Required Listening

The effects of using audio- and karaoke books in fiction education at Dutch vmbo schools

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Introduction

In many western countries, sustained reading activity is diminishing. People are increasingly favouring short-form text over long-form text. Digital media and online content are often absorbed with little attention. Especially during online activities, it is common to task-switch every two to three minutes, a type of attention that has been described as 'continuous partial attention'.[1] In this rapidly changing, increasingly digital environment, traditional literacy has become fragmented into various new ways of engaging with content, both textual and non-textual. Digital readers obtain useful skills from engaging with new media: being able to quickly recover and skim information, for example, or the ability to communicate in a multimodal way.[2] However, the cognitive and metacognitive abilities that allow the concentrated, submerged form of reading known as deep reading are becoming weaker. Today, many people experience issues with long-form reading. This is often due to a lack of cognitive patience, fed by the ongoing stream of information that the twenty-first century offers.[3]

With the decline of deep reading practices, not only literacy skills, but a whole set of cognitive abilities diminishes, which has significant societal and personal impact. Students who have no reading routine and do not engage in long-form reading might thus become the victim of unintended effects. In The Netherlands, the group most vulnerable for this development are students in preparatory vocational education, known as vmbo.

Unsurprisingly, reading intervention for this group is a prominent topic of debate. One way in which reading skills could perhaps be trained and reading behaviour could be stimulated, is by using alternative reading channels, particularly auditory reading. As of recently, audiobooks and karaoke books are being offered in some Dutch schools as an alternative reading method, particularly for students with reading- or visual impairments.[4]

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1 M. Wolf, *Tales of Literacy for the 21st century,* (Oxford: Oxford University Press, 2016), pp. 145-146.
2 P. Ventimiglia and G. Pullman, 'From Written to Digital: The New Literacy' *EduCause Review*, 7 March 2016. <https://er.educause.edu/articles/2016/3/from-written-to-digital-the-new-literacy> (21 July 2020).
3 Wolf , *Tales of Literacy for the 21st century,* pp. 148-153.
4 'Titels in de Luisterbieb', *De Luisterbieb,* <https://www.onlinebibliotheek.nl/luisterboeken/titels-in-de-luisterbieb.html> (10 October 2020). Karaoke books (sometimes referred to as 'talking books') are a form of digital reading where the text can be listened to while being simultaneously highlighted on screen.

The question remains whether reading via other modalities has similar effects on literacy acquisition as a print book, and whether it leads to the level of reading performance that is required for vmbo-students. This thesis is meant to create an insight in the intended and unintentional effects of auditory 'reading' compared to print reading, and answer the question whether or not auditory reading can actually increase reading performance or reading motivation for vmbo-students.

Literacy in vmbo schools

Every three years, the programme for international student assessment (PISA) measures the literacy levels of fifteen-year old students globally. Literacy is defined as '[the] students' capacity to understand, use, evaluate, reflect on and engage with texts in order to achieve one's goals, develop one's knowledge and potential, and participate in society.'[5] In the twenty-first century, many Dutch adolescents fail to master the reading level expected for their age and educational level. In fact, within the last PISA classification, 24 percent of Dutch participants fell into category 1a, b or c, scores that indicate reading capabilities so insufficient that basic literacy requirements are not met.[6] Literacy scores of Dutch adolescents have been declining rapidly amongst all secondary school students, but those in the Dutch preparatory vocational tracks are especially vulnerable to low literacy.[7] The preparatory vocational level, known as vmbo, is followed by around half of Dutch secondary school students, making it the most prevalent educational track.[8] The four-year vmbo education prepares students for further careers and technical education. It contains two general levels, *vmbo-tl* (theoretical) and *vmbo-gl* (theory and practice combined), as well as two practice-based levels, *vmbo kader* and *vmbo basis*.[9]

Naturally, the group of students enrolled at a vmbo-level is large and diverse. Many

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5 OECD, *PISA 2018 Results (Volume I): What Students Know and Can Do*, PISA, (Paris: OECD Publishing, 2019), p. 27.

6 'How does PISA for Development measure reading literacy?', *PISA for Development Brief,* December 2016. <https://www.oecd.org/pisa/pisa-for-development/8%20-%20How%20PISA-D%20measures%20reading%20literacy.pdf> (14 July 2020).

7 OECD, *PISA 2018 Results (Volume I),* p. 133.

8 'Rapport De Staat van het Onderwijs 2019: Onderwijsverslag over 2017/2018', *Inspectie van het onderwijs, Ministerie van Onderwijs, Cultuur en Wetenschap,* 10 April 2019. <https://www.onderwijsinspectie.nl/documenten/rapporten/2019/04/10/rapport-de-staat-van-het-onderwijs-2019> (10 July 2020), p. 89.

9 As of 2021, vmbo-gl has been merged with vmbo-tl.

leave their secondary education with an appropriate reading level, but vmbo-students generally score below the international literacy average.[10] Especially in the practice-based tracks the percentages of students who fail to meet the reading requirements for PISA literacy level 2, or basic literacy, are concerningly high. In 2018, the average reading score of vmbo basis students at the PISA test was 378 points, which is the lowest possible reading level. Around forty percent of participants in vmbo kader also obtained scores within level 1a to 1c. In the theoretical vmbo-levels, this number is around a quarter.[11] This setback in literacy skills is frequently tied to the reduced time spent on print reading.[12]

On a national level, the reference framework seen below is used in The Netherlands. The majority of vmbo-students master the 2F level at the intended moment.[13] However, fourteen percent of vmbo-students still read at a primary school level at the end of their secondary education.

Level[14]	Fundamental qualities required at:
1F	End of primary school
2F	End of vmbo, mbo-2, mbo-3
3F	End of mbo-4 and havo
4F	End of vwo

Table 1: Reference levels for language in Dutch education.[15]

The fiction effect

The reading of fictional texts is known to have favourable effects on adolescents' literacy levels. Vmbo-students who spend more time reading fictional texts usually score higher in

[10] J. Gubbels, A. van Langen, N. Maassen and M. Meelissen. *Resultaten PISA-2018 in vogelvlucht* (Enschede: Universiteit Twente, 2019), p. 20.
[11] Ibid., p. 19.
[12] Leesmonitor, *Waarom lezen we minder boeken*? (2021), <www.leesmonitor.nu/nl/waarom-lezen-we-minder-boeken> (16 January 2021).
[13] Leesmonitor, *Leesprestaties kinderen*. (2020). < www.leesmonitor.nu/nl/leesprestaties-kinderen> (21 July 2020).
[14] Aside from the preparatory vocational tracks, the Dutch education system consists of the levels havo (higher general secondary education) and vwo (pre-university education).
[15] Table by me, data via 'Referentieniveaus taal/niveauopbouw', *SLO,* 28 January 2020, <https://www.slo.nl/thema/meer/taal-rekenen/taal/> (21 July 2020).

vocabulary, textual understanding, basic reading skills, technical reading and spelling.[16] Fiction reading is compulsory in the Dutch school system, and vmbo-students are required to reflect on a minimum of eight fictional works (of which at least four have to be books for adults).[17]

Teachers indicate that fiction reading is not a popular subject, as many vmbo-students believe that reading is dull.[18] The introduction of audiobooks is one of the various reading promotion initiatives that have been developed in the past years. The practice is debated. Audiobooks have their own inherent properties, which lead to a different reading experience than print books offer. Vmbo-teachers generally have a positive attitude towards auditory 'reading'; a significant percentage already reads aloud in class and notices student engagement.[19] Audiobook-reading is considered to be an accessible way of reading, as it might give students who struggle with literacy – who may otherwise not do the required reading at all – the opportunity to be intrigued by a story. Initiatives such as *De Luisterbieb* (The Listening Library), have therefore begun to offer books appropriate for secondary school students' required reading list in audio format.[20] However, the audiobook also has its opponents. The idea that audiobooks are 'cheating' is quite prevalent. There are studies that elaborate on the effects of audiobooks, but they often discuss the properties of the audiobook in their own context.[21] Therefore, it remains largely unclear to what extent audiobooks are a valuable substitute for print reading. In Chapter One, a general overview of the effects of reading long-form fiction will be provided, specifically within the context of the vmbo-classroom.

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16 De Koninklijke Bibliotheek en Stichting Lezen voor Kunst van Lezen, 'Meer lezen, beter in taal', September 2015. <https://www.lezen.nl/nl/publicaties/meer-lezen-beter-in-taal-vmbo> (20 July 2020), pp. 11- 12.

17 'Nederlandse taal vmbo: Vakinformatie staatexamen 2020', *College voor Toetsen en Examens*, 2 April 2019. <https://maken.wikiwijs.nl/userfiles/bd156862db9da8e630c22ae3f3a80f9ff6831928.pdf> (24 July 2020).

18 Lezen op het vmbo: een stand van zaken', *DUO Onderwijsonderzoek*, (Amsterdam: Sitchting Lezen, 2017), pp. 24-25.

19 Ibid. p. 14.

20 'De Luisterbieb' (the listening library) is a library initiative that offers audiobooks 'for the list'. It is unclear whether teachers encourage students to use commercial audiobook vendors. 'Titels in de Luisterbieb.', *De Luisterbieb,* <https://www.onlinebibliotheek.nl/luisterboeken/titels-in-de-luisterbieb.html> (10 October 2020).

21 See for example N.A. Thooft, 'The Effect of Audio Books on Reading Comprehension and Motivation.' Dissertation. (Duluth: The College of St. Scholastica, 2011), T. Knutson, 'Exploring the Influence of Audiobooks on Adolescent Readers' Motivation and Reading Comprehension', *Illinois Reading Council Journal* 47.4 (2019) or G. Wolfson, 'Using Audiobooks to Meet the Needs of Adolescent Readers', *American Secondary Education*, 36, no. 2 (2008).

The question whether audiobooks can have a significant role in vmbo-level curricula will be examined through a comparative literature analysis. When discussing reading fiction, it is common to think of the contents of books. One might thus ask: why would it matter if a student consumes one and the same text through their headphones instead of a print book? However, as proposed by Mangen and Van der Weel in 'The evolution of reading in the age of digitisation: an integrative framework for reading research', reading can be studied through two fundamental tenets, respectively:

> *'(a) Reading is interaction with a technology/device with specific interface affordances and (b) Cognition, hence reading, is embodied– it entails physical (in particular, manual/haptic) interaction with a device (e.g. tablet; e-reader; book). These assumptions provide a theoretical backdrop and a minimal common denominator across the levels and dimensions of the framework.'*[22]

The reading process is not limited to contents. The technologies used to access a text impact the reading experience and thus it makes sense to expect a different outcome. The device has affordances; possibilities that arise during the interaction between a person, the object used and the environment it is used in.[23] This research thus emphasises the properties of each technology, and how the different methods of reading influence the reading process both cognitively and in terms of reading motivation.

Building on the two principles set out by Mangen and Van der Weel, reading can be explored along a set of dimensions. These dimensions include, amongst others, the attentional; cognitive; emotional; phenomenological and ergonomic.[24] The framework will be incorporated to define the differences in reading acts. Thus, reading will be approached from an angle that considers embodied reading, modality-specific affordances, impact of (environmental) factors and the way these affect mental interaction with the text. Mental interaction entails the levels of mental resources used, comprehension level and level of immersion in the text.

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[22] A. Mangen and A. van der Weel, 'The evolution of reading in the age of digitisation: An integrative framework for reading research', *Literacy*, 50.3 (2016), p. 119.
[23] A. Hampson, A.H. Lundh and G.V. Johnson, 'The Use of Digital Talking Books by People with Print Disabilities: A Literature Review', *Library Hi Tech* 33.1 (2015), pp. 54-64.
[24] Mangen and Van der Weel, 'The evolution of reading in the age of digitisation', p. 120.

Chapter Two contains an analysis of print reading from these various angles, and in Chapter Three the same is done for audiobook 'reading'.

In Chapter Four the effects of the types of reading will be examined within the contexts of a vmbo-level classroom: does the audiobook have particular properties that could engage vmbo-students? In this chapter, attention is given to reading motivation. Realistic obstacles for teachers and students will be disclosed.

In Chapter Five, a third and quite underexplored form of reading will be added to the comparison: dual channel reading. The idea is that the affordances of multiple channels might be combined during the reading process. For students with documented reading disabilities, a book format called the karaoke book or talking book is on the market. This so-called karaoke book is a form of digital reading that – alike to a karaoke machine – plays an audio book while the text on the screen follows along, so the reader can access the text through dual channel reading.

Limitations

Students engage with fictional, literary texts in a different way than they would with educational textbooks. In order to limit the scope of this research, only fictional books of the type that vmbo-students are allowed to read for their required reading list will be taken into consideration. These are long-form books deemed appropriate for (young) adults. It might be relevant to note that when discussing the properties and functions of print reading, this encompasses print reading only and does not entail the reading of e-books.[25] There are no quantitative studies that determine the ratio of paper-based readers and e-book readers in school. However, the paper book has significant popularity over the e-book amongst Dutch youth.[26] It is unlikely that this would be any different within the context of required reading, an assumption that can be additionally supported with the argument that e-reading 'for the list' is still in a developmental phase.[27]

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[25] For research that compares print versus e-reading, see for example: A. Mangen et al, 'Reading Linear Texts on Paper versus Computer Screen: Effects on Reading Comprehension', *International Journal of Educational Research* 58 (2013), pp. 61-68.

[26] 'Leesgedrag e-boeken', *Leesmonitor, 2020.* <www.leesmonitor.nu/nl/leesgedrag-e-boeken> (7 July 2020).

[27] P. Kreutzer, and P. Sikkema, 'Het succesvol implementeren van digitaal lezen en luisteren voor de lijst in het VO', Dutch Royal Library, December 2019 <https://docplayer.nl/183513791-Het-succesvol-implementeren-van-digitaal-lezen-en-luisteren-voor-de-lijst-in-het-vo-ingekorte-versie.html> (7 July 2020).

The term audiobook will be used to describe recorded versions of the same narratives that could also be read as print text for required reading at school. This excludes, for example, made-for-radio narratives or stories that have been published in audio-format only.

Lastly, I have been unable to find representative evaluations on audiobook use by vmbo-students or Dutch secondary school students. I believe that a thorough study of students' self-perceived experiences with using audiobooks for school would have been a compelling addition to my research, a note I wish to add for future reference.

Chapter One: Engaging with long-form fiction at the vmbo

As mentioned in the introduction, many vmbo-students have low literacy and struggle with reading long-form text, which forms a significant obstacle both in- and outside of school. Educational researchers and professionals continuously search for stimulating techniques to improve this situation.[28] Before discussing the effects of modal-specific forms of reading in Chapter Two and Three, this chapter is an overview of the effects of engaging in long-form fiction, specifically at vmbo-level. The chapter will also give insight in common issues experienced at vmbo-schools, and clarify the intended aims with which educational specialists offer fiction education to these students. While discussing these themes, it is important to remain aware of the multicomponent nature of literacy, as well as the distinction between foundational skills and language components. Foundational skills in this context mean the cognitive skills required to read, such as concentration and word reading (decoding). Language components constitute language, such as syntax, grammar and semantics. In the approach of low literacy, this contrast between ability and understanding is relevant.

Reading activity can be catalysed by a variety of factors. In a school setting, however, fiction education is offered with specific aims in mind. The first goal is to improve (high) literacy skills.[29] This includes skills such as inference-making, understanding non-linear narratives and metaphorical speech. Another important reason to embed fiction in the educational system, is to spark the students' interest in fiction reading.[30] There, the aim is to help students become intrinsically stimulated to read, so they will create a reading routine outside of school. Effects of frequent long-form reading take place on both a personal and societal level. An intended personal goal may be knowledge expansion, whereas a more unintended effect of long-form reading is improving the ability to stay focused.[31] Reading can also lead to the more unintentional, societal effect of increasing

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[28] Examples of these initiatives can be found on *Lezen in het vmbo.* <https://www.lezeninhetvmbo.nl>. (22 July 2020).
[29] I. Bolscher et al, *Literatuur en fictie: een didactische handreiking voor het voortgezet onderwijs,* (Leidschendam: Biblion, 2004). pp. 23-24.
[30] Ibid.
[31] A. van der Weel, 'Where will the digital turn in reading take us?' in *Lux librorum: Essays on books and*

readers' level of empathy, for example.[32] This thesis does not aim to find out if engaging with long-form narratives is 'good' or 'important'. Such a subjective judgement is highly dependent on the purposes for which one reads or listens to a text. However, engaging with long-form fictional narratives does have certain inherent effects, which are to be discussed here.

Long-form fiction and supramodal processing

When reading or listening to a long-form narrative, the areas in the brain that process language are activated.[33] A large part of these processing activities are embedded in the same systems, so-called *supramodal* language processing activities.[34] Supramodal processing indicates that the input is processed in brain areas that function similarly for the input of more than one sensory modality. This part of the language network thus functions independently of input modality.[35] Equally, modal-specific activity exists, in which the modality influences the manner of neurological processing. Modal-specific processing activity of print reading and auditory reading will be thoroughly discussed in Chapter Two and Three. Firstly, the supramodal processing activities are to be discussed in this chapter.

The effects of engagement with fictional (long-form) narratives have been researched from various perspectives and in various scientific fields. In narrative theory, attention has been given to the cognitive processes at play while engaging with stories. The operations behind textual processing have been a key point of discussion in hermeneutic theory. It is by now broadly accepted that one relies on one's own background knowledge to understand and contextualise spoken or written text. When confronted with long-form narratives, one has to make inferences, and one is constantly forced to shift or expand one's perspective. The famous phenomenological approach of literary reading by Wolfgang Iser aptly describes how a literary text is in itself made up out of 'component parts': intentional correlatives that are connected by the author, but also aim at something behind the text.[36]

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history for Chris Coppens ed. Goran Proot et al. (Mechelen: Flanders Book Historical Society, 2018), p. 234.

[32] Ibid.

[33] For a thorough description of neurological language processing, see chapters Two and Three.

[34] M. Berl et al.,'Functional Anatomy of Listening and Reading Comprehension during Development', *Brain and Language* 114, no. 2 (2010), pp. 115-25.

[35] Ibid.

[36] W. Iser, 'The Reading Process: A Phenomenological Approach', *New Literary History,* Vol. 3.2, On

This 'unwritten' part, the connection between the correlatives, is revealed to the reader due to their own participation. The reader uses their memories and imagination to tie the text together and actively interpret what they read.

> *'[T]he reader, in establishing these interrelations between past, present and future, actually causes the text to reveal its potential multiplicity of connections. These connections are the product of the reader's mind working on the raw material of the text, though they are not the text itself-for this consists just of sentences, statements, information, etc.'*[37]

Research suggests that a large part of the reading process as Iser discloses it, is not that different when listening to a spoken narrative.[38] A reader's interaction with a narrative is supramodal to a certain extent. Therefore, it is relevant to discuss the functions of narrative as a supramodal activity to explain why vmbo-students benefit from engaging with long-form fictional texts.[39]

Earlier research has suggested a so-called 'fiction effect', which implies that the frequency with which young people read fiction affects their literacy development more than reading any other type of text.[40] One simple factor causing this, is that fictional narratives usually contain a more complex vocabulary and syntax than, for example, news articles or day-to-day speech do. The long-form itself, however, also plays a crucial role. In order to follow a longer, more complex narrative, the reader is required to rely on a variety of cognitive skills. While reading the reader (subconsciously) constructs a situation model to contextualise the text, for which they make inferences using their own world knowledge and expectations.[41] Engagement of the memory and attention retention are prerequisites. Although readers are seldomly able to recall a long-form narrative's surface structure,

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Interpretation: I (1972), pp. 279- 299.

[37] Ibid, p. 283.

[38] See for example Berl et al 'Functional Anatomy of Listening and Reading Comprehension during Development', F. Deniz et al., 'The Representation of Semantic Information Across Human Cerebral Cortex During Listening Versus Reading Is Invariant to Stimulus Modality', *The Journal of Neuroscience 39,* no. 39 (2019), pp. 7722-7736, or M. Regev, et al., 'Selective and Invariant Neural Responses to Spoken and Written Narratives', *The Journal of Neuroscience* 33, no. 40 (2013), pp. 5978-5988.

[39] For convenience, in this chapter this engagement with fiction will be simply described as 'reading', when referring to both print and audiobook reading, unless stated otherwise.

[40] J. Jerrim and G. Moss, 'The Link between Fiction and Teenagers' Reading Skills: International Evidence from the OECD PISA Study', *British Educational Research Journal* 45, no. 1 (2018), pp. 181-200.

[41] R.A. Zwaan and G.A. Radvansky, 'Situation models in language comprehension and memory', *Psychological Bulletin 123*, (1998), pp. 163-165.

events in the story are remembered, and when the story refers to earlier developments, this information can be evoked again.[42] Forming a coherent collection out of a long list of component parts given by the author is a cognitively demanding job.

Overall, listening to or reading words activate the brain's language network at a surpamodal level in five major linguistic systems: semantics, syntax, phonology, morphology and pragmatics. Long-form narratives improve both passive language comprehension and active language development, such as narrative skills, but are also good practice for our memory and attention span. These supramodal effects are thus activated in the aforementioned linguistic systems in both audio- and print reading. Still, there are vast differences between the modalities, and they affect readers in a different manner.

Print reading and development for vmbo-students

When discussing vmbo readership, the focus lies on those who are already combatting or are at risk for low literacy; a phenomenon that is more common at this level than in other Dutch secondary school levels. It might be challenging to refrain from generalisations, but it must nonetheless be remembered that the issues discussed cannot be attributed to every individual school or student.

Although for adequate readers print reading may feel completely natural, the print book is a human-made technology. Reading, unlike listening, is not an inherent human ability. Reading skills have to be taught and trained. When all goes as planned, this results in adequate readers with well-developed decoding skills, who can efficiently read at word level, as well as properly comprehend the text. However, this development takes practice, time and resources. When this development falters, a student will acquire a literacy deficit.[43]

Struggling readers tend to underperform on all aspects of literacy: fluency, vocabulary, comprehension and word level (phonologic and phonemic) skills.[44] This

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[42] L. Bernaerts et al., *Stories and Minds: Cognitive Approaches to Literary Narrative.* (Lincoln: University of Nebraska Press, 2013), pp. 30-31.

[43] A deficit distinguishes itself from a literacy impairment or -disability by being the result of underdevelopment, whereas the latter category is the result of neurological conditions. See: 'Learning disabilities and deficits', *Washington State Department of Social and Health Services*, https://www.dshs.wa.gov/esa/social-services-manual/learning-disabilities-and-deficits. (14 August 2020).

[44] M.F Hock., et al, 'What Is the Reading Component Skill Profile of Adolescent Struggling Readers in Urban

means that they typically underperform in any code-related task.[45] This poses a difficulty in an educational environment, where reading is a necessary skill to interpret learning material, assignments and test questions, as well as in daily life, were reading abilities are necessary for professional and practical communication. Struggling readers often develop a negative association with (fiction) reading. They spend a lot of energy on reading at word level, but the bigger picture remains unclear. This makes reading a frustrating and demotivating activity.[46]

The Matthew Effect

A large part of literacy development takes place during the pre-primary and primary school ages.[47] Struggling vmbo-students have thus likely obtained a reading deficit in primary school. This idea is supported by vmbo-teachers, who note that from the first day on, there appears to be a gap between the students' abilities and the expected reading level, which has by then become difficult to bridge.[48] An upturn is hindered because vmbo-level students are not required to read as much as students in the levels havo and vwo, and are in school for a shorter period of time. It is a typical display of the Matthew effect, where those who lack fundamental literacy skills at an early stage will likely not become ardent readers. This then causes their literacy development to stagnate.[49]

Literacy is a vital skill, which notably impacts economic and societal opportunities. In the Netherlands, people with low literacy are prone to economic hardship and are thrice as likely to live in long-term poverty as literate peers with a similar demographic background.[50] Naturally, the correlations between literacy and socio-economic status are

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Schools?', *Learning Disability Quarterly* 32, no. 1 (February 2009), pp. 33-35.

45 A.E. Baroody, and Diamond, K. E., 'Links Among Home Literacy Environment, Literacy Interest, and Emergent Literacy Skills in Preschoolers At Risk for Reading Difficulties.' *Topics in Early Childhood Special Education* 32, no. 2 (2010), pp. 80-81.

46 C. Hebert and C. Fleener, 'Understanding Fourth Graders' Decline in Reading Motivation from Students' and Teachers' Perspectives.' Dissertation. (Norfolk: Old Dominion University, 2011.), pp. 18-19.

47 J.R. Hurford, 'The Evolution of the Critical Period for Language Acquisition', *Cognition* 40, no. 3 (1991), pp. 159-201.

48 De Koninklijke Bibliotheek en Stichting Lezen voor Kunst van Lezen, 'Meer lezen, beter in taal', p. 7.

49 J. Buckingham. , K. Wheldall, and R. Beaman-Wheldall. 'Why Poor Children Are More Likely to Become Poor Readers: The School Years.' *Australian Journal of Education* 57, no. 3 (2013), pp. 196-197.

50 I. Christoffels et al. 'Over de relatie tussen laaggeletterdheid en armoede', (Den Haag: *Stichting Lezen & Schrijven.* 2016.), pp.6-7.

complex and intertwined. For example, socio-economic status in turn influences the amount of reading that happens at home. Households with fewer resources – in the sense of financial means, time and abilities – tend to contain a weaker reading environment.[51]

Children without much of a literacy environment at home are dependent on education to acquire these skills. Unfortunately, schools in lower-income neighbourhoods or with less qualified teachers tend to score poorly when it comes to literacy education.[52] This reinforces the Matthew Effect, as the vmbo is made up of more children from lower socio-economic backgrounds than other school levels.[53] In underprivileged neighbourhoods, the large majority of teachers indicate that they frequently encounter language- and learning problems amongst (primary) school children.[54] The number of vmbo-students with serious learning impairments has been estimated at twenty to twenty-five percent.[55] This often leads to high concentrations of students with learning deficits being placed together.[56] A demographic group that demands extra attention are students with a non-western migration background. This group is overrepresented at the vmbo, and especially vulnerable to low literacy. Compared to students without a non-western migration background, this group is disproportionally affected by poverty, often grows up and goes to school in lower income neighbourhoods and over forty percent of students with a migration background in the Netherlands have low maternal education.[57]

The adolescent brain and the duality of reading abilities

Many studies on literacy improvement focus on primary school students. Various theories

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51 Buckingham et al, 'Why Poor Children Are More Likely to Become Poor Readers: The School Years', pp. 193, 203.

52 'Welke kinderen zijn goed in lezen?', Leesmonitor (2020). <www.leesmonitor.nu/nl/welke-kinderen-zijn-goed-in-lezen->0 (20 July 2020).

53 H.C.M van den Bulk, *Later kan ik altijd nog worden wat ik wil: statusbeleving, eigenwaarde en toekomstbeeld van leerlingen in het voortgezet onderwijs, met de nadruk op de relatieve positie van vmbo-leerlingen.* (Disseration: Utrecht University, 2011), pp. 20-21.

54 M. Visser, 'Leraren zien geen gelijke kansen op de basisschool', *Trouw,* 8 May 2019. <https://www.trouw.nl/nieuws/leraren-zien-geen-gelijke-kansen-op-basisscholen~b34c8c9e/> (18 October 2020).

55 'De school en leerlingen met gedragsproblemen', *Onderwijsraad. (*Den Haag: Onderwijsraad, 2010), p. 11.

56 'Rapport De Staat van het Onderwijs 2019, pp. 43- 44.

57 OECD, 'Untapped Skills: Realising the potential of immigrant students.' Via <http://www.oecd.org/education/school/programmeforinternationalstudentassessmentpisa/pisa-untappedskillsrealisingthepotentialofimmigrantstudents.htm> , pp. 42-43.

on the cognitive and linguistic processes linked to child language acquisition exist.[58] Young children have a cognitive advantage when it comes to securing language abilities due to their flexible neuroplasticity.[59] Typically a vmbo-student starts their secondary education track at age eleven or twelve and finishes it at around age sixteen. The plasticity for development of language- and high cognition skills has already drastically decreased by then. Literacy and language intervention is therefore most effective at a younger age.[60] The human brain still makes continuous, significant advancements during adolescence, but these are built on the linguistic fundament that was laid out during childhood. Between the ages of twelve and twenty, students typically begin to encounter new ways of language use. Socialising with peers starts to play a prominent role, and both the adolescent's social life and school work demand students to express themselves at a more complex level than before.[61] Due to this, students make leaps on the fronts of pragmatics, syntax and semantics. There are also cognitive functions useful for reading that – at least in typical cognitive development – are strengthened in this phase. For example, the verbal working memory, which is used during reading, becomes more refined and faster.[62] So although the most sensitive period for language acquisition is over for vmbo-students, there is still room for improvement.

As mentioned before, struggling readers often underperform on all levels, both on a language-component level and in word level reading and fluency. However, it is also possible that a reading deficit is grounded in the language component only.[63] In this case a student simply does not have a solid grasp on vocabulary and grammar. For students who do not speak Dutch at home, for example, the language component is likely a determining factor. The diversity of underlying reasons that can lead up to a literacy deficit within a classroom of vmbo-students will be put against a framework of general effects of print

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58 B. Ambridge and E. V. M. Lieven, *Child Language Acquisition : Contrasting Theoretical Approaches*, (Cambridge: Cambridge University Press, 2011), pp 1-5.
59 'Center on the Developing Child', *The Science of Early Childhood Development* (InBrief), 2007. <www.developingchild.harvard.edu> (14 August 2020).
60 J.R. Hurford, 'The Evolution of the Critical Period for Language Acquisition', pp. 159-201.
61 M.A. Nippold, 'Language development during the adolescent years: Aspects of pragmatics, syntax, and semantics', *Topics in Language Disorders,* 20.2, (2000), pp. 15–28.
62 D. Birdsong, 'Plasticity, Variability and Age in Second Language Acquisition and Bilingualism', *Frontiers in psychology* vol. 9 81, 12, March 2018, pp 2-3.
63 De Koninklijke Bibliotheek en Stichting Lezen voor Kunst van Lezen, 'Meer lezen, beter in taal', p. 7.

reading in the following chapter. Effects in relation to specific issues that are prevalent in the focus group of this essay are interwoven in the sections.

In sum, required reading is implemented at vmbo-level in order to improve the literacy levels of students and to increase their reading motivation. Reading long-form (fictional) texts is one of the most effective methods to meet the first goal. However, literacy is multicomponent. It requires significant amounts of practice and demands a variety of skills. For students with reading deficits, the educational aims of required reading frequently remain out of reach. Due to their existing deficit, their literacy improves slowly and their motivation decreases. This leads to a Matthew Effect, where those who would profit the most from extensive reading tend to avoid it. Since engagement with long-form fictional text is partly supramodal, certain educational aims may be met through auditory reading, something that will be expanded on in Chapter Two and Three.

Chapter Two: The effects of reading

Print reading has its own set of affordances and inherent properties, which contribute to the way in which the reader interacts with the text. As could be read in the introduction, print reading is an interaction with a specific technology, which fundamentally differs from audiobook listening.[64] This reading experience is embodied in the device, complete with its own functions and affordances. The impact of these affordances on the reader's engagement with a text will be acknowledged in this chapter. In order to determine the varying impact of text-based and auditory reading on the reading process and on reading motivation, it is necessary to first establish the properties and effects of the print book. The ways in which interface unintendedly impacts the reading experience is the major point of interest. How does the format affect the level of mental resources used, the amount of comprehension achieved and the level of immersion accomplished? The effects of reading long-form fiction from paper will be explored along the attentional, cognitive, phenomenological and ergonomic dimension as seen in Mangen and Van der Weel.[65]

The reading circuit

Everyone in literate societies is dependent on the written word. In order to understand information leaflets, recipes, or to fill in an application, we need access to the visual representation of language. While reading, the brain is continuously at work at a variety of levels known as the reading circuit.[66] There is no universal reading circuit, and the neurological processes at play are still being investigated. Reading circuits differ, as has been discovered when comparing the neurological activity of readers of alphabetic (e.g. Roman) and non-alphabetic (e.g. Mandarin) orthographies.[67] Nonetheless, all readers activate the same brain regions when reading written text. As described by Maryanne Wolf, '(they) include the visual areas in the occipital lobes and in the occipito-temporal junction; language-related regions of the temporal-parietal lobes; and the speech, language, executive

64 Mangen and Van der Weel, 'The evolution of reading in the age of digitisation', p. 119.
65 Ibid., pp. 116-124.
66 Wolf , *Tales of Literacy for the 21st century,* pp. 72-77.
67 Ibid., p. 73.

and motoric areas of the frontal lobe.'[68] When the human brain is confronted with the written word, the text is processed through orthographic and phonological paths that translate the visual representation of text to orthographic code and phonological representation, and from there on to word recognition.[69] Reading is an ability unique to humans, but the reading circuit is not natural. Unlike our ability to listen, reading is a culturally taught skill set. We learn that certain letters and letter combinations correspond with certain sounds, a process known as letter-sound correspondence or letter-sound translation.[70] With practice, the reading process becomes automatised; words are recognised at a glance and can be identified in less than 500 milliseconds.[71] When reading, the brain parses sentences and the semantic structure of the text is discerned. Reading written text activates phonological processes in the brain as well.[72] Even skilled adult readers perform phonologic coding during silent reading, where written text is mentally decoded phonologically. This happens because the intonation and prosody of the process '(…)helps to maintain verbatim word order and semantic information in short-term memory while thoughts and sentences are integrated.'[73] This ability to recognise written text is a result of a coordinated network of neural activity across areas of the brain, which in an illiterate brain are not originally connected.[74] The impact reading has on us and our brain is what will be discussed as the 'functions and effects of reading'.

Attention and memory

The decline in deep reading activities has been mentioned earlier. *Deep reading* is the state of reading where the reader reads attentively and is fully immersed in the material, able to capture the text's core, beyond a level of basic word comprehension.[75] It takes place once

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[68] Ibid., p. 73.

[69] For a detailed description of the pathways, see J. Grainger and P.J. Holcomb, 'Watching the Word Go By: On the Time-course of Component Processes in Visual Word Recognition', In *Language and Linguistics Compass* 3, no. 1 (2009), pp. 128-156.

[70] D.T. Willingham, *The Reading Mind: a cognitive approach to understanding how the mind reads* (New York, NY: Jossey-Bass, 2017), p. 189.

[71] Grainger and Holcomb,'Watching the Word Go By: On the Time-course of Component Processes in Visual Word Recognition', *Language and Linguistics Compass* 3, no. 1 (2009), p. 128.

[72] Willingham, *The Reading Mind,* p. 65.

[73] M. Leinenger, 'Phonological Coding during Reading', *Psychological Bulletin* 140, no. 6 (2014), p. 1549.

[74] Wolf , *Tales of Literacy for the 21st century,* pp. 79-81.

[75] Ibid., pp. 111-112.

the reader obtains a certain fluency in word reading and can comprehend the linguistic elements of a text. Long-form literary texts lend themselves especially well for this practice. Psychological, emotional and cognitive processes are put to work to get to the meaning of the text in question. Firstly, the reader is linking the individual elements in the text to each other, in order to establish the rhetorical relations between the textual elements.[76] What for a less developed reader might be merely a collection of sentences becomes a narrative during the deep reading process. The text provides clues, the reader analyses these and draws conclusions. In order to do so, the reader's world knowledge is actively involved. Although there are different theories about how situation-specific knowledge is included when deciphering a narrative, it is certainly required.[77] We only understand a text within the framework of what we already *know.* This framework allows us to make elaborative and causal inferences, take perspectives, and create imagery of whatever we read.[78] The large number of processes – including the phonological, semantic and orthographic – that are simultaneously put to work and coordinated, make reading an intense cognitive activity. Unsurprisingly, print book reading is believed to lead to the deepest levels of comprehension and immersion, compared to other forms of media.[79]

Attention and memory are two of the foundational skills that highly impact the literacy and reading comprehension required for deep reading. In fact, they are preconditions for facilitating the reading process and reading comprehension.[80] Attentional resources are significant predictors for literacy abilities, and particularly for reading comprehension. Attentional systems first and foremost allow readers to orientate themselves in the text, and when necessary, attract their focus to anything they might not recognise.[81] As reading becomes a more fluent activity, the attentional systems shift to retrieving syntactic information, rather than the visual information of the letters on the

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[76] A.J. Sanford and C. Emmott, *Mind, Brain and Narrative*. (Cambridge: Cambridge University Press, 2012). pp. 12-14.
[77] Ibid. pp. 20.
[78] For more detailed descriptions of the cognitive processes used here, see Wolf, *Tales of Literacy for the 21st Century* and Willingham, *The Reading* Mind*: a cognitive approach to understanding how the mind reads.*
[79] P. Delgado, C. Vargas, R. Ackerman et al., 'Don't throw away your printed books: A meta-analysis on the effects of reading media on reading comprehension', *Educational Research Review*, 25 (2018), pp. 23-28.
[80] M. Wolf et al., 'The Relationship between Reading and Listening Comprehension: Shared and Modality-specific Components.' *Reading & Writing* 32, no. 7 (2018), p. 1751.
[81] Wolf, *Tales of Literacy for the 21st century,* pp. 85-86.

page.[82] These types of attentional systems are similarly at work when, say, reading a short-form blogpost or tweet. A more critical attentional type used for print reading is sustained attention, which is maintained to execute one task for a longer period of time.[83] Sustained attention is required in order to get to a deep reading state.

Memory is another foundational skill that is known to impact reading abilities. Especially verbal working memory plays an important role in facilitating reading comprehension.[84] Working memory difficulties are understood to be a, or even *the,* hindering factor in a selection of learning and reading problems. Language impairments, reading comprehension impairments and attention deficits are mentioned to be a result of poor working memory capacity.[85] The working memory is responsible for quickly processing information in order to fulfil a task or make a decision. A variety of studies have determined that the working memory capacity and reading performance are strongly related.[86] Weaker readers use much of their working memory for word identification, which leaves little space for comprehending meaning.[87] On the fronts of comprehension and immersion, print reading is known to be more effective than digital texts.[88]

The decline in memory and attention skills are two prominent points of worry for people in the twenty-first century. People are increasingly relying on their continuous partial attention, catalysed by the continuous stream of short-form information thrown at them. However, this leaves people in a 'hyper-attention state'. Tasks are performed at a cognitive surface level, but the cognitive control required for deep reading is corroding.[89] This is the so-called 'shallowing hypothesis', in which it is argued that our newly-found interactions with (short-form) digital media are leading to a decline in deep thinking.[90] It must be noted that this development does not limit itself to long-form textual media. Lack of

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82 Ibid., p. 85.
83 M. Yildiz and E. Çetinkaya, 'The Relationship between Good Readers' Attention, Reading Fluency and Reading Comprehension', Universal Journal of Educational Research 5(3), 2017, p. 366.
84 Wolf et al., 'The Relationship between Reading and Listening Comprehension', p. 1750.
85 C. Hulme and M. Melby-Lervåg, 'Educational Interventions for Children's Learning Difficulties.', in A. Thapar et al. (ed.), *Rutter's Child and Adolescent Psychiatry*, (Chichester, UK: John Wiley & Sons, 2015). pp. 541.
86 See Cain, Oakhill and Lemmon for an overview.
87 Willingham, *The Reading* Mind. pp. 65.
88 Delgado et al., 'Don't throw away your printed books', pp. 23-28.
89 Wolf , *Tales of Literacy for the 21st century,* pp. 146-147.
90 The term 'shallowing hypothesis' is coined after Nicholas Carr's book *The Shallows*, which investigates the impact of new media on our brain.

sustained attention also plays a role in the consumption of long-form auditory media, which will be elaborated on in the next chapter. Evolutionarily, humans are inclined to look for new stimulus constantly, so it is obvious why our neural systems are so quick to adapt to new media activity. Cognitively, deep reading is a much more demanding activity than shallow media consumption, but – at least for a reader with no neurological impairments – it is to a an extent trainable.[91]

Vision and orthographic representation

In order to read a written text, most people rely on vision and orthographic representation.[92] The orthographic system is the set of rules that dictate which letters and letter-combinations represent which sounds in a given language.[93] The acquisition of orthographic knowledge, also known as one's orthographic representation, is embedded in the technology used for print reading. Typically, orthographic knowledge starts to manifest right away from the start of literacy acquisition.[94] Orthographic knowledge is simultaneously strengthened through reproduction via handwriting.[95] The abilities to recognise and reproduce written text are generally acquired simultaneously in primary school.

In typical development, the orthographic representation improves due to repeated exposure to written words.[96] Phonological recoding (letter-sound translation) also becomes a more automatic process. Words are thus recognised at a higher speed, and the cognitive workload can shift to comprehension instead of decoding.[97] Decoding difficulties can be a hindering factor in the reading process. However, it must be noted that decoding issues play

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[91] S. Mannheimer, 'Some Semi-deep Thoughts About Deep Reading.', *Journal of Management Education* 40, no. 4 (2016), pp. 409-410.

[92] Heavily visually impaired people are obviously unable to do so, but the hindrance they experience in society only emphasises how deeply normalised these orthographic processes are.

[93] E. Ferreiro, 'The distinction between graphic system and orthographic system and their pertinence for understanding the acquisition of orthography' in Olson et al. *Literacy, Narrative and Culture.* (1st ed. London: Routledge, 2002), p. 216.

[94] C. Martinet, S. Valdois, and M. Fayol, 'Lexical Orthographic Knowledge Develops from the Beginning of Literacy Acquisition', *Cognition* 91, no. 2 (2004), p. 11.

[95] S. Wollscheid, J. Sjaastad, and C. Tømte, 'The Impact of Digital Devices vs. Pen(cil) and Paper on Primary School Students' Writing Skills – A Research Review', *Computers and Education* 95 (2016), pp. 21-22.

[96] C. Martinet et al., 'Lexical Orthographic Knowledge Develops from the Beginning of Literacy Acquisition', p. 12.

[97] E.A. Stevens et al, 'The Effects of Reading Fluency Interventions on the Reading Fluency and Reading Comprehension Performance of Elementary Students With Learning Disabilities: A Synthesis of the Research from 2001 to 2014', *Journal of Learning Disabilities* 50, no. 5 September (2017), p.576.

a less significant role in reading issues amongst young adolescents. Decoding is a determinative predictor for reading comprehension (and thus deep reading skills) in primary school students; however, for the majority of students, decoding is sufficiently automatised after primary school. This means that deep reading for vmbo-students is primarily limited by so called high order skills, such as vocabulary knowledge and the cognitive control of attention.[98]

Another skill set associated with orthographic knowledge, is the production of our own written texts. When young readers start to require orthographic knowledge, they are also introduced to spelling and writing themselves. In a time in which writing is increasingly a digital, spell-checked activity, the relevance of that ability might be questioned. Spelling nonetheless remains an important tool to strengthen our grasp on our main method of communication: language. Furthermore, spelling is a cognitive task which, when poorly mastered, takes up an unnecessarily large amount of mental resources.[99] The impact of reading on spelling abilities, however, tends to be exaggerated. Although fervent readers will see improvement of their spelling skills on words they are frequently exposed to, this effect is modest.[100] Research has shown that readers have poor memory for the spelling of unfamiliar words they encounter.[101] Considering that a significant percentage of vmbo-students has insufficient word knowledge and would thus frequently encounter novel words, it is questionable whether print reading would make a significant impact on their spelling abilities.

The visual attention span does however seem to impact reading performance. Visual attention span abilities play a role when readers soak up the orthographic information of a text. Children who have a strongly developed visual attention span can recognise a larger number of words immediately, without letter-sound translation[102] This is, however, a

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98 R. van Steensel et al., 'The Role of Word Decoding, Vocabulary Knowledge and Meta-cognitive Knowledge in Monolingual and Bilingual Low-achieving Adolescents' Reading Comprehension', *Journal of Research in Reading* 39, no. 3 (2016), pp. 313-314.

99 R. Treiman and B. Kessler, *How Children Learn to Write Words*. (Oxford: Oxford University Press, 2014), p. 7.

100 Ibid., pp. 16-17.

101 Ibid.

102 Yildiz and Çetinkaya, 'The Relationship between Good Readers' Attention, Reading Fluency and Reading Comprehension', p. 366.

reciprocal development: as reading expertise increases, so does the visual attention span.[103] In other words, reading experience improves this cognitive ability. The development of the visual attention span caused by reading might moderately affect spelling abilities. A study executed by Van den Boer et al. suggests that the visual attention span in itself positively influences the spelling abilities, as children who can process more orthographic information in one glance (so children with a high visual attention span) seem to be better at spelling even when other factors, such as reading fluency, are levelled out.[104] Nonetheless, the research proposes that another possibility is that the visual attention span is beneficial for skills that are used during spelling and thus only improves spelling indirectly.[105] The exact relation between reading abilities and spelling abilities and the role of visual attention span herein remain unclear, but this does show that reading long-form text is connected to the development of the visual attention span.

Language skills, semantics and comprehension

Reading and writing have not always accompanied us in language use, as communication once was a primarily oral activity. Oral communication still plays a critical role in our language development, even to the point where our oral comprehension is predictive of our later reading comprehension.[106] Knowledge of vocabulary and syntax and the development of discourse and narrative skills are thus acquired during all sorts of language-related activities. Yet, there are inherent properties to the print books that have a specific effect on a reader's vocabulary and textual comprehension. Since these are issues many vmbo-students struggle with, it is worthwhile to discuss the position of the print book in language and comprehension development.

For required reading, vmbo-students need to read at least four books that contain long-form, fictional narratives. When discussing low literacy, the attention is often drawn to

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[103] M. Bosse, S. Kandel, C. Prado, and S. Valdois, 'Does Visual Attention Span Relate to Eye Movements during Reading and Copying?', *International Journal of Behavioral Development* 38, no. 1 (January 2014), p. 81.
[104] M. van den Boer, E. van Bergen, P. F. de Jong, 'The specific relation of visual attention span with reading and spelling in Dutch', *Learning and Individual Differences,* 39, (2015), p. 147.
[105] Ibid.
[106] K. Dickinson, K.G. Hofer and B.L. Rivera. 'The developing language foundation for reading comprehension: Vocabulary, complex syntax and extended discourse from preschool to grade one' in Veneziano, E. and A. Nicolopoulou, *Narrative, Literacy and Other Skills : Studies in Intervention.* (Amsterdam/Philadelphia: John Benjamins Publishing Company, 2019), pp. 26-27.

underdeveloped word recognition (decoding abilities), where the reader experiences trouble with connecting the letters on the paper with words and sentences. Although this issue can take place at a foundational skill level, word recognition is also related to a language component. One of the first steps in understanding a written word's meaning is deciphering which word it is, which requires vocabulary knowledge. Vocabulary knowledge proves to play an enormous role in reading comprehension amongst adolescents. It influences reading comprehension, reading efficiency and inference-making.[107] Reading narrative fiction is a useful manner to improve textual understanding and word knowledge. Written texts typically contain a broader lexicon than day-to-day speech does. Therefore, it is generally assumed that reading exposes one to new words and ultimately strengthens the vocabulary. This is partly true, but this vocabulary acquisition is most noticeable in adequate readers. Adequate readers already meet the reading requirements expected for their age-group and education level. This group of readers typically finds it easier to acquire and strengthen vocabulary and to determine the meaning of words from context.[108] However, for struggling readers, this effect is much weaker. In fact, students with poor comprehension skills are likely to have their reading comprehension *negatively* affected by encountering unknown vocabulary.[109] Again, we see the Matthew effect, where adequate readers snowball into further vocabulary acquisition, while those who begin reading with a weaker vocabulary lag behind.[110] Children with poor vocabulary skills are less apt to deduce the meaning of novel words and thus less likely to remember them, resulting in them learning the fewest new words by context. This phenomenon has also been witnessed amongst adolescent readers. A 2018 study by Oslund et al. which examined a group of 796 young adolescents with mixed reading abilities shows that, while adequate readers are likely to encounter many new words during the reading activity itself, struggling readers benefit more from direct instruction in vocabulary.[111] The effect of vocabulary on reading

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107 E.L. Oslund et al, 'The Direct and Indirect Effects of Word Reading and Vocabulary on Adolescents' Reading Comprehension: Comparing Struggling and Adequate Comprehenders', *Reading and Writing* 31, no. 2 (2018): 359-360.

108 K. Cain, J. Oakhill, and K. Lemmon. 'Individual Differences in the Inference of Word Meanings From Context: The Influence of Reading Comprehension, Vocabulary Knowledge, and Memory Capacity.' *Journal of Educational Psychology*, vol 96.4, (2004). pp. 672.

109 M. Wolf et al, 'The Relationship between Reading and Listening Comprehension'. 1750.

110 Cain et al., 'Individual Differences in the Inference of Word Meanings From Context', p. 674.

111 Oslund et al, 'The Direct and Indirect Effects of Word Reading and Vocabulary on Adolescents' Reading

comprehension increases when students grow older.[112] With age students are expected to know more words and the language they encounter in education and media consumption becomes more challenging. For vmbo-students with vocabulary deficits, this gap quickly widens. Oslund's results additionally suggest that 'just' making teenagers with underdeveloped reading abilities read more long-form fiction will not necessarily bring them up to speed.

Textual comprehension is however not only impacted by word knowledge. It is influenced by an extensive mix of the cognitive abilities and other skills that have been previously discussed, which influence the reading process as a whole. Nevertheless, the physical affordances of a print book also affect the reading process of and the readers' engagement with its contents. The difference in effects on the reading process that can occur due to a book's physical properties has previously been uncovered in, amongst others, a meta-study on the effects of print versus digital reading by Delgado et al.[113] The next section will discuss how the inherent properties of the print book influence attention and processing style.

Ergonomics, attention and distraction

When discussing the impact of media on our brains and/or lives, the conversation is often directed towards contents. Nonetheless, print reading is an embodied technology, with its own ergonomic affordances that affect the reader's connection with the contents. Reading a certain text from a screen is not the same as reading that same text from a print book. Similarly, reading a text and listening to that text are different activities, mostly due to the modality's form and our physical and cognitive relation to it. The most obvious difference of course lies within the fact that written text has to be visually decoded via a skill set that humans do not naturally possess, while audio-reading does not require such steps.

The technology of print reading is deeply embodied and to a certain extent depends on sensations and movements. The relationship between mind and body has been the topic

Comprehension', p. 375.

[112] Ibid., 371.

[113] Delgado et al., 'Don't throw away your printed books', p. 33.

of research for a few decades, from a perspective known as 'embodied cognition'.[114] Theories in embodied cognition assume a close relationship between cognition, perception and motor skills. From an embodied cognition perspective, print reading is believed to facilitate a more concentrated deep-reading style. In sum, the physical form of the book influences the reader's poise in (cognitively) engaging with the material. Reading relies on a variety of neurological 'modules', including vision, motor-coordination, and visual object recognition.[115] While reading, the reader forms a cognitive map of the text. This map is dependent on the reader's spatial awareness and spatial knowledge of the text. The physical characteristics impact the reader's understanding of the text's structure, as well as their level of comprehension and retention.[116] It has become clear that a print book has the most positive effect on cognitive mapping, whereas modalities that do not offer spatial cues are known to hinder one's ability to form a cognitive map.[117] In an effect similar to that of decoding issues, cognitive mapping issues lead to the reader spending many cognitive resources on plain reading and less for comprehending and remembering the text.[118]

Haptics influence our reading experience even beyond the phenomenon of cognitive mapping. It has been suggested that a modality's physical form impacts the reader's attention span and level of immersion. The sensory-motor affordances of a paper book are directly impacting the ability to deep read.[119] Different parts of the brain are engaged when text is presented through different sensory processes, and information presented through different sensory modalities is believed to be more easily remembered.[120] A study conducted by Margaret Mackey has found that readers use their hands to direct attention to parts of a book.[121] The physical tangibility of a book is likely to help the reader retain their attention and immerse in the text.

The most obvious factor of print reading that increases attention retention is that it

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114 A. Mangen, 'What Hands May Tell Us about Reading and Writing', *Educational Theory* 66, no. 4 (2016), p. 462.
115 J. Hou, J. Rashid, and K.M. Lee, 'Cognitive Map or Medium Materiality? Reading on Paper and Screen', *Computers in Human Behavior* 67 (2017), p. 85.
116 J. Hou, J. Rashid, and K.M. Lee, 'Cognitive Map or Medium Materiality?', p. 85.
117 Ibid.
118 Ibid.
119 A, Mangen, 'Hypertext Fiction Reading: Haptics and Immersion', *Journal of Research in Reading* 31, no. 4 (2008), pp. 404-19.
120 Hou et al., 'Cognitive Map or Medium Materiality?', p. 85.
121 Mangen, 'What Hands May Tell Us about Reading and Writing', p. 471.

cannot be combined with any other activity that requires visual engagement. One might listen to an audiobook while going for a jog, doing groceries or driving a car. This can be experienced as a perk, but has the unpleasant side-effect that the reader can easily bump into distractions. A print book does not permit that freedom, which is why the print book almost naturally facilitates a more focused environment. The argument that print reading is less distractive because the visual attention has to remain with the text also has a neurological foundation: eye-movement and attention are functionally related. As explained by Corbetta et al., 'voluntary covert shifts of attention and overt saccadic movements are closely integrated in everyday life and require the coordination of visual, visuomotor, and attentional signals (…) these processes recruit a common set of functional areas in frontal, parietal, and temporal cortex.'[122]

In sum, print reading is a visual process with intrinsic haptic affordances. A variety of the language processing activities are embodied in the format, which cannot easily be replicated by reading via another channel. Most prominently, written text has to be visually decoded, which calls upon visual processing activities, as well as a taught skill set of orthographic knowledge. While gaining experience with reading, these abilities are trained. Nevertheless, the effects that print reading can have on the development of literacy abilities, including vocabulary acquisition, is less potent in struggling readers. Beyond word reading level, the physical affordances of a book also influence other cognitive processes. They are primarily helpful in facilitating better attention retention and can help the reader orientate within the text. Some of the processing activities used in print reading are supramodal and are stimulated regardless of modality. The specifics of these processing activities will be discussed in the next chapter.

[122] M. Corbetta et al, 'A Common Network of Functional Areas for Attention and Eye Movements', *Neuron (Cambridge, Mass.)* 21, no. 4 (1998), p. 769.

Chapter Three: The effects of listening

In this chapter, the intended and unintended effects of audio-reading will be explored along the attentional, cognitive and ergonomic dimension. The question whether audiobooks are a viable alternative to do required reading in school is relevant, as audiobooks are a booming business and an increasingly popular alternative for print reading.[123] In The Netherlands, audiobook popularity has risen especially since the introduction of audiobook streaming services, such as Storytel and Mofibo.[124] Although audiobooks may differ in format, execution style and genre, they can in the broadest sense be defined as 'any narrative recorded onto a record, cassette tape, compact disc, MP3 digital file, or other audio format'.[125]

While audiobooks are gaining popularity, many users still admit to consider audio-reading 'cheating'.[126] The suspicion that audio-reading is a lesser type of reading likely plays a role in preventing it from being fully embraced in educational settings. However, in order to draw such a conclusion, it has to be clear what the intended effect of the reading activity is. As the previous chapter accounts for, modality *does* matter, but it seems constructive to abandon the question 'should audiobooks count as real books', as the answer to this is fully dependent on the intentions with which a book is being read.[127] Therefore, I believe we should replace this question with 'how do audiobooks function as a medium for required reading?' Or, more specifically: 'what are audiobooks' intended and unintended effects?'

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123 A. Rowe, 'U.S. Audiobook Sales Neared $1 Billion In 2018, Growing 25% Year-Over-Year', *Forbes Magazine,* 16 July 2019.
< https://www.forbes.com/sites/adamrowe1/2019/07/16/us-audiobook-sales-neared-1-billion-in-2018-growing-25-year-over-year/#38db99356050> (25 August 2020).

124 T. van Ringelestijn, 'Audioboeken zijn booming, ook in Nederland', *RTL Nieuws,* 26 July 2016. <https://www.rtlnieuws.nl/tech/artikel/3949586/audioboeken-zijn-booming-ook-nederland> (25 August 2020).

125 M. Rubery, *The Untold Story of the Talking Book*, (Cambridge: Harvard University Press, 2016), p. 2.

126 M. Heid, 'Are Audiobooks As Good For You As Reading? Here's What Experts Say', *Time,* 6 September 2018. <https://time.com/5388681/audiobooks-reading-books/> (25 August 2020).

127 E.g. is the goal to improve sustained attention or to understand the plot of a book?

A short introduction to audiobooks

Audiobooks have been around for a while, but for a long time went largely unnoticed. The first audio novels were recorded with the purpose of giving soldiers who lost their sight during the First World War the opportunity to read in the hospital.[128] For a long period of time, audiobooks remained primarily associated with visual and reading impairments.[129] This might explain why they have kept their marginalised position for so long. As Matthew Rubery points out in his perceptive social history of the audiobook, the format's identity has never existed in its own form, but always in comparison to print.[130] In its competing position with traditional print reading, and especially considering the connection with disabilities, the audiobook is often shunned as a lesser option by the general public.

The idea that listening does not 'count' as real reading is understandable. Obviously, the fact that one relies on different senses while reading creates a prominent difference between reading audiobooks and print books. The auditory pathway is neurologically different from the visual pathway, and even though the contents of a text may be the same, the brain has a dissimilar experience processing them. In the attentional and cognitive dimension, this can prove troublesome, but the affordances of audiobooks can also be a windfall for struggling readers. It is relevant to note that the *cause* of the reader's struggle with print literacy (e.g. decoding issues, language deficit) appears to be quite important when discussing the effects of audiobooks compared to print books.

Supramodal processing in the listening circuit

Auditory and optic input are processed is different ways. Before diving into the dissimilarities of these processing activities, it is interesting to discuss the similarities between the two. The processing of verbal information happens in a relatively similar manner, independent of modality. The optic nerve and visual pathway are part of the central nervous system, which is the same system that auditory information travels to. Some of these activities are embedded in the supramodal language processing systems.[131]

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128 M. Rubery, *The Untold Story of the Talking Book*, p. 2.
129 Ibid., pp. 1-6.
130 Ibid., p. 3.
131 M. Berl et al.,'Functional Anatomy of Listening and Reading Comprehension during Development', pp. 115-25.

It is challenging to compare the impact modality has on neurological processing when it comes to long-form texts. Re-creating a natural reading environment while simultaneously being able to measure brain activity has proven to be difficult. Berl et al. have made one of the most successful attempts in a study that targeted primary school children. As stated in the study, 'the language stimuli (…) are paragraph stories that require integration, inference, and derivation of overall meaning based on previous knowledge, as well as phonological, syntactic and semantic information.'[132] These samples led to a reading experience quite similar to reading a longer work of fiction. The results acquired in Berl's testing environment support the theory that certain processing activities do indeed react similarly to both auditory and visual information.

One of the brain areas that functions in a supramodal manner is the superior temporal sulcus. The superior temporal sulcus is a region of the brain that enables speech- and face perception, audiovisual integration and the processing of social and emotional information. This region is equally active in both reading and listening. The inferior frontal gyrus, which is used for language processing, language production and language comprehension also shows supramodal activity, as does the right cerebellum, which is used for logical reasoning and (non-motor) language. According to the research provided by Berl et al, this demonstrates a stable language network that functions independent of modality.[133] In these brain regions, both heard and read text are semantically and syntactically processed and comprehended in a similar manner. The theory that verbal information is subjected to modality-independent syntactical processing is supported by other studies conducted amongst (young) adults, for example Deniz et al. and Regev et al.[134] However, these studies measured the reading activity by word-for-word display of the text, which is not comparable to reading long-form texts.

This paragraph has demonstrated that there is a significant overlap between the auditory and visual processing of verbal information. The question which effects of audio-

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[132] Ibid.
[133] Ibid.
[134] F. Deniz et al., 'The Representation of Semantic Information Across Human Cerebral Cortex During Listening Versus Reading Is Invariant to Stimulus Modality', *The Journal of Neuroscience 39*, no. 39 (2019), pp. 7722-7736, and:
M. Regev, et al., 'Selective and Invariant Neural Responses to Spoken and Written Narratives', *The Journal of Neuroscience* 33, no. 40 (2013), pp. 5978-5988.

reading are *not* comparable to those of print reading are to be the focus point for the rest of this chapter.

Modality, attention and distraction

Audio 'readers', like print readers, rely on attention and working memory in order to follow the plot and be able to make inferences. These auditory memory and attention processes are no separate entities. In fact, a 2004 study found that bilateral regions respond similarly, both during visual reading and auditory reading tasks. Assumably, this is due to attentional control and response generation.[135] This suggests that attention skills are trained similarly by listening as they are by print reading. It is implied that, in an ideal situation, the effects of audio-reading could improve these cognitive abilities in a way that would also have effect on one's attention retention in print reading. However, the reality is a bit more complicated.

Oral language development precedes reading and writing abilities. For young children being spoken to is critical in their acquisition and understanding of their mother tongue. Studies with primary grade students have shown that levels of extended oral discourse and oral grammar are even stronger literacy predictors than vocabulary knowledge.[136] The advancement of narrative abilities by being spoken and read aloud to have proven to have long-lasting effects on reading comprehension, writing, language development and general educational accomplishments.[137] For most of us, language is naturally acquired through hearing, and auditory processing is highly automatised. People thus generally find it easier to process auditory information than to process print text. In theory, this should have a beneficial effect on our ability to retain auditory input. In fact, if the distraction factor is left out of the equation, our memory for spoken text is believed to slightly surpass our memory for read text.[138] It has even been implied that attentional and memory abilities are more crucial in listening than they are in reading. This would be due to

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[135] L. Cohen et al.,'Distinct Unimodal and Multimodal Regions for Word Processing in the Left Temporal Cortex', *NeuroImage (Orlando, Fla.)* 23, no. 4 (2004). pp. 1263.

[136] K. Dickinson et al.,'The developing language foundation for reading comprehension: Vocabulary, complex syntax and extended discourse from preschool to grade one', pp. 22-23.

[137] E. Veneziano, A. Nicolopoulou, 'Introduction to narrative and interventions. ' in -- *Narrative, Literacy and Other Skills : Studies in Intervention.* (Amsterdam/Philadelphia: John Benjamins Publishing Company, 2019), pp. 4-5.

[138] G. Jobard et al., 'Impact of Modality and Linguistic Complexity during Reading and Listening Tasks', *NeuroImage (Orlando, Fla.)* 34, no. 2 (2007), p. 787.

the fact that listeners do not have the option to re-orient themselves easily.[139] When reading a print book, the eyes often subconsciously go over a word or sentence again, an automatic act that is believed to improve comprehension.[140] Audio-readers lack that opportunity, as rewinding an audiobook takes conscious effort. Due to this, audiobook reading is likely more challenging for the memory.

This brings us to one factor that makes audiobook reading a less effective way of reading: the inherent properties of the audiobook often do not allow for periods of sustained attention. In the previous chapter, one could read how hand- and eye movement impact the reader's level of attention retention, because physical engagement improves the submersion in and memory for a text. The audiobook does not require physical interaction and thus functions poorly in this aspect. One of the most thorough studies on the haptic effect of audiobooks was conducted by Varao-Sousa.[141] In this study, 235 university students were presented with three fragments. The fragments, of around 1800 words each, were taken from a popular-scientific book. The students were instructed to read the texts silently, then aloud at their own pace, and finally were made to listen to another participant read aloud. Students first self-assessed their level of mind wandering during the reading tasks, and then were assessed once more with a memory test on the contents afterwards. The results demonstrate that mind wandering occurred most frequently during the listening tasks. Students showed the least ability to remember the contents correctly when listening to other students, whereas the students experienced the least distractions and best memory of the text while reading aloud, so the form that requires the most physical engagement.[142]

Concentration is a problem factor for all readers, but vmbo-students self-assess a lack of concentration to be slightly more influential for them than for the average reader.[143] It is reasonable to expect that these concentration issues flare up while using a medium that

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139 Wolf et al., 'The Relationship between Reading and Listening Comprehension: Shared and Modality-specific Components', pp. 1750 – 1751.
140 Heid, 'Are Audiobooks As Good For You As Reading? Here's What Experts Say'.
141 T. L. Varao-Sousa, 'The way we encounter reading material influences how frequently we mind wander', *Frontiers in Psychology, 28 November 2013*
<https://www.frontiersin.org/articles/10.3389/fpsyg.2013.00892/full> (17 September 2020).
142 Ibid.
143 S. Tellegen, 'Leesgedrag van vmbo-leerlingen' pp. 31-54 in D. Schram, *Lezen in het vmbo: onderzoek – interventie – praktijk*. (Delft: Eburon, 2008), p. 37.

leaves room for so many distractions. Nevertheless, this conclusion should not be drawn without a deeper investigation into the impact of the reading environment for audiobook-readers. For example, it is less challenging to concentrate on an audiobook during cognitively undemanding tasks (e.g. walking) or when sitting in a sterile environment, such as a classroom during quiet reading.

Similarly, it is unrealistic to assume that a vmbo-student's average print reading environment is necessarily comparable to the controlled reading environment used in many scientific studies. Students – particularly those who struggle with or dislike reading – would likely also allow their attention to wander during a print reading session. After all, the majority of vmbo-student admit that they have trouble staying focused while reading a print book, too.[144] On a practical level (e.g. user experience of software) there are affordances to audiobooks that could either improve or decrease reading experiences and attention retention, which will be further discussed in the next chapter.

Hearing, listening, decoding

When listening to an audiobook, the visual element of the reading circuit is completely removed. This can be a windfall for readers who struggle with reading at word level (meaning phonologic and phonemic abilities). The auditory format facilitates the reading process for low-achieving readers, and many struggling readers can understand a spoken text more easily than a written text. The question remains what the purpose of the reading activity is. For those whose issues are primarily caused by poor word reading skills, just listening to audiobooks will be of little help in improving these skills. However, it is important to keep in mind that 'just making them read' will not solve these specific problems either. As of the twentieth century, it has been generally accepted that people with significant reading problems require extra intervention to improve their word reading abilities.[145] As described in Chapter One, the compositions of vmbo-classes often allow few opportunities for such interventions. If audiobooks could lead to positive effects on literacy in a relatively low-effort manner, they are worth the investigation.

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[144] Ibid., 37.

[145] N.K. Scammacca et al, 'A Century of Progress: Reading Interventions for Students in Grades 4–12, 1914–2014.' *Review of Educational Research* 86, no. 3 (2016), pp. 763 – 775.

The matter whether audiobooks can improve decoding skills is quite uncertain. In a trial by Bowyer-Crane, a group of 152 young elementary school children with poor vocabulary and poor verbal reasoning skills were placed into two separate intervention programmes for a twenty-week programme of daily training. The study was conducted in twenty primary schools, where the eight pupils with the lowest language measures per school were selected.[146] The first test group received a 'phonology with reading intervention training', which included letter-sound knowledge training, phonological awareness and instructed reading training on a book level. The second test group received an 'oral intervention programme', which was audio-based, and focused on vocabulary, comprehension, inference generation and narrative skills. At the end of the programme, the group that received phonology-intervention scored higher on literacy, spelling and reading comprehension and reading accuracy.[147] It is not surprising that working with oral language does not have any noticeable effect on decoding skills and skills that build on orthographic representation. Audiobooks might however be of indirect benefit to vmbo-level students who struggle with decoding. A surprising result in the Bowyer-Crane study shows that the children who received the oral intervention did in fact obtain higher scores in expressive grammar skills and narrative skills, had a larger vocabulary and tended to form longer sentences. So although listening to spoken text did not improve these readers' literacy per se, the research suggests that listening to audio has beneficial effects on various other aspects of language command. A variety of studies have demonstrated that audiobooks can at least partially help to develop phonological, semantic, syntactic, and pragmatic systems.[148] As language command is a predictor for print reading, this could indirectly positively affect reading skills. However, there is no hard evidence that this indirect effect exists, and further research on the impact of listening skills on decoding skills has to be conducted.

Thus, reading audiobooks is likely effective for readers whose literacy difficulties are

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146 C. Bowyer-Crane et al. 'Improving Early Language and Literacy Skills: Differential Effects of an Oral Language versus a Phonology with Reading Intervention.' *Journal of Child Psychology and Psychiatry* 49, no. 4 (2008), pp. 422-432.

147 Ibid., p. 428.

148 For an overview, see Alcantud-Díaz, M., and C. Gregori-Signes, 'Audiobooks: improving fluency and instilling literary skills and education for development', *Tejuelo*, 20 (2014), p. 121.

the result of their level of language command. This could be an argument to defend the use of audiobooks in secondary school, as the impact of low order decoding skills on reading abilities typically decrease with age.[149] However, for the vmbo-students who do struggle with basic literacy, it is unlikely that listening to audiobooks will have notable effects on their low order literacy skills.

Comprehension

As one could see in the previous paragraphs, literacy is multicomponent. Reading difficulties are often rooted in a multiplicity of areas, including vocabulary, fluency and word level.[150] Once a reader has an issue in one or multiple of these areas, this will almost always interfere with their reading comprehension. It might therefore occur that readers without substantial fluency problems still fail to retrieve the essence of a text. Reading comprehension and listening comprehension are closely related, but naturally also have modality-specific aspects. The modality-specific aspects of audio-reading may have different effects on the reader's comprehension depending on the nature of their reading issues.

Underdeveloped reading comprehension abilities are often a symptom of broader language deficits, and poor comprehenders tend to encounter similar problems when it comes to oral language.[151] They struggle with word knowledge, figurative speech and grammar and are often also unable to adequately express themselves through language.[152] The impact of comprehension on overall reading abilities is serious, and vocabulary plays a key role in this deficit. In fact, a study conducted by Oslund et al. indicates that a poor vocabulary plays a more determinate role when predicting textual comprehension abilities, than poor word reading (decoding) does itself.[153] Aside from that, vocabulary knowledge is

[149] Van Steensel et al., 'The Role of Word Decoding, Vocabulary Knowledge and Meta-cognitive Knowledge in Monolingual and Bilingual Low-achieving Adolescents' Reading Comprehension', pp. 313-314.
[150] Hock., et al, 'What Is the Reading Component Skill Profile of Adolescent Struggling Readers in Urban Schools?', pp. 33-35.
[151] Hulme and Melby-Lervåg, 'Educational Interventions for Children's Learning Difficulties', pp. 536-537.
[152] P. J. Clarke et al., 'Ameliorating Children's Reading-Comprehension Difficulties: A Randomized Controlled Trial', *Psychological Science* 21, no. 8 (2010), p. 1106.
[153] Oslund et al., 'The Direct and Indirect Effects of Word Reading and Vocabulary on Adolescents' Reading Comprehension: Comparing Struggling and Adequate Comprehenders', pp. 355- 379.

believed to predict listening comprehension as it predicts reading comprehension.[154] This is an argument to support the use of audiobooks in school. Oral intervention has already shown positive results on the vocabulary and textual comprehension abilities in younger children. Two of the studies discussed in the analysis by Hulme and Melby-Lervåg show that oral intervention has positive effects on participants' vocabulary and grammar skills, which consecutively improved their reading comprehension abilities.[155] Bowyer-Cane has demonstrated that oral engagement with text can improve grammar and vocabulary skills, at least in a controlled training environment.[156]

One intervention conducted by Clarke et al. shows perhaps the most significant impact of listening on vocabulary and comprehension skills.[157] The study was carried out among eight-to-nine-year olds with reading comprehension issues. Eighty-four children with noticeable discrepancies between reading comprehension and reading fluency were selected for a twenty-week intervention programme. They were made to follow 1.) a text-comprehension intervention based on written narrative, 2.) an oral language intervention based on spoken narrative, or 3.) a combined programme which included all elements used in the first two programmes. In agreement with the results provided by Oslund et al., this study convincingly shows that vocabulary deficits have a tremendous impact on comprehension. The results of the trials by Clarke et al. suggest that vocabulary training is done at a faster rate during oral-based training than during textual training, as pupils who had received oral instruction had the most reliable knowledge of words they had been taught, as well as the most accurate understanding of previously untaught words.[158]

Nevertheless, one cannot uncritically expect results obtained within a controlled training group of younger children to be repeated when it comes to adolescents, let alone those who (self-)study in a possibly distracting environment. Furthermore, it has also been proposed that implementing audiobooks for vocabulary training is primarily effective for

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154 M. Wolf et al., 'The Relationship between Reading and Listening Comprehension: Shared and Modality-specific Components.' *Reading & Writing* 32, no. 7 (2018). pp. 1750 – 1751.
155 Hulme and Melby-Lervåg, 'Educational Interventions for Children's Learning Difficulties', pp. 533-544.
156 Bowyer-Crane et al. 'Improving Early Language and Literacy Skills: Differential Effects of an Oral Language versus a Phonology with Reading Intervention', pp. 422-432.
157 Clarke et al., 'Ameliorating Children's Reading-Comprehension Difficulties', pp. 1106- 1116.
158 Ibid., p. 1115.

children who already read at or above their expected grade level.[159] Vocabulary knowledge is believed to be a strong predictor for listening comprehension.[160] Students with a weaker vocabulary are thus more vulnerable to 'getting lost' during listening. This is in accordance with that what could be previously witnessed in comprehension training through print reading: struggling readers again reap the least benefits.

The fluency trap

Students who struggle not only with reading comprehension, but also with fluency and word reading, might benefit from audio-reading in terms of comprehension skills. These readers are at risk of becoming 'trapped' in underchallenging literature. Since their cognitive workload remains occupied with decoding, thorough engagement and deep reading is hindered. The books they can read correspond to their fluency and current vocabulary level, but are not representative of their interests and can be underchallenging content-wise.[161] Due to the hindrance these students experience at basic reading level, the development of their vocabulary and high order skills also falls behind. These students read books that do not introduce them to more complex lexicons and linguistic structures, which means the students have little room to improve their general language deficits.[162] Listening could introduce this group of readers to expressions, idioms and grammatical constructions which print books at their level do not provide or which they cannot properly register due to decoding and fluency issues. This theory has been endorsed by a study conducted amongst 343 English students with mixed abilities in Year 8.[163] In this study, teachers were asked to read two long-form narrative fictional texts aloud to their class over a twelve-week period, one group (165 students) with additional pedagogic intervention and one group (178 students) with as little intervention as possible. The novels that were read were above

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159 A. H. McGill. 'Audio Books with Struggling Readers at the Elementary School Level.' (Minneapolis: Walden University. ProQuest Dissertation, 2016), p. 49.

160 Wolf et al., 'The Relationship between Reading and Listening Comprehension', p. 1751.

161 Wolfson, 'Using Audiobooks to Meet the Needs of Adolescent Readers', pp. 106 -108.

162 (Fictional) texts were and sometimes still are simplified for vmbo-level readers, e.g. by shortening sentences and removing signal words. This has now proven to be counterproductive and in fact interferes with the readers understanding and engagement.

163 J. Westbrook et al., ''Just Reading': The Impact of a Faster pace of Reading Narratives on the Comprehension of Poorer Adolescent Readers in English Classrooms', *Literacy (Oxford, England)* 53, no. 2 (2018), pp. 60-68.
The eighth year in the English school system corresponds with the second year of Dutch secondary school.

the students assumed reading level, and included worldly themes and relatively complex language.[164] The books were read in class in sessions of twenty to forty minutes, at a high speed and with few interruptions. To measure their progress, participating students took a standardised reading comprehension test before and after the programme.

In a highly surprising turn, the results show that struggling readers had on average made a bigger improvement than adequate readers in both groups. This result is in contradiction with the Matthew effect that could be witnessed in paper-based reading intervention, and neither was it visible in the earlier mentioned audio intervention programmes directed at specific language- and vocabulary deficits. The authors of the study theorise that there is a simple explanation behind this noteworthy result: the fact that struggling readers usually do not get to read this much at this pace. According to the reports of participating teachers, back-to-back aloud reading kept weak readers interested. This means that audiobooks can have positive effects on reading comprehension for readers who struggle with fluency and decoding. More interestingly, the fact that the poor readers improved their performance on a standardised (print) comprehension text suggests that auditory reading positively affects print reading, in line with the aforementioned supramodal cognitive activities. Obviously, again we must be critical towards the environments in which these studies were conducted, as self-studying adolescents may not reap the same benefits as (younger) participants in a controlled study.

The evidence above suggests that students who struggle with reading fluency and textual comprehension may experience positive effects from listening to audiobooks, regarding the development of the cognitive capacities required for deep reading. Students who have the opportunity to improve these abilities through engaging with long-form fiction can be held back by basic reading level skills when encountering books in print. However, audiobooks do not seem to have any effect on word reading level itself. Furthermore, the effects of audiobook reading are dependent on attention levels as well. Unfortunately, this chapter

[164] English Year 8 students are 12-13 years old. The books read in this study are generally deemed appropriate for Grade 9 or higher. Examples are *Bog Child* by Siobhan Dowd and *The Boy In The Striped Pyjamas* by John Boyne.

has demonstrated that staying focused on audiobooks is typically more challenging than concentrating on print text.

Chapter Four: Audiobooks in the classroom

In the previous chapters, it has become clear that audiobooks and print books have different inherent properties that lead to different effects in the attentional, cognitive, phenomenological and ergonomic dimensions. Therefore, the *intended* effects of reading and the reasons required reading is carried out in vmbo-schools need to be clearly assessed. Perhaps, at this point, it seems obvious that the audiobook cannot replace the print book, especially since the orthographic element is so dominant in daily life. It could also be concluded that the research on ergonomic impact on attention retention is definitive enough, so that the audiobook cannot be seen as a substitute for print reading at all. That conclusion would, however, presume a simplified and generalised version of the (vmbo-student's) reading reality. In this chapter, the use of audiobooks will therefore be contextualised within the current states of reading behaviour and literature education in vmbo-schools. This contextualisation is urgent, as reading behaviour does not limit itself to a cognitive realm. Such a sterile perspective, in which fiction reading is considered only as a method of improving reading abilities, foregoes many other reasons to read fictional narratives.

In order to help students develop a reading routine, read frequently, and become better readers, reading should not be approached as a skill-level task. The social and emotional dimension of and intrinsic interest in reading are vital in these developments. 'Reading motivation' is one of the buzzwords of today's reading education, and the central point in a variety of scholarly and policy publications. There is a distinction between *extrinsic* and *intrinsic* reading motivation. Extrinsic motivation is evoked by external motivators, such as parental reward or grades, whereas intrinsic motivation is caused by personal objectives, such as relaxation or an interest in a certain topic.[165] A relevant question is whether or not the properties of audiobooks can impact the level of (intrinsic) reading motivation.

[165] M. Becker, N. McElvany, and M. Kortenbruck, 'Intrinsic and Extrinsic Reading Motivation as Predictors of Reading Literacy: A Longitudinal Study', *Journal of Educational Psychology,* 102, no. 4 (2010), p. 774.

Extrinsic versus intrinsic motivation

In classrooms full of teenagers, sparking reading motivation is often not an easy task. In fact, vmbo-teachers list a lack of motivation as the biggest barrier that prevents their students from reading.[166] This is unfortunate, as reading motivation is an important factor for success in reading promotion. When it comes to fiction reading in school, the extrinsic reading motivation for students is straightforward: handing in a reading report is a requirement for graduation. However, extrinsic reading motivation plays a fairly limited role in influencing reading behaviour and its consecutive effects on literacy. One esteemed longitudinal study has shown a far more impactful causality between intrinsic motivation and reading skills.[167] In this study, primary school students who showed a large intrinsic drive during the first assessment, were significantly better readers in subsequent test-moments over the years. As this study explicitly states, this result should not be taken at face value. There is a bidirectional relationship between intrinsic motivation and self-perceived competence. Adequate readers typically find reading more enjoyable than struggling readers, which in turn increases their level of intrinsic motivation.[168]

Even when considering the bidirectional relationship between intrinsic motivation and literacy abilities, intrinsic motivation appears to be more valuable in predicting literacy than extrinsic motivation is. A study by Becker et al. even suggests that readers who read as a result of extrinsic motivation experience a slightly negative direct effect on their literacy skills.[169] This negative effect was, however, not recovered in a similar study by Froiland and Oros. In this later study, extrinsic motivation appears to have a less prominent, but nonetheless positive effect on literacy.[170]

The presence of intrinsic motivation stimulates the unfolding of a reading routine. Furthermore, a person's use of cognitive strategies improves when intrinsic motivation is present.[171] Since intrinsic motivation and classroom engagement appear to be equally

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166 'Lezen op het vmbo: een stand van zaken', *DUO Onderwijsonderzoek*, pp. 24-25.
167 Becker et al., 'Intrinsic and Extrinsic Reading Motivation as Predictors of Reading Literacy', pp. 773 -785.
168 Ibid., pp. 780-781.
169 Ibid., pp. 773 –785.
170 J.M. Froiland and E. Oros, 'Intrinsic Motivation, Perceived Competence and Classroom Engagement as Longitudinal Predictors of Adolescent Reading Achievement', *Educational Psychology (Dorchester-on-Thames)* 34, no. 2 (2013), p. 127.
171 Ibid., pp. 119-132.

determining factors as race, gender and socio-economic status in the area of reading achievement, providing support for its development in vmbo-schools is worthwhile and necessary.[172] The attention to reading pleasure is vital in the development of reading promotion programmes. As has been demonstrated in earlier chapters, 'just making them read' is not an effective way to improve students' literacy levels, and neither will it motivate them to create an individual reading routine.

Fiction education and engagement

Although a lack of reading motivation is regularly noted by teachers, vmbo-students tend to be underestimated when it comes to their initial enthusiasm for pleasure reading. Most upcoming vmbo-students leave primary school with a positive reading attitude. Upon entering secondary school, a small majority of vmbo-students is believed to read at least semi-regularly.[173] Unfortunately, this percentage drops drastically over the secondary school years.[174] It is particularly the interest in fiction that diminishes: for most vmbo-students reading motivation stems primarily from a thirst for knowledge or information.[175] These students thus experience intrinsic motivation to read non-fiction in order to learn something, but not so much to read long-form fictional narratives.

The lack of interest in fiction is widely recognised within school boards on a national level, and many initiatives have been taken to awaken a love for fiction reading in secondary school students. Much of these reforms have been related to the contents of the material. Whereas in the past students were expected to read classics from the Dutch canon, reading didactics have been altered to meet the interests of adolescent readers, especially at vmbo-level. The details for reading education are decided at school level, based on a global national guideline that states:

> *'The student learns to read stories, poems and informative texts that meet their interests and broaden their horizon.'*[176]

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172 Froiland and Oros, 'Intrinsic Motivation, Perceived Competence and Classroom Engagement as Longitudinal Predictors of Adolescent Reading Achievement', p. 127.
173 S. Mol and J. Jolles, 'De Lezende VMBO'er', *Pedagogiek in praktijk,* 2014, pp. 34-38.
174 Ibid.
175 Ibid.
176 M. Nicolaas and S. Vanhooren, 'Het literatuuronderwijs in Nederland en Vlaanderen: Een stand van zaken' (Nederlandse Taalunie, 2008), p.8. via <https://taalunie.org/publicaties/71/het-literatuuronderwijs-in-

Contrary to the higher secondary school levels vwo and havo, vmbo does not have a set curriculum for fiction. Teachers and/or schools can decide at individual level what is fit to read, based on a list of broadly interpretable requirements.[177] For vmbo-gl and -tl students, there is attention for (youth) literature and common literary practices. In the practice-based vmbo-tracks, fiction reading is subordinate to technical and functional reading.[178] In order to stimulate students, form has also been considered. At a vmbo-level, required reading is currently part of the course element 'fiction'. This course element is completed by handing in a dossier compiled out of reflective exercises on at least eight fictional 'works'. Some of these works can be films or theatre productions.

Reading and literary education are marginalised in secondary schools at all levels. At vmbo-level, the subject Dutch constitutes of eight obligatory 'exam units'.[179] A selection of these units is tested and completed through the national standardised exam (central exam). The remaining units, including 'fiction', are completed before the central exam takes place, in exams provided by the schools. Centrally examined elements are usually prioritised, and fiction education is sometimes sacrificed in order to provide more time for other lesson elements.[180] The didactics for pleasure reading and literary education have also become somewhat neglected in secondary school teacher training , especially in recent years.[181] This is unfortunate since, especially for young adolescents, reading and fiction education at school plays a more influential role than parental stimulation.[182] However, its influence is

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nederland-en-vlaanderen>. Originally in Dutch, translated by me.

[177] According to the syllabus, during their examination a vmbo-student must be able to:
− recognise different types of fictional works
− describe the thoughts and actions of the characters in the fictional work
− elaborate on the relation between the fictional work and reality
− point out characteristics of fiction in the fictional work (not applicable for vmbo basis)
− gather and select relevant background information (not applicable for vmbo basis)
− give a personal reaction to a fictional work and elaborate using examples from this work
As stated (in Dutch) in 'Nederlands vmbo syllabus BB, KB en GT Centraal Examen 2020', *College van Toetsen en Examens,* June 2018. <https://www.examenblad.nl/examenstof/syllabus-2020-nederlands-vmbo> (4 October 2020). Translated by me.

[178] Nicolaas and Vanhooren, 'Het literatuuronderwijs in Nederland en Vlaanderen', p. 9.

[179] 'Nederlands vmbo syllabus BB, KB en GT Centraal Examen 2020', *College van Toetsen en Examens,* p. 7.

[180] J. Hoogendoorn, 'Literatuuronderwijs in het vmbo', *Tsjip/Letteren.* Jaargang 10 (2002), p. 26.

[181] 'Leesbevordering en leesvaardigheid in het vmbo: noodzaak en kansen', *Stichting Lezen and ITTA.* (Amsterdam: Stichting Lezen, 2014), pp. 7-8.

[182] I. Nagel and M. Verboord, 'Reading Behaviour from Adolescence to Early Adulthood: A Panel Study of the Impact of Family and Education on Reading Fiction Books', *Acta Sociologica* 55, no. 4 (December 2012), pp.

stronger in havo and vwo classes, where literary education is more prominent and students are required to read more. The Matthew Effect dividing adequate and unskilled readers has been amply discussed, but it is particularly unfortunate that, for vmbo-students, this effect can barely be bridged in an educational setting. With the bare minimum of reading education, this gap will remain.

There is no doubt that many teachers do whatever they can to implement more adequate reading programmes, but vmbo-schools run into considerable problems.[183] Aside from the scarce motivation teachers witness in their students, teachers say they lack the time to develop or implement reading promotion initiatives during class. This is an insurmountable problem. The Dutch educational system is known to have been heavily economised and understaffed. Over the past years numerous strikes have been organised to draw attention to the high workload, low salaries, and disproportionate percentage of burn-outs affecting people in this profession.[184] Furthermore, it is mentioned that the students' initial low reading levels form a barrier when teachers attempt to stimulate their reading behaviour. Lastly, teachers speak of a lack of funding to structurally support reading promotion projects and materials.

Audiobooks and reading enjoyment

It is now clear that vmbo-students generally are not uninterested in reading per se, but typically lack the intrinsic motivation to engage with fiction. The lack of enjoyment in reading fiction plays a large role in this. One might imagine that a struggling reader who wants to learn about a certain topic, sees reading as a 'necessary evil' in order to find that information. However, the purpose of reading fiction may not immediately be clear to students. Furthermore, the elements that make reading fiction enjoyable are typically not prominent for those who cannot read fluently or struggle to understand sentences. Reading fiction becomes most interesting when the cognitive aspects of reading are under control, the vocabulary is sufficient, and the reader can fluently comprehend the text. Then the

358 -361.

183 'Lezen op het vmbo: een stand van zaken.', *DUO Onderwijsonderzoek*, pp. 24-25.

184 'Oorzaak lerarentekort? Slecht imago door werkdruk en laag salaris', *RTL Nieuws,* 10 January 2019, <https://www.rtlnieuws.nl/economie/artikel/4545206/imagoprobleem-onderwijs-drempels-om-leraren-te-vinden> (10 October 2020).

reader comes to understand the narrative: the text is no longer a collection of words, but a continuous stream of thoughts and images. This leads to the deep reading state that an educator would typically want their students to achieve. At that point, reading becomes more enjoyable, too.

Enjoyment is critical in the development of a consistent reading routine, especially for students who have difficulties finding the motivation to read. Throughout this essay it has been extensively discussed how reading is a skill that needs to be practiced, which students who dislike the activity are unlikely to do. When the reading activity is deprived of pleasure, aliteracy (being able, but unwilling to read) becomes a risk.[185] In fact, even adequate or good readers who develop a negative connotation with reading may stop reading in their spare time.[186]

This is where the audiobook comes in. Although the audiobook lacks some of the cognitive, attentional and ergonomic benefits of print, it carries promising factors in the emotional dimension. In the regard of enjoyment of and motivation for fictional texts, the audiobook has proven itself rather successful. Audiobooks have been used, albeit sparsely, in educational contexts since the audiobook became an affordable medium for schools, about twenty-five years ago.[187] Over this period of time, multiple studies have concluded that audiobooks are perceived positively by many students.[188] Audiobooks have been found to function as constructive tools to increase students' engagement with books and to improve their self-perceived competence.[189]

Motivation and engagement

In 2010, an underachieving Middle School in the United States added audiobook-players to

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185 S. Stone-Harris, 'The Benefit of Utilizing Audiobooks with Students Who Are Struggling Readers', (Dissertation: Walden University, 2008), p. 30.

186 Ibid.

187 Knutson, 'Exploring the Influence of Audiobooks on Adolescent Readers', Motivation and Reading Comprehension'.

188 See the results of J. Whittingham, 'Use of Audiobooks in a School Library and Positive Effects of Struggling Readers' Participation in a Library-Sponsored Audiobook Club', *School Library Research,* vol. 16 (2013), T. Knutson, 'Exploring the Influence of Audiobooks on Adolescent Readers' Motivation and Reading Comprehension' or N.A. Thooft, The Effect of Audio Books on Reading Comprehension and Motivation.'Dissertation. (Duluth: The College of St. Scholastica, 2011).

189 Ibid.

their library.[190] Thereafter, their effect on motivation and comprehension was researched in a small group of struggling readers.[191] This group was made up out of non-native speakers, students in special education, and students who fell into both categories. A diverse collection of Middle School reading material for adequate readers was available on the players, including well-known titles like *Charlotte's Web*, *Of Mice and Men* and *A Midsummer Night's Dream*.

Advantages of audiobook reading as voiced by the students were that they 'made them imagine better, helped with understanding, and sped up the reading process because they were not spending time decoding text.'[192] All students reported that the option of choosing audiobooks had made them read more than they would have in print. Another positive effect of audiobook reading is demonstrated by Whittingham et al. In this study, struggling readers who participated in an audiobook club experienced strongly increased reading motivation, particularly due to an improved sense of self-competence.[193] Being able to understand 'big books' and discuss them boosted the students' enjoyment of (audio-)reading fiction. It made them more confident of their own abilities to engage with long, complex narratives. However, not all students prefer audiobook reading. Disadvantages mentioned by adolescent students were that they were easily distracted and sometimes bored. Most students in fact preferred combining two modalities at the same time, something that supports the case for the karaoke book, which will be further discussed in Chapter Five.

The most recent study on the effects of audiobooks on adolescents' reading motivation and engagement has been conducted by Knutson in 2019.[194] A handful of thirteen- and fourteen-year olds were assessed after a four-week summer school programme for struggling readers. Over this period, the students listened to an audiobook for an hour a day. After their participation, students self-assessed their enjoyment of both

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[190] Children in Middle School are between eleven and fourteen years old, which means it roughly corresponds to the first three years of a vmbo-school.
[191] Thooft, 'The Effect of Audio Books on Reading Comprehension and Motivation', p. 31.
[192] Thooft, 'The Effect of Audio Books on Reading Comprehension and Motivation'.
[193] Whittingham et al., 'Use of Audiobooks in a School Library and Positive Effects of Struggling Readers' Participation in a Library-Sponsored Audiobook Club', pp. 1-18.
[194] Knutson, 'Exploring the Influence of Audiobooks on Adolescent Readers' Motivation and Reading Comprehension', pp. 3-18.

print reading and auditory reading via a short survey. Four out of five students expressed a (strong) dislike for print reading, but *all* students wrote down they liked or strongly liked listening to audiobooks. Obviously, this study is too small to draw definitive conclusions about audiobook use. Still, the results are in agreement with the other studies and might indicate that audiobooks can improve reading motivation even for 'zoomers', who were born in the midst of digital distractions.[195]

It is important to note that in both Knutson and Thooft, the audiobook was not ultimately esteemed as a better way of reading by participating students. The studies demonstrate that the different reading profiles of students impact their esteem for audiobooks. The same factors of the audiobook can be perceived as both a pro or con by different students. For example, in the study by Thooft the audiobook was evaluated by students as more distracting than the print book, whereas one of the students in the Knutson study said: 'Some of the pros were [that] it kind of helped me stay focused instead of the background noise that just screws me up.'[196] This indicates that auditory distraction may affect some readers more than visual distraction, and that the question whether or not listening to an audiobook is a fit reading method differs per individual student. It is probably unrealistic to expect that audiobooks would automatically engage students who do not have a particular interest in reading fiction. Just as is the case with print books, guidelines, instruction and reflection on audiobooks should be required.

Technological affordances and limitations

With regards to practical accessibility, the audiobook hits a few bumps in the road. In the first place because it requires a device, and often an internet connection. Although it is generally believed that all young people own a smartphone, this has proven to be untrue. Over the course of 2020, when the COVID-crisis forced Dutch students to follow their classes from home, it became clear that thousands of students cannot afford proper devices to do schoolwork.[197] Vmbo-students are statistically more likely to be in low-income

[195] Zoomers, or Generation Z, describe people who were born roughly between 1997 and 2012. Therefore, internet and digital media have always been ingrained in their lives.

[196] Knutson, 'Exploring the Influence of Audiobooks on Adolescent Readers' Motivation and Reading Comprehension', p. 12.

[197] E. van Gaalen. 'Laptops en lessen in de bieb voor leerlingen uit kwetsbare gezinnen', *Algemeen Dagblad,* 20

households, hence the absence of necessary (personal) devices may hinder equal access for all students.[198] This has to be taken into consideration when implementing audiobooks at an educational level.

Furthermore, certain technical skills are required. Commercial platforms, such as Storytel, are relatively straightforward and easy to use. However, educational services providing audio materials have bumped into problems. The National Library in The Hague found that a national e- and audiobook platform offered to secondary school students required the assistance of teachers or librarians to use and install.[199] Most adolescents are accustomed to using apps and services that invest grandly into making their interface as user-friendly as possible. Poorly functioning systems are demotivating, especially for students who are uninterested in utilising them to begin with.

Another limiting element of audiobooks is that students cannot re-read passages as easily. The difficulties in navigating through long-form audio material are the subject of frequent complaints on fora and audiobook service helpdesks.[200] Audiobooks are best recorded in multiple shorter segments, so that readers can easily navigate through the text, or else they should contain a rewind option that rewinds no more than thirty seconds max.

Not all audiobooks lead to a fun and engaging reading experience. Aside from needing to be easy to install and use, the quality of the material is important. Audiobooks need to be narrated in a professional way, and must be pleasant to listen to.[201] This is quite subjective, so ideally the books can be somewhat customised, for example by offering the same books voiced by different narrators. In order to obtain positive effects on word recognition and comprehension, students must at least have control over the volume and speed of the text.[202] To create an even more immersive experience, extra elements might be added, such as sound effects, cueing aids or music.[203] However, some experts worry

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March 2020. <https://www.ad.nl/binnenland/laptops-en-lessen-in-de-bieb-voor-leerlingen-uit-kwetsbare-gezinnen~ab977c79/> (19 November 2020).

198 Van den Bulk, *Later kan ik altijd nog worden wat ik wil,* pp. 20-21.

199 Kreutzer and Sikkema, 'Het succesvol implementeren van digitaal lezen en luisteren voor de lijst in het VO', pp. 24-28.

200 Examples can easily be found when searching 'audiobook rewind issue'. See, for example, the websites of audiobook- and device providers such Audible, Apple and Sandisk, or common fora such as www.reddit.com.

201 Wolfson, 'Using Audiobooks to Meet the Needs of Adolescent Readers', pp. 106 -108.

202 Ibid., p. 108.

203 J.E. Brown, 'Evaluation of audio books: A guide for teachers', *ALAN Review,* 30, no. 3 (2003), p. 56.

'that if you keep increasing the external support for attention we might actually atrophy the internal control for attention.'[204]

Fiction as training

Although the following matter could be the topic of a philosophical paper in its own right, another argument can be made to defend the place of the audiobook in the classroom. Since the eighteenth century, the consumption of long-form (literary) texts in written form has become normalised and, specifically in educational settings, favoured. Nonetheless, realistically, it should be considered that many struggling readers do not get into a deep reading state when reading print text, are easily distracted, and are on top of that having a miserable time. Offering students who struggle with reading or are aliterate a format that helps them train a selection of the cognitive abilities used in print reading, while also giving them a more enjoyable reading experience, is not a ridiculous idea.

The importance of literacy skills is obvious, but to what extent should they be trained in fiction education? And, perhaps more importantly, are they trained at all, if – as previously demonstrated – struggling readers take far less from a text than adequate readers do? Is it beneficial for literacy development to make unmotivated readers work their way through four to eight fiction books? If supporting long-form reading with audiobooks would cause students to engage with more and different books, is that not equally valuable? Since our adaptation to oral storytelling goes far back, it seems rather odd to approach it as a lesser form of engagement with long-form narratives today.

In conclusion, fiction reading should perhaps not be approached as a systematic training method towards adequate literacy. As John Calapinto has said: 'When we stop to consider that reading a book for "the pleasure of its characters, setting, dialogue, drama, and the Scheherazade an impulse to know what happens next," we realize that the whole audio versus text debate may be somewhat misguided.'[205]

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[204] E. Jaffe, 'Your Brain On Audio Books: Distracted, Forgetful, And Bored', *Fast Company,* 2 December 2014. <https://www.fastcompany.com/3026224/your-brain-on-audio-books-distracted-forgetful-and-bored> (12 January 2021).

[205] K. Dali and L.K Brochu, 'The Right to Listen: A Not So Simple Matter of Audiobooks', *Library Resources & Technical Services* 64, no. 3 (2020), p. 115.

Chapter Five: Dual channel reading

In the previous chapters, it has become clear that the inherent properties of both print books and audiobooks carry specific benefits for specific types of readers. Audiobooks do not contain every element that is offered in print reading, and vice versa. However, both options can have significant effects on students with literacy deficits, dependent on the cause of their issues. This raises the question if it would be worthwhile to combine the affordances of each, creating a multimodal reading experience. This option is currently being explored in the form of 'karaoke books', sometimes called 'talking books'. The karaoke book is a mixed media format in which a user listens to the audio file of a book, while simultaneously reading the text on screen. This is also known as 'dual channel reading'. Just like a karaoke machine does, a karaoke book marks the words that are being read at that moment.[206] Readers can thus easily orientate themselves in the written text while hearing the pronunciation of words and phrases. For readers with a decoding disability or impairment, this takes a lot of the cognitive load from decoding away and creates a more natural reading experience. Karaoke books are already being offered on a small scale to students with dyslexia or visual disabilities, but they are not widely used for other vmbo-students. Karaoke books seem to combine the positive and motivational elements that audiobooks have, with the training of cognitive skills that auditory reading alone does not attend to. This includes word recognition, visual attention span and perhaps to a small extent spelling abilities. The Dutch publisher and karaoke book developer Bontekoe compares karaoke reading to cycling with training wheels: while some students reach a fluent independent reading level quickly on their own, others can benefit from the additional support given by a karaoke option.[207]

Multimodal literacy

Reading via multimodal input through text and audio is commonly referred to as dual

[206] 'Karaokelezen', *Bibliotheekservice Passend Lezen.* <https://www.passendlezen.nl/iguana/www.main.cls?surl=karaokelezen> (24 September 2020).
[207] 'Karaokeboeken leren kinderen lezen', *Oost.nl,* <https://oostnl.nl/nl/showcase/karaokeboeken-leren-kinderen-lezen> (29 November 2020).

channel reading. It is an age-old and common practice, but is typically restricted to specific age groups and settings. Beginning readers typically read aloud in order to gain phonemic skills. Similar practices are used in foreign language acquisition, where reading together and listening to fragments while reading simultaneously are popular didactic methods.[208] Reading aloud has been the norm for a significant period of time, and in certain contexts it is still common amongst adults to assure a deep feeling and understanding of certain texts; think of how hymns or verses are read in religious settings. The benefits of 'sounding-out' in reading acquisition have been discussed by many specialists, and it is not unlikely that karaoke books could be a helpful support to strengthen decoding skills, vocabulary knowledge, fluency and comprehension.[209] In this chapter, the affordances of dual channel reading or audio-assisted reading will be elaborated on from within the cognitive, attentional and ergonomic dimension. Lastly, its impact on reading motivation will be compared to the single channel modalities.

Orthographic representation and fluency

As previously discussed, vmbo-students self-assess their concentration skills as a problem factor during reading.[210] However, this lack of concentration does not affect them much more than it does students in other educational levels . One element that vmbo-level readers do stand out in, is 'reading fatigue'. Generally, readers at other educational levels do not find reading particularly tiring. Yet, over half of vmbo-students do.[211] 'Reading fatigue' can be broadly interpreted, as the causes behind it may differ. It appears in both physical forms, such as eye-strain or discomfort from sitting in the same position for prolonged periods of time, as well as mental forms. Mental fatigue is typically cognitive fatigue, otherwise defined as central fatigue. It results in decreased mental performance after lengthy or challenging mental tasks or during 'acute but sustained mental effort'.[212] Since the vmbo houses many students who find reading demanding, it is not surprising that

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208 B. Inan-Karagul and D. Yuksel. *Teaching Language Skills*, (New York: Nova Publishers, 2014), pp. 183-188.
209 See, for example: Hulme and Melby-Lervåg, 'Educational Interventions for Children's Learning Difficulties'.
210 Tellegen, 'Leesgedrag van vmbo-leerlingen', p. 37.
211 Ibid., p. 38.
212 R. Holtzer et al., 'Cognitive fatigue defined in the context of attention networks', *Neuropsychology, development, and cognition. Section B, Aging, neuropsychology and cognition* vol. 18,1 (2011), pp.108-28. doi:10.1080/13825585.2010.517826

reading fatigue is common. In order to create a more fluent reading experience and lift some of the cognitive load, auditory support during print reading can be a helpful tool.

Combining sensory input can be helpful in creating more phonemic and phonological awareness and consecutively improve reading fluency.[213] It is therefore already quite commonly used in reading interventions for children with dyslexia. The necessary baseline of phonological and phonemic skills is usually present in adolescents.[214] However, adolescents with reading issues can still be affected by underdeveloped phonological awareness. This can, as has been discussed in Chapter Two, lead to poor spelling skills, mispronunciation of words and the inability to properly decode and remember new words.[215]

Research conducted with older primary school children suggests that by presenting stories in both written and oral form, the cognitive loads of language processing are diminished.[216] It could therefore be that by combining the methods, the cognitive demands of orthographic representation are taken away, while one spends less cognitive effort on 'continuously monitoring the oral story presentation (without any 'backup' support from the written text)'.[217] One might expect that due to this diminished effort, the cognitive effects also decrease, but this is not the case. In the study, a treatment group of ten students with reading disabilities read with audio assistance for a minimum of four times twenty minutes a week, spread over an eight-week period, against a control group who did the same without audio assistance. The reading fluency of the treatment group, measured by the amount of words read correctly per minute, increased significantly compared to that of the control group.[218]

Furthermore, it is thought that dual channel reading can have a positive effect on the *reading-writing connection*.[219] However, as has been previously seen, spelling abilities are

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213 Hulme and Melby-Lervåg, 'Educational Interventions for Children's Learning Difficulties', p. 534.
214 Van Steensel et al., 'The Role of Word Decoding, Vocabulary Knowledge and Meta-cognitive Knowledge in Monolingual and Bilingual Low-achieving Adolescents' Reading Comprehension', pp. 313-314.
215 L. Moats and C. Tolman, 'Phonological Instruction for Older Students,' *ReadingRockets* (2009). <https://www.readingrockets.org/article/phonological-instruction-older-students> (19 November 2020).
216 A. Valentini et al., 'Listening While Reading Promotes Word Learning from Stories', *Journal of Experimental Child Psychology* 167 (2018), p. 26.
217 Ibid.
218 K.J. Esteves, 'Audio-assisted Reading with Digital Audiobooks for Upper Elementary Students with Reading Disabilities', Dissertation. (Kalamazoo: Western Michigan University, 2007), p. 51.
219 B. Padberg-Schmitt, 'Increasing Reading Fluency in Young Adult Readers Using

not notably improved by engaging with long-form written content alone, and additional intervention would likely be required.[220] Lastly, 'the combination of the written and the auditory modes can provide support in future readings knowing the correct pronunciation of written words'.[221] This could not only be of use in fluency intervention, but also beneficial to (non-native) students who struggle with reading words phonologically in the target language.

Contents and comprehension

In the previous section, results of dual channel reading experiments suggest a positive effect on reading fluency. As has been discussed earlier, word identification can take up a large amount of cognitive capacity. This prevents a fluent reading experience, while impeded reading fluency decreases the level of comprehension a reader experiences.[222] It has already been explained that, when reading fluency falters, the mental space for vocabulary acquisition suffers, which is why students with reading deficits obtain less vocabulary from print text. Diminishing the cognitive load of processing could likely support readers in encoding the meanings of new words more easily.[223] Since audio-assisted print reading aids the reader with fluency, a natural result would be that reading comprehension also improves. The effects of sounding- out and oral intervention on word- and language comprehension are quite well documented. These have already been thoroughly discussed in Chapter Three.[224] It is plausible that these effects occur in dual channel reading as well, a conclusion that is endorsed by the existing research on karaoke books that will now be discussed.

In one recent study conducted at Sun Yat-sen University, forty-two undergraduates in Humanities or Social sciences were divided amongst three groups. They took a reading comprehension test after reading the same short novel visually, auditory or via both

Audiobooks', *CLELEjournal* 8, no. 1 (2020), p. 43.

220 Ibid.

221 E. Marchetti and A. Valente, 'Interactivity and multimodality in language learning: the untapped potential of audiobooks', *Universal Access in the Information Society*, 17.2 (2018), p. 261.

222 Esteves, 'Audio-assisted Reading with Digital Audiobooks for Upper Elementary Students with Reading Disabilities'.

223 Valentini et al.,'Listening While Reading Promotes Word Learning from Stories', p. 26.

224 See also: Hulme and M. Melby-Lervåg, 'Educational Interventions for Children's Learning Difficulties', pp. 536-537.

channels.[225] This study concludes that those who had read through dual channels obtained the best results on their comprehension test. A point of critique regarding this study is that the specifics of the comprehension test are not made fully clear. Moreover, other factors that could have impacted the participants' reading comprehension were apparently not ruled out.

The conclusion that audio-assisted reading improves comprehension is nevertheless supported by more research, amongst them the previously discussed dissertation by Thooft, that was conducted with struggling adolescent readers.[226] The adolescent readers in this study indicate that audio-assisted print reading improved their level of comprehension. Seventy-five percent of the participating students felt most confident about their comprehension level when they had listened to and read books at the same time, which strongly exceeded their confidence for reading or listening alone.[227] A similar user experience was found in dyslexic Dutch karaoke book-users. Dedicon, a Dutch organisation that develops 'accessible media', surveyed dyslexic students who utilise karaoke books.[228] The survey results show that the (emotional) intonation of the narrator aids in understanding the narrative.[229] Furthermore, Dedicon mentions that when dyslexic readers do not constantly have to read back, this aids their comprehension of the essence of the story.[230] However, the specifications of this survey are not enclosed and, considering that Dedicon is a developer of karaoke book software, its objectivity cannot be fully guaranteed.

Altogether, the use of karaoke books has effects on self-perceived comprehension levels. So far, there is little quantitative research to back up this perceived improvement, but it is probable that textual comprehension does indeed improve. There is a causal relation between fluency and reading comprehension, and dual channel reading has led to

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225 H. Liu, S. Cao and S. Wu, 'An Experimental Comparison on Reading Comprehension Effect of Visual, Audio and Dual Channels', *Proceedings of the Association for Information Science and Technology* 56, no. 1 (2019). pp. 716-718.

226 Thooft, 'The Effect of Audio Books on Reading Comprehension and Motivation.'

227 Ibid., p. 32.

228 'Accessible media' means media that can be accessed by people with (visual) disabilities.

229 'Karaokelezen: tegelijk luisteren en lezen', *Goede Kennis.*<https://goedekennis.dedicon.nl/alle-artikelen/karaokelezen-tegelijk-luisteren-en-lezen> (29 November 2020).

230 Ibid.

observable effects on fluency in the past.[231]

Attention and memory

For the average reader, print text has proven to be more helpful in attention retention than audiobooks due to its ergonomic and haptic properties.[232] Yet, many struggling readers find it equally difficult to stay focused on a print text. For those readers, multi-sensory input might be a solution. A theory called the *multi-sensory learning theory* exists. It states that the best way to pick up information is by acquiring it through more than one sensory modality.[233] The engagement of different parts in the brain supports the ability of focusing on and retaining information. The influence of multi-sensory input is already visible in print reading: the haptics of a print book (feeling and seeing) improve the readers ability to focus and remember.[234] This is because different parts of the brain are engaged when information is accessed that way.

Reading while listening is generally believed to have positive effects on the amount of immersion that takes place. Studies mentioned earlier in this thesis also point to that direction. In the research conducted by Varao-Sousa, the most effective manner of limiting distractions was by reading a text aloud.[235] Whether a student reading print is distracted by sound, or an audio-reader's mind wanders due to visual stimuli, both experience that irrelevant modalities interfere with the text's representation in the working memory.[236] However, when the same input is provided through multiple modalities, the brain does not switch focus that quickly. The brain areas that control visual and auditory attention can be operated in parallel across modalities.[237] The brain can therefore process the input from a karaoke book effectively, while the distracting pull from irrelevant stimuli is ruled out.

The idea that dual channel reading improves one's ability to focus on the content is

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231 See the previous section, *orthographic representation and fluency,* pp. 53-54.
232 See Chapter Two.
233 Hou et al., 'Cognitive Map or Medium Materiality? Reading on Paper and Screen', p. 86.
234 Ibid.
235 T. Varao-Sousa, D. Smilek and A. Kingstone, 'In the lab and in the wild: How distraction and mind wandering affect attention and memory', *Cognitive Research: Principles and Implications*, 3.42 (2018), pp. 1-9.
236 M. Quak et al.,'A Multisensory Perspective of Working Memory', *Frontiers in Human Neuroscience* 9 (2015), p. 8.
237 D. Talsma et al., 'The Multifaceted Interplay between Attention and Multisensory Integration', *Trends in Cognitive Sciences* 14, no. 9 (2010), pp. 400-410. In pdf by publisher: p. 15.

supported by the anecdotal experience of many people who listen to audiobooks while following along with print. For example, in an enthusiastic Reddit-thread on this topic these two randomly-selected users claim:

> *'So I have quite severe dyslexia. (…) I can only really muster about half a page before I notice (…) my eyes are tracing the words and not taking in the content. Similarly with Audiobooks; (…) I notice after about 15-20 seconds that I haven't taken in any of the content. (…) Last night I put on The Order of the Phoenix, cranked it up to 2.0x Speed and managed to get through 150 pages in one sitting without losing concentration once and was taking in every piece of information. (…)'*[238]

> *'I'm not dyslexic but I have been having concentration problems (…), but I've been reading/listening together and it's so much more effective!!! My mom has been doing this too and she was never a reader before so it's pretty amazing.'*[239]

Neurologically, this experience makes sense. The working-memory capacity for audio-visual material is higher than for modality-specific material.[240] However, this likely also means that the 'retrieval of modality-specific information from a cross-modal representation is more difficult than assumed'.[241] It is thus questionable what kind of effect multi-sensory reading has on the ability to retrieve orthographic information, for example. Again, the most relevant question to ask is what the purpose, or intended effect, of dual channel reading should be, and which specific goals can be realised through it. Extensive research on the effect of dual channel reading on print-specific abilities such as orthographic representation has yet to be carried out.

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[238] uMadFam, 20 August 2019, 10:40 GMT+0200. Comment on vaultyboy93, 'Dyslexic here, I read along with Audiobooks…', *Reddit,* 19 august 2019. https://www.reddit.com/r/audiobooks/comments/csf4xi/dyslexic_here_i_read_along_with_audiobooks_i/ (12 November 2020).

[239] LemonCitron47, 19 August 2019, 16:22 GMT+ 0200. Comment on vaultyboy93, 'Dyslexic here, I read along with Audiobooks…', *Reddit,* 19 august 2019. https://www.reddit.com/r/audiobooks/comments/csf4xi/dyslexic_here_i_read_along_with_audiobooks_i/ (12 November 2020).

[240] Quak et al., 'A Multisensory Perspective of Working Memory', p.5.

[241] Ibid.

User experience and ergonomics

Although so far the effects of reading-while-listening seem largely positive, the technological affordances of karaoke books present some challenges. The functionality of talking books is a bit ambiguous. Karaoke books are customarily a digital reading experience. The karaoke book is offered as e-book software, where the 'follow along'-technique is digitally realised by marking the words as they are being sound out. This technique is purposeful for students who experience (severe) word reading level challenges, as is the case with dyslexia, or those with visual impairments that interfere with word reading. For those students, the additional feature of highlighting words as they are said can provide more clarity in the mush of print on a page.[242] However, it is questionable if this particular technique is more beneficial than following along with the text in a print book, especially for students without reading disabilities. E-book reading is known to provide a less immersive reading experience than print reading.[243] When trying to reach the deep reading level that long-form fiction is meant to convey, the affordances of the screen could reduce the immersive effects of dual channel reading.

Moreover, the functionality of karaoke books is highly dependent on functional software and a pleasant user experience, similarly to audiobooks. The karaoke books' affordances play a fateful role in obtaining the desired deep reading results. The importance of well-developed systems has been uncovered in one particular Norwegian study. In 2007, an enhanced reading system called DAISY was run through a usability trial after having been under development for a significant period of time.[244] DAISY, which stands for *Digital Accessible Information System,* is a system offered to students with learning and/or physical disabilities. Its development began in the late eighties. DAISY can store texts, images and sound, and offer additional features, such as a braille-display for blind readers.[245] Although the system is built with much expertise and with the aim to meet many needs, the complications of digital reading were prominently visible in terms of usability. The readers

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[242] See, for example: Hulme and Melby-Lervåg, 'Educational Interventions for Children's Learning Difficulties', pp. 533-544.
[243] Mangen et al., 'Reading Linear Texts on Paper versus Computer Screen', pp. 61-68.
[244] M.E. Stenberg Nes, 'Appraising and Evaluating the Use of DAISY : For Print Disabled Students in Norwegian Primary- and Secondary Education', Dissertation. (Oslo: University of Oslo, 2007).
[245] Ibid., p. 2.

participating in the survey rated the usefulness and ease of most functions as 'low.'[246] Poor scores were received on the traditional 'print'-features of the device, such as creating notes and bookmarks. This is unfortunate, as active engagement with a text, for example by manually marking or writing in the margins, is believed to deepen engagement for students.[247] It is especially important when reading with audio-material, as audio-reading is believed to offer a more passive reading experience than print books do.[248] The auditory qualities of DAISY, such as controlling the speed of the speech, also received negative feedback.

However, electronic karaoke books can also have assets that support struggling readers. Helpful additional features can be integrated. Readers appreciate, for example, the possibility to look up the definition of words while reading, or the possibility to increase font size.[249] Nonetheless, these benefits likely do not outweigh the distracting inconveniences that official karaoke books also bring to the table. Dual channel reading is effective, but at this point, the affordances of karaoke books seem to get in the way of reaching its full potential. Perhaps a more effective way of dual channel reading is simply combining a regular audiobook and a print book, an argument that will be elaborated on in the next section.

Motivation and experience

Extensive quantitative research on the reading experience of users of karaoke books has not yet been carried out. The small-scale studies that have paid attention to dual channel reading do however show positive responses. In Thooft's study, seventy-five percent of participating students stated that, during pleasure reading, they would prefer to do dual channel reading rather than print or audio alone.[250] These students did however not read with a specific karaoke-device, but followed along with print text while listening to audiobooks. The participants of this study universally agreed that reading print and audio

246 Ibid., p. 68.
247 L.C. Larson, 'E-Books and Audiobooks,' *The Reading Teacher* 69, no. 2 (2015), p. 172.
248 Marchetti and Valente, 'Interactivity and multimodality in language learning', p. 258.
249 Larson, 'E-Books and Audiobooks', p. 174.
250 Thooft, 'The Effect of Audio Books on Reading Comprehension and Motivation', p. 31.

at the same time gave them the most confidence in their reading comprehension.[251] The study indicates that dual channel reading has a motivational effect on struggling adolescent readers, even when no specific karaoke book software is used. By using this more traditional method of dual channel reading, limiting properties of karaoke book software can be foregone.

In Larson, a study conducted with sixth-graders, evaluations of dual channel reading were also mostly positive. Students mention that their reading stamina increased and they were not as keen to give up when encountering difficult language.[252] Some qualities that are specific to digital karaoke books were also praised for increasing motivation. A prominent aspect is that digital karaoke books create a feeling of inclusivity. Students with special needs who would otherwise need different material (e.g. big letter books) can now access their special needs options in the karaoke book, unnoticed by their classmates.[253] Another element that is mentioned is that the digital formats generally are perceived as more interesting or flashier than traditional print books, but this sentiment might be stronger with primary school students than it is with adolescent readers.

In sum, the research so far shows that dual channel reading is a promising additional option to support struggling readers. By taking away some of the cognitive load of print reading, the reading experience becomes more fluent. This supports struggling readers with comprehending the text, which can consecutively realise the immersive, deep reading experience that is intended in fiction reading. For (phonological) vocabulary acquisition, dual channel reading even appears to have an advantage over print reading. However, positive effects of print reading on literacy might be best obtained when traditional print books are combined with audio books. Specific karaoke book software is hard-to-use, sometimes faulty and the digital text can be distracting and might thus reduce the level of immersion.

[251] Ibid., p. 37.
[252] Larson,'E-Books and Audiobooks', p. 174.
[253] Ibid., p. 173.

Conclusion

Over the past years, a significant decrease in literacy abilities has been observed amongst Dutch youth. A considerable percentage of Dutch fifteen-year olds fail to attain the basic literacy level required to participate in society. This phenomenon is particularly visible in vmbo-level secondary schools. Literacy skills and a variety of related cognitive abilities can be trained by deep reading long-form fictional literature. However, many vmbo-students have language- and literacy deficits upon entering secondary school, lack a consistent reading routine, and experience aliteracy. On top of this, there is relatively little room in the four-year educational track to improve their situation. This results in a Matthew Effect, where struggling readers are reluctant to read and read little, so their abilities barely improve.

Educators and policymakers are thus looking for ways to create reading incentive for students who need it most. There is an increasing interest in offering fiction through new media formats, such as the audiobook, or the lesser known karaoke book. These technologies have their own affordances and effects, which impact the way in which a user interacts with the contents. The ultimate goal of this thesis was to compare the intentional and unintended effects of print reading, audiobook reading and dual channel (karaoke book) reading. A comparison was made by applying the framework proposed by Mangen and Van der Weel. This frameworks suggests an approach of interface affordances through multiple dimensions. The effects of print reading within the setting of a vmbo-level educational reading context were compared in the attentional, cognitive, emotional, phenomenological and ergonomic dimensions.

When processing linguistic information, parts of the brain function independently of modality. It has been discovered that both auditory and visual information travel through the central nervous system in a similar way. Processing social and emotional information happens similarly in both modalities. The inferior frontal gyrus, which controls language processing, language production and language comprehension, also functions similarly regardless of modality. When the intended effect of long-form reading is to improve skills that belong to the aforementioned categories, audiobooks can function as a proper

alternative to print reading.

However, there are also significant differences in reading between modalities. The orthographic representation is completely removed from audio-reading. Considering that many students in the vmbo are vulnerable to low literacy, the removal of decoding skills is problematic. Another discouraging aspect is the fact that audiobooks' technology allows for easy distractions, which is not ideal for a demographic group that assesses their own concentration skills as a limiting factor in reading. It should however be taken into consideration that the reading fatigue experienced by vmbo-students during print reading also hinders their attention retention. Reading fatigue caused by fluency or word knowledge issues could in fact outweigh the concentration-improving effects caused by the haptic and ergonomic affordances of print books.

In terms of user experience, audio-reading can be fastidious. Audiobooks can be pleasant and motivating to use, but they have to be of high quality and customisable to the individual student's needs. To effectuate this quality on a national level would require significant investments, which so far has not been done in the Netherlands. From this practical point of view, print reading is cheaper and more accessible for educational institutions.

The strongest support for using audiobooks in secondary school is the effects it has on reading motivation. Many struggling readers find 'reading' through audiobooks a relief. It increases their feelings of competence and helps them engage with long-form fiction in a way that is usually hindered by their reading abilities. When the cognitive workload is no longer occupied with low order reading skills, these students get the chance to be immersed in a text. This can also prevent them from getting stuck in reading material that matches their literacy level, but does not challenge them in terms of high order skills, such as inference-making or understanding metaphorical speech.

The idea that just making students read long-form print text will automatically improve their reading abilities does not hold ground: specific intervention is almost always required. One way to combine the best of both worlds, might be serious investigation into the use of dual channel reading via karaoke books. The karaoke book could perhaps function as a low-effort form of reading intervention. Considering that time is highly valuable in vmbo-classrooms, this form of reading may be an interesting support tool. Of

course, like the audiobook, it requires user-friendly software of high quality. If it functions properly, though, it requires little support and can easily be used in the student's own time. Multi-sensory input has a beneficial impact on the reader's fluency. Distraction by irrelevant stimuli is minimised, and the working memory is most effective at remembering when it is exposed to multiple modalities. This has a positive effect on reading fluency and subsequently on comprehension. As has been suggested, karaoke books could be viewed as training wheels. In that definition, they can be regarded as a tool that supports readers who cannot or are unwilling to make their way through a print book. Just like regular training wheels, the karaoke book can ultimately create readers who can 'cycle' without the additional support. The existing research on dual channel reading is promising. It is suggested that dual channel reading diminishes the cognitive load and working memory effort that interfere with attaining the benefits of deep reading, such as vocabulary acquisition and comprehension. When reading is no longer a difficult and tiring task, the intrinsic motivation to read fiction is likely to increase.

However, it is counterproductive to make generalising claims about the functions of either form of reading. Vmbo-students are the largest group of Dutch secondary school students. There are big differences between their abilities and their needs are diverse. While audio- or karaoke book reading might give an impulse to one student's reading behaviour, another might not reap any benefits from alternative reading methods. Most importantly, the purposes and the intended effects of fiction reading in school need to be clearly assessed. Listening to fiction might make the narratives more meaningful for some, but it is unlikely that it will directly improve the PISA literacy scores. It is a matter of which of these two we consider to be more important.

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