explore the affordances offered by these tools, such as peer collaboration in online inquiry, to systematically integrate reading and writing in digital contexts (Sonia et al., 2022).

To optimize the impact of integrated instruction, it is essential to explicitly highlight and emphasize the connections between reading and writing, fostering students' awareness of how these two domains intersect and mutually support each other (awareness of reading–writing connections). Students may not readily recognize the utility and transfer of skills and knowledge from reading to writing, and vice versa, and may struggle to apply what they have learned in one context to the other (Kim, 2022a; Shanahan, 1988). This is particularly impor-

tant for reading comprehension and written composition (Kim, 2022b), as the relation between these two skills is not as strong as that between word reading and spelling (Kim et al., 2023). Thus, explicit and systematic instruction that enhances students' metaknowledge and awareness of reading–writing connections becomes imperative. The awareness of reading–writing connections encompasses both metaknowledge and pragmatic aspects, as discussed in previous research (Fitzgerald & Shanahan, 2000; Langer, 1986). I take this further to argue that, in order for students to effectively capitalize on such connections, it is crucial to cultivate an *awareness* that extends beyond knowledge of the connections. Students need to understand how the strategies and skills they acquire in the context of comprehending texts can be applied to writing texts or vice versa in service of communicative goals and functions. This awareness should be developed through explicit instruction that helps students see the practical relevance of reading–writing connections.

Furthermore, this awareness should begin with teachers' own understanding and awareness of reading–writing connections. Teachers need to maintain a deep and practical knowledge of reading and writing development, as well as a comprehensive understanding of the nature of their interrelations, the challenges associated with reading and writing difficulties, and effective instructional strategies for teaching both domains separately and in an integrated manner. By fostering teachers' awareness and expertise, they can effectively guide students in navigating the interconnected landscape of reading and writing, enabling them to harness the benefits of integrated instruction.

Closing

In conclusion, the theoretical models and research examined in this chapter clearly indicate that there are undeniable connections between reading and writing. However, these connections are far from simple or one-dimensional; they are complex and multidimensional. The existing body of literature highlights the need for further exploration to uncover the intricacies of reading–writing relations. Moreover, it calls for the develop-

ment of effective and feasible integrated approaches to teaching both reading and writing. As educators and researchers continue to delve into this important area, it is crucial to embrace a comprehensive understanding of the interplay between reading and writing, ultimately enhancing literacy instruction and fostering the development of proficient readers and writers.

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