Identifying student and classroom characteristics related to primary school students' listening skills: A systematic review

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Abstract

This study presents a systematic review of the empirical research on primary school students' first language listening skills. In total, 27 studies were selected and reviewed. The purpose of this review is twofold. First, outcome variables of listening skills were labeled according to the conceptual HURIER model of Brownell (2006). Results showed that most studies evaluated listening skills as the ability to remember, understand or interpret the auditory message. Second, important correlates according to the model of Palardy and Rumberger (2008) were related to primary school students' listening skills. At the classroom level, a significant relationship was found between students' listening skills and teaching practices (e.g. listening strategy instruction) as well as classroom features (e.g. classroom noise). At the student level, a significant relationship was found between students' listening skills and their cognitive skills (e.g. working memory) and background characteristics (e.g. socioeconomic status). Based on these results, suggestions for further research and practice are discussed.

Key words: listening skills, primary education, language education, educational effectiveness, systematic review

Highlights

- This systematic literature review reveals trends and shortcomings in empirical studies regarding listening skills in the primary education context.
- The HURIER model of Brownell (2006) is used as a conceptual framework.
- The model of Palardy and Rumberger (2008) is used as an analytical framework.
- Input and process characteristics of listening skills at the student and class level are identified.

This systematic review is relevant as it illustrates how listening skills, defined by the HURIER model of Brownell (2006), could be improved by identifying different important correlates of first language listening skills according to the model of Palardy and Rumberger (2008).

1. Introduction

Listening is one of the four language skills, next to speaking, reading and writing (Hopper, 2007). Good listening skills are of critical importance in daily, relational, educational and industrial life (Iwankovitsch, 2001). In the educational context, research indicates that primary school students spend approximately 50 to 75% of each school day listening to teachers, classmates or audio-supported media (Imhof, 2008; Sandall, Schramm, & Seibert, 2003). Consequently, proficient listening is an essential language skill for primary school students, for various reasons (Barr, Dittmar, Roberts, & Sheraden, 2002; Bommelje, Houston, & Smither, 2003; Dickinson, McCabe, & Sprague, 2003). First, listening skills and academic success or knowledge are closely connected, since listening is an important medium for students to process and acquire information (Sandall et al., 2003). More specifically, students require listening skills because it is the primary means by which information is transferred from teachers to students. If students listen efficiently, they are able to follow a line of reasoning, monitor their understanding and actively connect new information to their prior knowledge (Imhof, 2008; Wolvin & Coakley, 2000). The second reason why listening skills are essential in primary school is that they play a key role in literacy success and the development of numerous other language skills, such as reading comprehension (e.g. Jalongo, 2008) and writing skills (e.g. Sandall et al. 2003). Third, students also need listening skills to understand practical oral instructions from the teacher, such as homework assignments (Owca, Pawlak & Pronobis, 2003). Finally, good listening skills are fundamental for the development of social and relational skills in the school context (e.g. during group discussions, literary conversations) (Adelmann, 2012; Wolvin & Coakley, 2000).

Despite its importance, listening skills are still rather challenging for many students (Owca et al., 2003), especially for non-native speakers (Janusik, 2010; Swanson, 1997) and students with language impairments (Hulme & Snowling, 2009), learning disabilities (Pulsifer, 1996) or hyperactivity disorders (McInnes, Humphries, Hogg-Johnson & Tannock, 2003). There are many different explanations why so many students with normal hearing capacity also possess insufficient first language listening skills. In the literature, various contextual factors have been mentioned, such as classroom noise and bad acoustics (Dockrell & Shield, 2006;

Howard, Munro & Plack, 2010). It has also been suggested that there is a shortage of listening instruction (Beall, Rosier-Gill, Tate & Matten, 2008; Hopper, 2007; Johnson & Long, 2007). In communication courses, in particular, less than 7% of the time is actually spent on providing listening instruction (Janusik, 2002; Janusik & Wolvin, 2002). A possible explanation for this lack of listening instruction is the fact that there is simply not enough high-quality material to teach listening skills (Jalongo, 1996; Janusik, 2002). In this respect, it is often argued that listening has long been regarded as a passive and instinctive skill that develops naturally, resulting in little instruction time dedicated to teaching it (Jalongo, 1996; Swanson, 1997). More recently, language researchers see listening as a complex mental process that does not develop spontaneously but requires instruction (Adelmann, 2012; Beall et al., 2008; Kutlu & Aslanoğlu, 2009). During the last two decades, language researchers increasingly focus on listening research. Predictors of listening skills are being more and more investigated in (pre)school students (e.g. Florit, Roch, & Levorato, 2011; 2013) and second language learners (e.g. Li, Cheng, & Kirby, 2012). In the primary school context, listening researchers often relate student background characteristics such as gender and home language to listening skills (e.g. Yildiz et al., 2010). Other language researchers identify linguistic knowledge (e.g. vocabulary) and cognitive abilities (e.g. working memory or reasoning skills) as the most important predictors of listening skills (e.g. Wolfgramm, Suter & Göksel, 2016). Further, they increasingly investigate the effect of teachers' instructional methods on listening skills (e.g. Oduolowu & Oluwakemi, 2014; Stevens, Van Meter & Warcholak, 2016). Despite the newly found accreditation of listening and the availability of recent experimental listening studies, there is, however, no state-of-the-art of what works in listening education. In general, the findings of existing listening studies have not yet been synthesized and an overview of the empirical listening research in primary school is lacking (Wolfgramm et al., 2016). As a consequence, listening skills still remain one of the least understood processes in language acquisition (Osada, 2004). Therefore, the intent of this study is to analyze the existing listening literature and to give a systematic overview of the correlates of primary school students' listening skills. An overview of the existing knowledge about listening skills is essential to enlarge the knowledge about listening skills, predictors of listening skills and the evidence-informed teaching of listening skills.

In addition, there is still no universally accepted view regarding the conceptualization of listening. This lack of agreement about fundamental concepts has made it difficult to identify the boundaries of the field for purposes of teaching and research (Witkin & Trochim, 1997). As a consequence, there is considerable variability in defining and especially in evaluating

listening skills. For instance, some researchers assessed listening in a quantitative manner by using a multiple-choice listening test (e.g. Aarnoutse, van den Bos, & Brand-Gruwel, 1998), while others evaluated listening during an interactive moment between the students and the teacher (e.g. Oduolowu & Oluwakemi, 2014). In this way, the first challenge of this review is to organize the different listening concepts in the literature. In this respect, a conceptual model will be used to describe and analyze the outcome variables of students' listening skills in different studies. The second challenge is to give a systematic overview of which student, classroom and school variables are related to primary school students' listening skills. An educational effectiveness model will be used as a framework to categorize the selected listening studies.

2. Theoretical framework

2.1. Defining listening skills: the HURIER model

Many different definitions of first language listening skills are found in the literature (McKenzie & Clark, 1995; Witkin, 1990). Most of these definition models share similar components and almost all are consistent with variations of the six most used elements in listening definitions: i.e. perception, attention, remembering, interpreting, evaluating and responding (Janusik, 2007). For example, Wolvin and Coakley's behavioral model defines listening as *'the process of receiving, attending to and assigning meaning to aural and visual stimuli'* (Wolvin & Coakley, 1996, p.69). Barker conceptualizes listening as *'the selective process of attending to, hearing, understanding, and remembering aural symbols'* (Barker, 1971, p.17), while Bostrom defines listening rather as *'the acquisition, processing, and retention of information in the interpersonal context'* (Bostrom, 1997, p. 247). In addition, Brownell (2012) fragmented listening into a range of skills and developed the HURIER model, which is an acronym for *hearing, understanding, remembering, interpreting, evaluating and responding*. Brownell's HURIER model resulted from a comprehensive review of the literature and standardized tests to measure listening competence.

For the purpose of this review, the model of Brownell (2012) was chosen to define listening skills, as this model provides the clearest and most complete blueprint for listening development and testing. Moreover, the HURIER model recognizes the complexity of listening and clearly defines the six behaviors involved in the listening process. As a consequence, Brownell's six proficiency levels are suitable to investigate different aspects of students'

listening skills. Although these six components are interrelated, each component can be approached as a separate skill area (Brownell, 2012).

The first component, *hearing*, is a physiological and passive process, referred to as the ability to attend to and perceive a message (Brownell, 2012; Sweetow & Sabes, 2006). The ability to hear presupposes a healthy, functioning auditory system and is a prerequisite for listening (Behrens, 2010).

Next, *understanding* is an active process that allows listeners to comprehend the message based on information literally presented. Understanding implies that the listener decodes and analyzes the message to comprehend it (Brownell, 2012). Students constantly find themselves in listening situations where understanding is their primary goal, for example when they are looking for details in an auditory text or are following directions from teachers and peers (Brownell, 1994).

The third component, *remembering*, is the ability to retain and retrieve information in working and long-term memory. Early memory researchers divided the memory process of listening into short-term and long-term memory (e.g. Kahneman, 1973; Loftus & Loftus, 1976). By 1980, the Working Memory theory became the dominant theoretical perspective, replacing short-term memory theory (Janusik, 2007). Working memory, often described as a “mental workspace”, refers to the ability to actively keep task-relevant information in mind while processing information (Just & Carpenter, 1992). While working memory has a limited storage capacity (Janusik, 2007), the opposite is true for long-term memory (Brownell, 2006). Long-term memory has an enormous storage capacity, as it requires the retrieval of information that is no longer present or maintained in an active state (Cowan, 2008). Both working and long-term memory are key cognitive resources associated with individual differences in listening skills (Just & Carpenter, 1992).

The fourth component of the HURIER model is *interpreting*, which refers to the ability to combine visual, auditory and situational information to fully understand a message. Moreover, interpreting refers to attaching meaning by connecting information from the text to previous experiences (Brownell, 2012). Interpreting also means making sense of a message by processing paralinguistic (e.g. tone of voice), kinesthetic (e.g. posture, facial expression, bodily movement) and proxemics cues (e.g. contextual knowledge, the use of space) (Brownell, 2006; 2012; Wolvin, 2010). In this respect, audiovisual listening material is superior to audio only material, since the dual-channel representation provides more information for students to interpret the message (Mayer, 2001).

Fifth, *evaluating* entails the ability to assess a message, referred to as *critical listening* by Brownell (2012). Critical listeners apply a variety of skills, such as judging the validity and adequacy of main ideas and supporting arguments, distinguishing facts from opinions, inspecting, comparing and contrasting ideas, and arriving at a conclusion.

The final component, *responding*, is being able to select an appropriate response to what is heard. As to the classroom context, researchers prefer the term *interactive listening* rather than responding (Canpolat, Kuzu, Yildirim, & Canpolat, 2015; Vandergrift, 1997). Interactive listening takes place in a communicative situation in which the listener, taking an active role, provides responses, such as signaling comprehension, requesting clarification and negotiating meanings. In doing so, s/he solves communication problems, shapes the discourse, and accomplishes certain goals of interaction (Xiaoxian & Yan, 2010). Based on these six components of the HURIER model, the present study defines listening as an interactive and comprehension process through which students hear, understand, remember, interpret, evaluate and respond to what is presented.

2.2. Analyzing listening skills according to the effectiveness model of Palardy and Rumberger (2008)

The major aim of educational effectiveness models is to reveal the impact of relevant input and process characteristics on educational outputs and this at the student, classroom and school level (Scheerens, 2016). For this review, an educational effectiveness model will be used as an analytical framework to determine which characteristics are associated with differences in students' listening skills. The field of educational effectiveness research offers some well-developed and research-based theoretical models such as the dynamic model of Creemers and Kyriakides (2010), the model of Palardy and Rumberger (2008) or the model developed by Scheerens (1992). These educational effectiveness models all systematically present inputs and processes related to educational outcomes and explain why specific factors are important for explaining variation in student outcomes. In order to choose the best fitting analytical framework for this systematic review, different effectiveness models were compared. Eventually, the model of Palardy and Rumberger was selected because this model subdivides general categories (e.g. teacher practice or student background) in very specific and thoroughly described subcategories (e.g. "instructional modalities of the teacher" or "family background") and this for the student, class and school level. This subdivision facilitates the categorization of selected studies according to the different levels of the model.

The model of Palardy and Rumberger (2008) (Fig. 1) illustrates that educational input and process characteristics operate at three levels to explain the variation in students' achievement, i.e. the student, classroom and school level. Input characteristics refer to the structural, contextual and background characteristics of the students, teachers and schools that are potentially related to students' outcomes but are beyond their control. Process characteristics, in contrast, refer to behavioral and attitudinal characteristics over which students, teachers and schools have more control (Palardy & Rumberger, 2008).

Fig. 1. The educational effectiveness model of Palardy and Rumberger (2008)

The first level at which these characteristics operate involves the student level. *Student input* characteristics are classified into three categories: demographics (subcategories: ethnicity, age and gender), family background characteristics (subcategories: socioeconomic status and family structure) and academic background characteristics (subcategories: prior achievement and retention). Palardy and Rumberger (2008) refer to *student process* characteristics as student experiences, which include time on task, peer interactions and motivation to learn.

The second level at which these characteristics operate involves the classroom level. In the model of Palardy and Rumberger (2008) this level refers to both classroom and teacher characteristics. *Classroom input* characteristics refer to teacher background (subcategories: credentials, experience and training) and classroom features (subcategories: class composition, instructional resources and class size). Further, Palardy and Rumberger (2008) define *classroom processes* as (1) teacher attitudes (subcategories: teacher expectations, community and teacher efficacy) and (2) teacher practices (subcategories: instruction time, instructional

modalities and specific practices). More specifically, the subcategory “instructional modalities” refers to a *general* teaching technique such as ability grouping or differentiation, while “specific practices” entail *subject-specific* listening activities such as providing instruction on listening strategies or using a specific type of auditory text (Palardy & Rumberger, 2008).

At the third level, *school input* characteristics involve student composition (e.g. based on socioeconomic background), resources (e.g. type of textbooks) and school size. *School process* characteristics include decision-making and the school’s academic and social climate (Palardy & Rumberger, 2008).

To conclude, the general aim of this review is to synthesize existing listening research and to foster the development of new knowledge concerning listening skills, predictors of listening skills and the evidence-informed teaching of listening skills. To reach this goal, we first want to investigate how students’ listening skills were defined and described in different studies, according to the HURIER model. Second, we want to investigate which input and process characteristics according to the model of Palardy and Rumberger (2008) are related to primary school students’ listening skills. In this way, the general aim can be subdivided into two research objectives:

- (RO1): Identifying skills of Brownell’s HURIER model (2006) addressed in the listening research literature;
- (RO2): Categorizing the input and process characteristics of the listening studies according to the model of Palardy and Rumberger (2008).

3. Method

To analyze which input and process characteristics at the student, class and school level are related to primary school students’ listening skills, the standard steps of a systematic review process were followed. First, potential studies were searched through scanning relevant databases. Second, these potential studies were screened and selected on the basis of inclusion and exclusion criteria, based on the recommendations of the PRISMA statement. Third, the data from the selected studies were abstracted and analyzed. All steps of the review process were discussed in an interdisciplinary research team consisting of two educational effectiveness researchers and one literacy researcher.

3.1. Literature search

To conduct this review, the major electronic and academic databases – The Education Resources Information Center (ERIC), Web of Science (WoS) and Linguistics and Language Behavior Abstracts (LLBA) – were searched for scholarly journal articles in December 2017. The search was limited to the last three decades before the study began. A Boolean logic combining key concepts from the research question was applied. Search strings consisted of a combination of the following terms that were scanned for in titles, keywords, abstracts and full text: (listening * OR listening skills OR listening comprehension) AND (correlates OR predictors) NOT (second language OR foreign language OR EFL OR ESL). Only peer-reviewed studies were identified, resulting in 3553 hits.

3.2. Study selection

The study selection protocol is based on the recommendations of the Preferred Reporting Item for Systematic reviews and Meta-Analyses PRISMA statement (Moher, Liberati, Tetzlaff, & Altman, 2010). The PRISMA flow diagram (Fig. 2) conveys the different phases of this systematic review from the number of records identified through to those included and excluded.

Fig. 2. Overview of the search protocol based on the PRISMA statement.

The initial search of the three databases identified 3553 studies. Duplicates were excluded and results were refined by research domain (i.e. social sciences, educational research and psychology), resulting in 2756 studies. In the first screening phase, the first author screened relevant studies by judging *title and abstract*. Studies were excluded if they were not about first-language listening skills, were not published in English or were not reporting an empirical study (e.g. reviews or editorial). After this first screening phase, the remaining 126 studies were downloaded to a computer into the electronic format Mendeley. These studies were *read fully*

in order to evaluate their relevancy for the aims of this study. Again, these studies were screened against different inclusion and exclusion criteria. In this second selection phase, studies were excluded if (a) the study was not situated in the regular primary education context. More specifically, studies were excluded if they focused on second- or foreign-language listening skills or focused on listening in music education. Further, studies were excluded if (b) the study was not investigating operationally defined listening skills based on one or more components of the HURIER model or (c) the study was not analyzing the relationship between student, class or school characteristics and students' listening skills.

Based on these eligibility criteria, the first author selected 28 relevant studies. Three extra studies were selected after scanning the reference lists of the full text papers (snowballing method). After fully-reading the articles, 31 studies were selected. In case of doubt, the members of the interdisciplinary team assessed the relevance of these studies. In order to select interventional and correlational studies of sufficient quality, different methodological criteria for the interventional and correlational studies were considered. The following three methodological criteria were considered for the interventional studies:

- The interventional study had to include a control group. Without control group it is unclear whether the results of the experimental group were caused by the intervention or by normal developments.
- The interventional study had to provide pretest and posttest measures. If there was no pretest, there could be initial differences between the control and the experimental group.
- The study sample had to include at least ten students per group in order to ensure that the effect size Cohen's d would be approximately normally distributed (Hedges & Olkin, 1985). Studies with fewer than ten students per group were, therefore, excluded from our systematic review.

The following methodological criteria was considered for the correlational studies:

- The correlational study had to include adequate statistical analysis with significance level/confidence intervals reported.

To maintain a high methodological quality, four extra interventional studies that did not meet our methodological criteria were deleted. The final literature search yielded 27 studies that were analyzed in the review. Of the selected studies, 14 studies were interventional studies and 13 were cross-sectional studies.

3.3. Data abstraction and analysis

In the first phase of analysis, the following study characteristics were formally abstracted: authors and publication year, country, grade and sample size, methodology, study design, study duration, level and description of the independent and dependent variables, applied listening test, and study outcomes. The descriptive information of the papers can be found in Appendix A, B, C and D. During the second phase of analysis, the first author clustered the 27 selected studies. First, the dependent variables were categorized according to the six components of the HURIER model of Brownell (2006). Second, the independent variables were categorized according to the category (e.g. student background) and the subcategory (e.g. family background) of the multilevel model of Palardy and Rumberger (2008). In a third phase of analysis, an independent coder reviewed the categorization of all 27 studies based on the abstracts. When this categorization was compared to that of the first author, it was shown that all disagreement was due to ambiguity in the subcategories of instructional modalities and specific practices. These subcategories were therefore further clarified and categorized once more by both the first author and the independent coder. Afterwards, a percent agreement for the categorization of all 27 studies of 100% was achieved for the subdivision in levels, 96% for the subdivision in categories and 93% for the subdivision in subcategories. In case of disagreement, consensus was reached between the reviewers by discussion. In a fourth phase, for each category and subcategory of the model of Palardy and Rumberger (2008), all relevant findings were described to make comparisons and render joint interpretations. In the final analysis stage, the findings were summarized and conclusions were drawn to present an overview of the relationship between input and process characteristics on the one hand and students' listening skills on the other hand.

4. Results

In total, this review included 27 studies. This section presents the findings from the systematic review based on the HURIER model (2006) and the model of Palardy and Rumberger (2008).

4.1. Identifying skills of Brownell's HURIER model (2006) addressed in the listening research literature

The six components of the HURIER model (i.e. Hearing, Understanding, Remembering, Interpreting, Evaluating and Responding) were used to label the outcome variables (i.e. listening skills) of the selected studies. Table 1 shows that all 27 studies evaluated maximum three different components of the HURIER model. Most studies could be classified on the

understanding (18 studies) and/or interpreting level (12 studies) of the HURIER model (Brownell, 2012). This means that most studies evaluated listening skills as the capacity to identify information that has been explicitly mentioned in the text (i.e. understanding level) or as the capacity to integrate different information from the text (i.e. interpreting level). For example, in the study of Paris and Paris (2016) teachers taught their students different strategies to identify story characters and objects (understanding component) or to make inferences about thoughts and feelings (interpreting component). Further, 8 studies focused on the remembering level. In these studies students often have to retell a story or have to recall as many events as they could remember. For example, in the study of Stevens et al. (2016) teachers trained their students in retelling narrative stories. Only 5 studies included the hearing level. These studies mainly investigated in which listening condition (e.g. listening to a story with or without background noise) students show the most favorable listening behavior. Finally, only 4 of the 27 studies focused on the evaluating level (e.g. students have to make judgments about the content of the text) and 2 studies focused on the responding level (e.g. students need to compose a poem about a story). A detailed overview indicating how outcome variables were labeled according to the HURIER model is in Appendix A (teaching practice), Appendix B (classroom features), Appendix C (teacher background) and Appendix D (student background).

Table 1
Overview of studies per level of the HURIER model

Level of the HURIER model	Studies	Number of studies
Hearing	2, 12, 13, 14, 16	5
Understanding	1, 4, 5, 8, 9, 10, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27	18
Remembering	6, 7, 8, 10, 16, 22, 24, 25	8
Interpreting	1, 3, 5, 8, 9, 11, 15, 17, 20, 21, 24, 27	12
Evaluating	4, 20, 21, 23	4
Responding	3, 11	2

4.2. Categorizing the input and process characteristics of the listening studies according to the model of Palardy and Rumberger (2008)

In total, 15 studies focused on the class-level variables and 12 examined student-level variables. No studies were found to address characteristics at the school level. Table 2 gives an overview of the categorization and results of all studies included in the systematic review. Out of the 27 studies, 26 were conducted from a single-level perspective. For these studies, all the independent variables belonged to one level of the model of Palardy and Rumberger (2008), more specifically the student or class level. Only one multilevel study, the study of Oduolowu

and Oluwakemi (2014) was classified into two different levels (i.e. class level as well as student level).

Table 2

Overview of studies per level, category and correlate

Level	Category	Subcategory	Correlate	Studies	Results Effect size (d): small = 0.20, moderate = 0.50, large = 0.80
<i>Class</i>	Teaching practice	Specific practices	Listening strategy instruction	1	Significant positive (p<.05)
			Text type familiarization techniques	4, 5, 8, 10	Significant positive: 5 (p<.001), 8 (p<.05), d= 0.40-0.90, 10 (p<.01), d= 0.10-0.49 Non-significant: 4 (p>.05)
			Using specific listening material	11	Non-significant (p>.05)
			Visual techniques	3, 6, 7	Significant positive: 3 (p<.05), 6 (p<.01), d= 0.80, 7 (p<.05), d=0.73-0.89
		Instructional modalities	E.g. Computer-assisted instruction program, integrating listening and speaking activities, giving homework	2, 9	Significant positive: 2 (p<.01); 9 (p<.001), d=2.74
<i>Student</i>	Classroom features	Classroom features	Improving classroom acoustics	12,13,14	Significant positive: 12 (p<.001), 13 (p<.001), d=0.90, 14 (p<.01)
			Class size	15	Significant negative (p<.05)
		Teacher background	Teacher training	16	Significant positive (p<.05)
	Student background	Family background	Socioeconomic status	17, 20	Significant positive: 17 (p<.01), 20 (p<.001)
			Home language	26	Significant positive (p<.001), d=0.48
			Cultural background	7	Significant positive (p<.001)
		Academic background	Language skills	17,19,23,26	Significant positive: 17 (p<.05), 19 (p<.001), 23 (p<.01), 26 (p<.001), d=0.81
			Cognitive skills	18,24, 25, 26, 27	Significant positive: 18 (p<.001), 24 (p<.05), 25 (p<.05), 27 (p<.001), d=0.46 Non-significant: 24, 26 (p>.05)
		Demographics	Gender: female	7,22,23,26	Significant positive: 7 (p<.05) Non-significant 22, 23, 26 (p>.05)
	Student experiences	Student experiences	Motivation	21	Significant positive (p<.001)

Figure 3 visualizes which categories and correlates of the model of Palardy and Rumberger (2008) could be addressed in this systematic review. This overview shows that most of the studies focused on the relationship between teaching practices (i.e. instructional modalities and specific practices) and student background characteristics (i.e. family background and academic background) on the one hand and students' listening skills on the other hand. At the classroom level, the relationship between classroom features and listening skills was considerably investigated. Further, none of the selected studies addressed teachers' attitudes and only one study addressed teachers' background. At the student level, listening skills related to student experiences were barely investigated. Figure 3 also shows that none of the selected studies focused on the school level.

Less than 3 studies investigated this relationship:
 Between 3 and 10 studies investigated this relationship: _ _ _
 More than 10 studies investigated this relationship: _____

Fig. 3. Overview of the amount of studies based on the model of Palardy and Rumberger (2008).

4.2.1. Results at the class level

Sixteen studies investigated the relationship between class level characteristics and students' listening skills, and 14 of them were intervention studies with a pretest-posttest control group design. The other 2 studies were descriptive in nature, using a cross-sectional design. Of the 14 intervention studies, only 4 studies ^(1,8,9,16) have included a retention test design.

As to the class level, three out of four categories (i.e. teaching practice, classroom features and teacher background training) of the model of Palardy and Rumberger (2008) were discussed. A detailed overview indicating how variables at the class level are related to students' listening skills is presented in Appendix A (teaching practice), Appendix B (classroom features) and Appendix C (teacher background).

4.2.1.1. Class level: Teaching practice

This first category at the class level classified 10 intervention studies and 1 cross-sectional study investigating the relationship between the practice of the teacher and primary school students' listening skills. Further, teaching practice could be divided into the subcategories "specific practices" (n=9) and "instructional modalities" (n=2). As stated in section 2.2., the subcategory "specific practices" entails *subject-specific* listening activities such as providing instruction on listening strategies, while the subcategory "instructional modalities" refers to a *general teaching technique* (Palardy & Rumberger, 2008). In most studies, a significant positive effect of teaching practice on students' listening skills was observed (n=9). Most intervention studies about listening skills were set up in the lower primary grades (i.e. first or second grade) with only two studies focusing on upper primary grades (i.e. fifth grade).

Teaching practice: specific practices. Nine studies investigated the relationship between a specific listening practice and students' listening skills. First, four studies ^(4,5,8,10) examined the effects of specific text type instruction (i.e. instruction in expository or narrative text comprehension) and three out of four found a significant result. In this respect, Paris and Paris (2007) and Stevens et al. (2016) reported a significant positive effect of narrative instruction on narrative listening comprehension, while Kraemer, McCabe and Sinatra (2012) reported a significant positive effect of expository instruction on expository listening comprehension. More specifically, Paris and Paris (2007) found that 83 first-grade students benefited from *narrative strategy instruction* after a five-week during intervention. Narrative strategy instruction refers to teaching children comprehension strategies that were specific to the cognitive demands of understanding narrative stories. Teachers taught their students, for example, strategies for identifying the characters or making inferences about thoughts and feelings of the stories. Further, in the study of Stevens et al. (2016) kindergarten and first-grade students were trained in narrative text comprehension through *story structure instruction* (SSI) and this for the period of one school year (15 minutes a day). SSI provides explicit instruction

during traditional storybook reading. For example, teachers trained students in retelling stories and asked students questions about events such as the main character or the location. In the study of Kraemer et al. (2012) 37 first-grade students heard expository *read-alouds* for four weeks, while two control classes followed their teacher's normal schedule. Diakidoy (2014), however, found no significant impact of text type familiarization on second-grade students' listening skills.

In addition, three studies ^(3,6,7) focused on applying visual techniques during listening training and they all reported a significant positive impact on the experimental group. First, Oduolowu and Oluwakemi (2014) found a significant positive effect of *storytelling with illustrations* on first-grade students' listening skills. During a three-week long intervention, trained teachers told the three stories twice a week. The experimental group was exposed to storytelling supported with illustrations, while the control group did not receive any visual support. After seven weeks the experimental group significantly outperformed the control group in retelling the stories. Second, Center, Freeman, Roberston and Outhred (1999) carried out to assess the effect of a *visual imagery training program* on the listening skills of 66 second-grade poor comprehenders, randomly allocated to an experimental group (instruction with visual imagery training) or a control group (instruction without visual imagery). Only the experimental group was asked to visualize (paint a picture in their minds) the main features of each presented object. After 12 listening lessons over four weeks, visualization training appears to significantly improve comprehensive and interpretative listening tasks. Third, Marley and Szabo (2010) examined the cognitive benefits of *physical manipulations* on 76 kindergarten and first-grade students, randomly assigned to two groups: stories with pictures (viewing pictures of the actors) or manipulation strategy (moving manipulatives as directed by the narrative). Participants were requested to recall as many story events as they could remember. Significant differences in favor of the manipulation strategy were observed.

Furthermore, one study ⁽¹⁾ found a significant positive effect of 20 lessons of *strategy instruction* on the listening skills of 9- to 11-year-old poor readers and listeners. Effective listening strategies were, for example, teaching students to listen for a purpose, clarifying difficult words, imagining the auditory text, predicting what could happen or summarizing the text. Students have to apply these listening strategies while answering questions in a discussion group. The significant results were maintained on retention tests, administered three months after termination of the program.

Finally, only one study ⁽¹¹⁾ investigated the effect of using specific listening material. Tok and Mazi (2015) concluded that an intervention using "*stories for thinking*" did not reveal

a significant increase in fifth-grade students' listening skills. Stories for thinking refer to thinking together about the text in discussion groups whereby the researcher acts as a questioner and facilitator.

Teaching practice: instructional modalities. Two studies ^(2,9) investigated the effect of a general instructional modality and found a significant positive effect in favor of the experimental group. Potocki, Ecalle and Magnan (2012) found notable lasting effects of the use of a *computer-assisted program* (CAI-program) to remediate listening and reading comprehension difficulties in second-grade students. The CAI-program is a reading and listening training program that distinguishes between two aspects of text comprehension, i.e. literal and inferential comprehension. The difference between the groups was significant at the second post-test, i.e. 11 months after the training phase. Further, Bilican, Kutlu and Yildirim (2012) confirmed in their quantitative correlational study that the combination of listening and reading activities (e.g. giving free reading time or doing homework based on reading passages) is significantly related to fifth-grade students' listening skills.

4.2.1.2. Class level: Classroom features

This second category at the class level classified four studies addressing the relationship between classroom features (i.e. classroom noise and class size) and students' listening skills. Further, classroom features could be divided into the subcategories "classroom noise" (n=3) and "class size" (n=1).

Classroom features: classroom noise. Three studies ^(12,13,14) reported that attention and listening were impaired when classroom acoustics were less beneficial. Two studies ^(12,14) indicated the potential benefits of *sound field amplification technology* for students' listening skills. This technology improves the sound environment of the class by ensuring an even distribution of sound from the teacher, the students and multimedia. Arnold and Canning (1999) and McSporran, Butterworth and Rowson (1997) compared the hearing capacity of students in classes with and without sound field amplification and found a significant positive effect on listening. Good classroom acoustics were especially important for special needs students (e.g. students with learning difficulties, non-native students or students with hearing loss) (McSporran et al., 1997). In addition, Klatte, Lachman and Meis (2010) found a significant negative effect of background speech or background noise on 4th grade students' attention and speech perception.

Classroom features: class size. Only one selected study ⁽¹⁵⁾ focused on the relationship

between class size and students' listening skills. The quantitative study of Shin and Raudenbush (2011) found that reducing class size significantly improves listening scores from kindergarten to third grade.

4.2.1.3. Class level: Teacher background

This third category at the class level classified only one study ⁽¹⁶⁾ focusing on the relationship between teacher background characteristics and students' listening skills. Crosskey and Vance (2011) observed significant positive changes in students' listening skills after the implementation of a teacher-training package, including information on the theoretical aspects of the listening material as well as instruction strategies. The teacher-training package presented information about teaching listening skills.

4.2.2. Results at the student level

At the student level, eleven studies investigated the relationship between students' listening skills and their background characteristics, while only one study focused on student motivation. There were eleven studies with a cross-sectional design ^(17,18,19,20,21,22,23,24,25,26,27) and one with a pretest-posttest design ⁽⁷⁾. A detailed overview of how student background is related to students' listening skills is presented in Appendix D.

4.2.2.1. Student background

In terms of student background, all three subcategories of the model of Palardy and Rumberger (2008) (i.e. family background, academic background and demographics) will be considered below.

Student background: family background. Four correlational studies ^(7,17,20,26) found a significant positive relationship between family background and students' listening skills. Acat, Demiral and Kaya (2016) found that fifth-grade students' listening skills are positively correlated with the socioeconomic status of the child, measured as the educational level of the mother and the father. Kutlu and Aslanoğlu (2009) found a significant positive relationship with the number of books at home and read within one month. However, no significant relationship was found between the educational level of the mother and students' listening skills. Further, Wolfgramm et al. (2016) found a significant positive relation between sixth-grade students' home language and their listening skills. Students who do not speak the instruction language at home performed significantly worse in listening skills than first-language learners. Oduolowu and Oluwakemi (2014) also found a significant relationship with

students' home language. They found that students who could listen in their native language performed significantly better.

Student background: academic background. As to students' academic background, seven correlational studies showed that academic background characteristics were positively related to students' listening skills ^(17,19,23,24,25,26,27). Academic background characteristics can be further subdivided in linguistic knowledge (e.g. vocabulary, language scores) and cognitive skills (e.g. working memory, theory of mind, concentration). With regard to linguistic knowledge, the results of Acat et al. (2016) and Lin et al. (2014) showed a significant positive correlation between general language scores and listening skills. Further, Kim (2016), Kim and Philips (2014) and Wolfgramm et al. (2016) revealed that listening skills are directly predicted by students' vocabulary level. Different studies investigated the relationship between cognitive skills and listening skills. First, Tighe, Spencer and Schatschneider (2015) focused on the influence of working memory, reasoning and fluency on listening skills in third, seventh and tenth grade students. They found that verbal and nonverbal reasoning, word reading fluency, and working memory significantly predicted listening comprehension, but found that working memory was the least predictive. In addition, working memory was only found to be an important predictor to listening skills in the earlier grade levels. Molloy (1997) differentiated between "low-level" and "high-level" working memory tasks, which measure differences in terms of the amount of storage capacity and processing demands placed on the working memory. She found that high-level working memory tasks were more predictive of listening skills than low-level tasks. Only the high-level working memory task was a significant predictor of listening comprehension. However, Wolfgramm et al. (2016) could not actually find a significant relationship between working memory and listening skills. Kim (2016) found that different cognitive skills such as working memory, theory of mind and attention were weakly to moderately related to listening skills. Wolfgramm et al. (2016) and Cain and Bignell (2014) found a significant relationship between concentration and listening skills. Cain and Bignell (2014) found that there was a significant negative effect of high hyperactivity and poor attention on students' listening skills. Finally, Kim and Philips (2014) found that inhibitory control (the ability to suppress a dominant response) was significantly positively related to listening skills. They also revealed that there was a significant relationship between theory of mind (the ability to infer others' mental states), comprehension monitoring (the ability to reflect on and evaluate one's own comprehension of text) and listening skills.

Student background: demographics. Regarding demographics, four correlational studies investigated the relationship between gender and students' listening skills ^(7,22,23,26).

However, only the study of Oduolowu and Oluwakemi (2014) found a significant relationship, showing girls performing higher on listening skills than boys. Lehto and Antilla (2003), Lin et al. (2014) and Wolfgramm et al. (2016) could not find a significant relationship between gender and listening skills. Wolfgramm et al. (2016) even found boys performing significantly higher on one of the two listening comprehension tests that were administered.

4.2.2.2. Student experiences

Except for the subcategory “motivation to learn”, no studies could be allocated to the other subcategories.

Student experiences: Motivation to learn. The study of Lau (2017) demonstrated that high-proficiency listeners had a significantly higher listening motivation and listening interest in doing listening exercises than low-proficiency listeners. They also found that high-proficiency listeners used significantly more listening strategies than low-proficiency listeners.

5. Discussion

As stated in the introduction, listening skills are a prerequisite for further educational success. However, to date, there are no literature reviews synthesizing the specific characteristics affecting students’ listening skills. Therefore, this study aimed to synthesize the existing listening research by investigating correlates at the student, class and school level related to primary school students’ listening skills, as defined in the HURIER model. In this section, we discuss the results of our review and describe the implications for further practice and research.

5.1. Skills of the HURIER model addressed in the research literature

The six components of the HURIER model were used to label the outcome variables (i.e. listening skills) of the selected studies. This review showed that the relationship between correlates and listening skills was primarily investigated towards the “lower levels” of listening skills (i.e. remembering, understanding and interpreting level), while the higher levels (i.e. critical or interactive listening) have been barely investigated. We assume the focus on those lower levels is rather a pragmatic decision given higher test complexity and practical constraints when assessing higher order listening skills. In particular, critical or interactive listening skills could be more complex to define and to measure. For example, as interactive listening takes place in a communicative situation in which the listener takes an active role, it is recommended

to assess interactive listening skills through a face-to-face conversation instead of a classical paper test. As critical and interactive listening skills are barely investigated, future research should focus on the assessment of these higher listening skills.

5.2. Listening skills and student-level correlates

This review indicates that different student level characteristics (i.e. academic background, demographics and family background) are correlated to students' listening skills. According to the academic background characteristics of students, especially working memory and vocabulary showed to be significant predictors of listening skills. The strong correlation between working memory and listening skills could be expected, as working memory is necessary to keep task-relevant information in mind while listening (Just & Carpenter, 1992). However, Wolfgramm et al. (2016) could not find a significant relationship with working memory. The lack of significant results in this study could be attributed to the fact that the listening tests consisted of short auditory texts with simple structures that did not depend on the capacity of the working memory. The correlation between vocabulary and listening skills could also be expected, because lexical gaps may interrupt the continuous process of listening (Hagtvet, 2003).

As to demographics, the results on gender differences are not clear. Most gender studies could not find a significant relationship between gender and listening skills. Only in the study of Oduolowu and Oluwakemi (2014) girls did significantly outperform boys. These results are not in line with research on other language skills, where girls significantly outperform boys in reading comprehension (e.g. Below, Skinner, Fearington & Sorrell, 2010; Lynn & Mikk, 2009) or writing skills (e.g. De Smedt et al., 2017). This difference with other language research was not expected, as it has been suggested that reading and listening rely on similar cognitive processes (e.g. Verlaan, Pearce & Zeng, 2017).

This review also showed that family background characteristics, such as students' socioeconomic status do relate to students' listening skills (e.g. Acat et al., 2016). A possible explanation for the relationship between SES and students' listening skills is that parents with a higher SES, on general, have the opportunity to provide more supportive conditions for the development of listening skills. For example, they may be more able to interact with clear and responsive communication styles or to use diverse forms of multimedia (Bergen, Zuijen, Bishop, & Jong, 2017; Sohr-Preston et al., 2013). These results are comparable with other language research, in which SES was shown to be a powerful predictor of students' reading

(e.g. Bradley & Corwyn, 2002; Kieffer, 2012) and writing development (e.g. Kim, Puranik & Otaiba, 2015).

5.3. Effective instructional practices and implications for listening education

The identified student-level correlates are generally fixed characteristics that are difficult or impossible to alter in the context of schooling. This implies that investments at the class level are more feasible to improve listening skills and might partly compensate negative influences at the student level. Therefore, the present research synthesis provides directions as to how teachers might structure their listening courses to improve students' listening skills. The following teaching practices could be integrated into listening courses. First, students will remember more facts of auditory texts when they receive instruction in the specific structure of the text type (i.e. narrative or expository strategy instruction). Second, students' listening skills can be improved through applying visual techniques during listening training, such as telling stories supported by illustration (Oduolowu & Oluwakemi, 2014) or asking students to paint a picture of the main features in their mind (Center et al., 1999). Third, listening strategy instruction affects listening skills positively. For example, teaching students different listening strategies such as listening for a purpose or predicting what could happen will improve their listening skills (Aarnoutse et al., 1998). Finally, listening skills can be improved through integrating listening activities into the entire curriculum and to combine listening activities with speaking, reading or writing activities. When teachers give students the opportunity to practice listening throughout the day instead of teaching listening solely in a separated course, students will become better listeners (Bilican et al., 2012).

In addition, this review provides evidence for the importance of adequate listening conditions in classrooms. Different studies showed that poor interior acoustics and background noise cause attention loss and exacerbate listening difficulties (e.g. Dockrell & Shield, 2006), while systems improving the learning environment, such as sound system improvements, positively influence students' listening skills. In this respect, the findings are in line with other research indicating the significance of classroom design and classroom equipment on students' learning outcomes (e.g. Barrett, Zhang, Moffat, & Kobbacy, 2013). Therefore, reducing class sizes and/or investing in sound systems by improving the sound environment in the classroom will positively influence students' listening performance, especially in classrooms with a high percentage of special needs students (McSporran et al., 1997).

5.4. Recommendations for future research

Notwithstanding the identification of some important correlates and the recommendations for further listening practice; future research in the regular primary school context is necessary to uncover unexplored correlates and to fine-tune our knowledge of listening education. Specifically, studies showing the relationship between *school* input or processes and students' listening skills were not found.

Moreover, as long-term studies were lacking in this review, different listening interventions (e.g. explicit listening strategy instruction or specific text type instruction) should be repeated in longitudinal research to explore whether or not the results persist over a longer period of time and to measure learning gain. Next to longitudinal research, multilevel listening research is also applied. Research that has investigated the impact of certain factors on listening skills appears to have been mostly conducted from a single-level perspective. However, such educational research should be multilevel in nature as students are nested in classrooms and classrooms are nested in schools (Creemers & Kyriakides, 2010). Correlates operated at different levels (student, class or school level) and were expected to interact across levels to predict students' listening skills. Ignoring variation between these levels may therefore lead to a deficient evaluation of listening skills.

To conclude, this systematic review is relevant as it illustrates how listening education could be improved and by identifying different important correlates of listening skills. Nonetheless, further listening research in the primary school context is necessary to find unexplored correlates and to extend our knowledge in the field of effective listening education.

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Appendix

Appendix A

Descriptive information of the studies on the class level: subcategory teacher practice

Nr.	Authors	Country	Grade: Sample size	Methodology (type of analysis)	Sample selection	Design	Groups (experiment: control)	Duration	Level of independent variables according to the model of Palardy and Rumberger	Intervention	Listening test	Labeling listening skills according to the HURIER model	Study outcomes
1	Aarmoutse, van den Bos & Brand-Gruwel, 1998	The Netherlands	4 th - 6 th grade (n=169)	Quantitative (ANOVA)	Poor listening and reading students	Experimental: pre-test post-test retention test control group design (randomly assigned)	Ex = listening strategy training Co = no intervention	20 lessons of 30 minutes	<u>Specific practices</u> : Training in four listening strategies: clarifying, questioning, summarizing and predicting	After listening to a text a group executes one or more strategies. E.g. the discussion leader explains difficult words (understanding) or predicts the future content of a text (interpreting) and asks the others what they think about it.	*The Listening Comprehension Test (stories, conversations, expository texts) with multiple choice questions at word, sentence and text levels *The Strategic Listening Test to measure to apply the strategies	Focuses on <u>understanding</u> (e.g. defining difficult words) and <u>interpreting</u> (e.g. predicting the future content of a text)	Significant positive effect of listening strategy training, maintained on posttest and retention test (+*) (p<.05)
2	Bilican, Kutlu & Yildirim, 2012	Turkey	5 th grade (n=281)	Quantitative (Multiple regression)	/	Cross-sectional	/	/	<u>Instructional modalities</u> : Considering the activities that develop listening comprehension	/	*Listening Comprehension Activities Test (Likert type scale) *Students Information Questionnaire	Focuses mainly on <u>hearing</u> (i.e. using materials such as radio or mp3)	Significant positive effect of writing summary, computer usage, doing homework, radio listening out of school and free reading time (+*) (p<.01)
3	Center, Freeman, Roberston & Outhred, 1999	United States	2 nd grade (n=66)	Quantitative (Univariate analyses of covariance)	Poor listening comprehension students	Experimental: pre-test post-test control group design (matched pairs randomly assigned to groups)	Ex = instruction with visual imagery Co = instruction without visual imagery	12 lessons of 20 minutes for a period of four weeks	<u>Specific practices</u> : Training in visual imagery and visualization techniques while listening	Lessons consisted of different components: Discussion of one aspect e.g. identifying characters (understanding) Facilitating comprehension by introducing the prepared passage or story, activating prior knowledge (interpreting) The experimental group was asked to try to visualize the main features.	*Reading Accuracy and Reading Comprehension subtest of the Neale Analysis *Adapted listening comprehension *Story Event Structure	Focuses mainly on <u>interpreting</u> (i.e. students have to relate two stories to each other) and <u>remembering</u> (i.e. students had to tell a story which was audiotaped and transcribed)	Significant positive relationship with explicit instruction in visual imagery (+*) Byrne Listening Comprehension: (p=.018) Neale Listening Comprehension (p=.099)
4	Diakidoy, 2014	Cyprus	2 nd grade (n=203)	Quantitative (Hierarchical Regression analyses)	/	Experimental: pre-test post-test control group design (randomly assigned)	Ex= familiarization with text type Co = no intervention	18 lessons of 40 minutes for a period of 9 weeks	<u>Specific practices</u> : Familiarization with oral expository text types	<u>Familiarization phase</u> : The teachers were given a packet containing the selected expository texts and the corresponding comprehension questions. Teachers must read aloud a text in class and pose comprehension questions (understanding and interpreting) that followed in a whole class-discussion context. <u>Read-aloud procedure</u> : The researchers read one EI book or article per visit (Hearing). Each session began with a discussion about the topic of text. During the read-aloud, there was time for occasional comments and questions. After each read-aloud the researcher asked the class to have new things that they learned (Understanding).	*Sentence verification task: listening to an expository and comprehension text - literal and inferential statements followed by a yes/no option	Focuses on <u>understanding</u> (literal statements e.g. single idea units) and <u>interpreting</u> (inferential statements e.g. comparison/contrast relationships between text idea units)	No significant effect of text familiarization on listening comprehension (either expository or narrative) (p=.74)
5	Kraemer, McCabe & Sinatra, 2008	New York	1 st grade (n=77)	Quantitative (MANOVA)	/	Experimental: pre-test post-test control group design (cluster sampling, randomly assigned)	Ex = read-aloud procedure Co = no visits or reading	12 sessions for a period of 4 weeks	<u>Specific practices</u> : Read-aloud procedure using expository instruction material. 12 first-grade EI texts (ten books and two articles) were used.	Researcher read one EI book or article per visit (Hearing). Each session began with a discussion about the topic of text. During the read-aloud, there was time for occasional comments and questions. After each read-aloud the researcher asked the class to have new things that they learned (Understanding).	* Passages from the Qualitative Reading Inventory-3	Focuses on <u>understanding</u> (e.g. answers clearly stated in the text) and <u>interpreting</u> (make an inference)	Highly positive significant effect of the read-aloud procedure on expository listening comprehension (p < .001) (+*)

6	Marley & Szabo, 2010	New Mexico	Kindergarten - 1 st grade (n=76)	Quantitative (ANCOVA)	/	Experimental: pre-test post-test control group design (randomly assigned)	Ex = stories with manipulation Co = stories with pictures	3 sessions of 40 minutes	<u>Specific practices:</u> Training with pictures or manipulative (manipulative moving – pictures – imagining)	<u>Manipulation strategy</u> moved the manipulatives as directed by the narrative. <u>Picture only strategy</u> viewing pictures of the actors. Instructional Period 1: activity vs. pictures Instructional Period 2: activity plus imagery vs. pictures plus imagery Instructional Period 3: imagery only in both strategies (Remembering)	* Assessing on free recall and 12 cued-recall items of story events (memory test): Students' free recall of the story was tape recorded.	Focuses on <u>remembering</u> (i.e. participants were requested to recall as many story events as they could remember and were administered 12 cued-recall items)	Significant positive effect of physical manipulation followed by imagery instructions (+*) *instructional period 1 (p<.01) *instructional period 2 (p<.01). Manipulation strategy participants recall of 62% and picture strategy participants' recall of 47%.
7	Oduolowu & Oluwakemi, 2014	Nigeria	1 st grade (n=49)	Quantitative (ANCOVA)	/	Experimental: pre-test post-test control group design (purposive sampling technique and randomly assigned)	Ex = storytelling with illustrations Co = storytelling without illustrations	For a period of 8 weeks	<u>Specific practices:</u> Training through storytelling with illustration (picture storybook)	Teachers told three indigenous stories. <u>Storytelling with illustration</u> <u>Storytelling without illustration</u> Remembering (i.e. trained teachers told each of the three stories twice a week for three weeks. During the seventh week, the pupils were asked to retell all the three stories)	*Pupils retelling were analyzed using Morrow's 10-point scale (points for character, theme, plot episodes, setting, resolution and sequence)	Focuses on <u>remembering</u> (i.e. pupils have to retell the stories)	Significant positive effect of storytelling with illustration (+*) (p= .016)
8	Paris & Paris, 2007	United States	1 st grade (n=123)	Quantitative (ANCOVA)	/	Experimental: pre-test post-test control group retention test design (randomly assigned)	Ex = narrative comprehension strategy training Co = no intervention	For a period of 5 weeks	<u>Specific practices:</u> Training in narrative comprehension strategy	<u>Narrative strategy instruction:</u> Direct strategy comprehension instruction about narrative elements and relations. They taught children strategies for identifying narrative text structure (understanding) and to bolster inferences about psychological aspects of stories and making inferences (interpreting)	*Battery of wordless narrative and expository comprehension tasks (picture book) Children were asked to retell the story and their responses were scored according to the number and order of story elements recalled. Comprehension was assessed by asking questions about five explicit and implicit text relations *Listening Comprehension tasks assess L.C. and strategy use by asking comprehension and metacognitive questions	Focuses on <u>remembering</u> (i.e. retelling the story), <u>understanding</u> or literal understanding (e.g. character, problem), <u>interpreting</u> of inferential understanding (e.g. prediction, theme, sequencing)	Significant positive effect of narrative instruction on narrative comprehension task in the experimental group (+*) (p<.05)
9	Potocki, Ecalie & Magnan, 2013	France	2 nd grade (n=258)	Quantitative (ANOVA)	Less skilled comprehenders	Experimental: pre-test post-test control group retention test design (randomly assigned)	Ex = CAI to assist comprehension processes Co = CAI to encourage word decoding	20 sessions of 30 minutes for a period of 5 weeks	<u>Instructional modalities:</u> Training listening comprehension with a computer assisted instruction program (CAI)	LoCoTEx: a text comprehension training software program. The software practices on literal comprehension (i.e. understanding) and inferential skills (i.e. interpreting)	* Listening comprehensive test using a short narrative with multiple-choice questions	Focuses on <u>understanding</u> (e.g. explicit information) and <u>interpreting</u> (e.g. coherence inferences)	Significant positive effect of the computer assisted instruction program (p<.001) (+*) Effect was non-significant after the first post-test (at the end of the intervention), but significant after an interval of 11 months after the end of the intervention.
10	Stevens, Van Meter & Warcholak, 2016	United States	Kindergarten and 1 st grade (n= 321)	Quantitative (MANOVA)	High poverty schools	Experimental: pre-test post-test control group design (stratified random sampling)	Ex = story structure during reading children's literature Co = no story structure during reading children's literature	For a period of one school year (15 minutes per day)	<u>Specific practices:</u> Training the narrative structure through story structure instruction (SSI). SSI provided explicit instruction and more guided practice that what normally occurs during traditional storybook reading (i.e. implements different elements such as teacher reads the story aloud, teacher asks questions about story structure of the story after reading)	<u>Story Structure Instruction:</u> Focuses on understanding (e.g. who is the main character and ordering information) and responding (e.g. teacher asks students for responses).	*Story structure measures with free and prompted recall measures to measure recalling abilities (i.e. students were asked to retell the story read to them)	Focuses on <u>remembering</u> (i.e. free recall) and <u>understanding</u> (e.g. organizing story content, location, main character, problem solution)	Significant positive effect of SSI on narrative comprehension (significant higher free recall of details about the main character p = .002 and problem solution p = .007) (+*) (non-significant higher free recall off setting p = .018 and attempted solution p = 5.31 (significant higher prompted recall of details about the main character p = .000, problem solution p = .002 and setting p = .000)

11	Tok & Mazi, 2015	Turkey	5 th grade (n=74)	Quantitative (Single Sample K-S test)	/	Quasi-experimental: pre-test post-test control group design (not randomly assigned)	Ex = stories for thinking Co = various activities	40 class hours for a period of 10 weeks (4 hours a week)	<u>Specific practices:</u> Training listening comprehension through stories for thinking = thinking together about stories	<u>Stories for thinking:</u> researcher acts as a questioner and facilitator of discussion. Focuses on interpreting (i.e. recognizing the theme step) and responding (i.e. the class was divided into discussion groups)	*Listening comprehension test (35 questions)	Focuses on <u>interpreting</u> (e.g. determine the theme of the story, searching for a title for the story, guess the end of the story) and <u>responding</u> (e.g. students need to compose a poem about the story, write a story about the theme)	No significant evidence of the stories for thinking (p > .05) (+)
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Appendix B

Descriptive information of the studies on the class level: subcategory classroom features

Nr.	Study	Country	Grade: Sample size	Methodology (type of analysis)	Selection of students	Design	Groups (experimental + control)	Level of independent variables according to the model of Palardy and Rumberger	Listening test	Labeling listening skills according to the HURIER model	Study outcomes
12	Arnold & Canning, 1999	United Kingdom	5 th – 6 th grade (n=49)	Quantitative (ANOVA / t-test)	/	Experimental: pre-test post- test control group design (randomly assigned)	Ex = Soundfield amplification Co = no Soundfield amplification	<u>Instructional resources:</u> Soundfield amplification	*Spoken comprehension test: the Neale Analysis of Reading ability (six taped stories)	Focuses on <u>hearing</u> (i.e. skills with and without S.A.) and <u>understanding</u> (e.g. asking for details in a text)	Significant positive effect of Soundfield amplification (+*) (p= .00). This improvement became greater as the complexity of the stories increased (p = .00)
13	Klatte, Lachman & Meis, 2010	Germany	4 th grade (n=55)	Quantitative (ANOVA / t-test)	/	Quasi-experimental: one shot case study pre-test post-test control group design	Ex = sound conditions (with background noise) Co = silent classroom	<u>Instructional resources:</u> classroom noise	*Listening comprehension by complex oral instructions *Speech perceptions through a word-to-picture matching task	Focuses on <u>hearing</u> (i.e. number of items recalled without background noise and with background noise)	Significant negative effect of background speech on attention and speech perception (p<.001) (+*)
14	McSporran, Butterworth & Rowson, 1997	United States	3 rd grade (n=65)	Qualitative	Selective selecting one class with English as first language + one class with 40% English as second language	Quasi-experimental experimental: one group pre-test post-test control group design	Ex = Soundfield amplification Co = no Soundfield amplification	<u>Instructional resources:</u> Soundfield amplification	*Children's auditory processing performance scale (CHAPPS)	Focuses on <u>hearing</u> (i.e. listening behavior with or without soundfield amplification)	Significant positive effect of S.A. on listening behavior (p< .005) (+*)
15	Shin & Raudenbush, 2011	United States	Kindergarten - 3 rd grade (n=6325)	Quantitative (three level multivariate equation model)	/	Cross-sectional study	/	<u>Classroom features:</u> Class size	*Standard Achievement tests (SAT)	Focuses on <u>understanding</u> and <u>interpreting</u>	Significant negative relationship between class size and listening (-*)

Appendix C

Descriptive information of the studies on the class level: subcategory teacher background characteristics

Nr.	Study	Country	Grade: Sample size	Methodology (type of analysis)	Duration	Design	Level and description of independent variables	Intervention	Listening test	Study outcomes
16	Crosskey & Vance, 2011	United States	3 rd – 6 th grade (n=27)	Quantitative (multiple post-hoc analyses)	Two sessions, each lasting for 90 minutes	Quasi-experimental: Pre-test post-test design with retention test after three months	<u>Teacher background:</u> Teacher training Package with a selection of ideas and strategies to support listening in a whole class group	<u>Communication Friendly Environments package:</u> presenting information about theoretical aspect of listening including attention (hearing), processing information (understanding) and memory (remembering)	*Questionnaire using software (focus and attention, processing of the language to understand, retention of information and instructions)	Significant positive effect Of the listening training (+*) (p<.01)

Appendix D

Descriptive information of the studies on the student level

Nr.	Study	Country	Grade: Sample size	Methodology (type of analysis)	Selection of students	Design	Level and description of independent variables according to the model of Palardy and Rumberger	Listening test	Labeling listening skills according to the HURIER model	Study outcomes
17	Acat, Demiral & Kaya, 2016	Turkey	5 th grade (n=605)	Quantitative (T-test, ANOVA, Turkey HSD test)	/	Descriptive: cross-sectional	<u>Academic background:</u> <ul style="list-style-type: none"> Language scores <u>Family background:</u> <ul style="list-style-type: none"> Education level of the mother Education level of the father Household income Music type 	*The Listening Comprehension Test *Web based listening scale	Focuses on <u>understanding</u> and <u>interpreting</u>	Significant positive relationship with: <ul style="list-style-type: none"> Education level of the father (p<.01) and the mother (+*) (p<.01) Household income (+*) (p<.01) Language scores (+*) (p<.05) Favorite and mostly listened music type (upbeat music) (+*) (p<.01)
18	Cain & Bignell, 2014	UK	7- to 11- year-olds (n=66)	Quantitative (ANOVA)	Children at risks of ADHD	Descriptive: cross-sectional	<u>Academic background:</u> <ul style="list-style-type: none"> Poor attention High hyperactivity 	*NARA-2	Focuses on <u>understanding</u>	Significant negative relationship with hyperactivity and poor attention (p<.001) (*)
19	Kim & Philips, 2014	United States of America	Kindergarten & 1 st grade (n=156)	Quantitative (Structural Equation Modeling)	High-poverty public schools	Descriptive: cross-sectional	<u>Academic factors</u> <ul style="list-style-type: none"> Vocabulary Comprehension monitoring Inhibitory control <u>Demographic factors</u> <ul style="list-style-type: none"> Age 	*Listening Comprehension Scale of the Oral and Written Language Scales *Test of Narrative Language	Focuses on <u>understanding</u> (e.g. character-'s name)	Significant positive relationship with: <ul style="list-style-type: none"> Vocabulary (p<.001) ToM (p<.001) Comprehension monitoring (p<.001) Inhibitory control (p<.001) Non-significant relationship with: <ul style="list-style-type: none"> Age (p=.97)
20	Kutlu & Aslanoglu, 2009	Turkey	5 th grade (n=265)	Quantitative (Factor analysis)	/	Descriptive: cross-sectional	<u>Family background:</u> <ul style="list-style-type: none"> Number of books at home Time spent reading and listening at home Material used in the classroom Education level of parents ... 	*A listening comprehension test (text + short-answer questions)	Focuses on <u>understanding</u> (e.g. finding explicit ideas), <u>interpreting</u> (e.g. relating the themes to personal knowledge and experience) and <u>evaluating</u> (e.g. evaluate the elements, content and language of the text)	Significant positive relationship with: <ul style="list-style-type: none"> Number of books at home (p=.000) (+*) Books read within one month (p=.000) (+*) Time spent reading /listening to the radio (p=.000) (+*) Significant negative relationship with: <ul style="list-style-type: none"> Father's education (p=.016) (-*) Frequency of using computers (p=.017) (-*)
21	Lau, 2017	China	7 th and 9 th grade (n=2805) Qualitative = 24	Quantitative (MANOVA) and qualitative	/	Descriptive: cross-sectional Qualitative: retrospective interviews with coding criteria	<u>Listening motivation:</u> <ul style="list-style-type: none"> Intrinsic interest Listening importance 	*A Chinese-language listening comprehension test	Focuses on <u>understanding</u> (i.e. identify information that has been directly mentioned), <u>interpreting</u> (i.e. integrate different info and implicit meaning of the text) and <u>evaluating</u> (i.e. making judgments about the content of the text)	Significant positive relationship with: <ul style="list-style-type: none"> Using listening strategies (p<.001) (+*) Listening motivation (p<.001) (+*) → Intrinsic higher interest in doing listening exercises (p=.004) (+*) → Higher perceived importance of developing listening ability (p=.011) (+*)
22	Lehto & Antilla, 2003	Finland	2 nd , 4 th and 6 th grade (n=107)	Quantitative	/	Descriptive: cross-sectional	<u>Demographic factors</u> <ul style="list-style-type: none"> Gender Age 	*Sentence verification technique (narrative and expository passages)	Focuses on <u>remembering</u> (i.e. students hear a short passage and afterwards the pupil is given sentences related to the passage and have to judge whether this is correct or incorrect)	Significant positive relationship with: <ul style="list-style-type: none"> Text type (Narrative texts) (p<.01) (+*) (for 2nd, 4th and 6th graders) Grade (Narrative texts) (p<.01) (+*) Non-significant positive relationship with: <ul style="list-style-type: none"> Gender (Girls +) (p>.05) Grade (Expository texts +) (p>.05)

23	Lin, Liu, Chen, Wang & Kao, 2014	Taiwan	4 th and 6 th grade (n=1080)	Quantitative (Correlation analysis and regression coefficient test)	/	Descriptive: cross-sectional	<u>Academic background and Demographic factors</u> <ul style="list-style-type: none"> • Language • Gender • Prior knowledge 	*Computer-based assessment for listening comprehension of science talk	Focuses on <u>understanding</u> , <u>evaluating</u> and <u>responding</u> (students have to listen to science classroom discussions and select an answer = critical listening)	Significant positive relationship with: <ul style="list-style-type: none"> • Prior scientific knowledge (+*) (p<.01) • Language ability (+*) (p<.01) Non-significant positive relationship with: <ul style="list-style-type: none"> • Gender (Girls +) (p>.05)
24	Molloy, 1997	Columbia	5 th and 7 th grade (n=120)	Quantitative (PCA + MANOVA)	/	Descriptive: cross-sectional	<u>Academic background</u> <ul style="list-style-type: none"> • Working memory 	*Wechsler Individual Achievement test (2 subtests)	Focuses on <u>understanding</u> (literal questions) and <u>interpreting</u> (inferential questions)	Significant positive relationship with: <ul style="list-style-type: none"> • Complex sentence span measure (+*) (p<.05) Non-significant relationship with: <ul style="list-style-type: none"> • Backward digit span (p>.05) • Word span (p>.05)
7	Oduolowu & Oluwakemi, 2014	Nigeria	1 st grade (n=49)	Quantitative (ANCOVA)	/	Quasi-experimental: Pre-test post-test control group design	<u>Demographic factors</u> <ul style="list-style-type: none"> • Gender • Cultural background 	*Morrow's 10-point scale for retelling analysis	Focuses on <u>remembering</u> (i.e. pupils have to retell the stories)	Significant positive relationship with: <ul style="list-style-type: none"> • Gender (Girls +*) (p=.001) • Cultural background (+*) (p=.000)
25	Tighe, Spencer & Schatschneider, 2015	United States	3 rd , 7 th and 10 th grade (n=585)	Quantitative (PCA)	/	Descriptive: cross-sectional	<u>Academic factors</u> <ul style="list-style-type: none"> • Working memory • Verbal and nonverbal reasoning • Fluency 	*Florida Comprehensive Assessment Test	Focuses on <u>remembering</u> and <u>understanding</u>	Significant positive relationship with: <ul style="list-style-type: none"> • Verbal and nonverbal reasoning (+*) (p<.05) • Fluency (+*) (p<.05) • Working memory (+*) (p<.05)
26	Wolfgramm, Suter & Göksel, 2016	Switzerland	6 th grade, (n=345)	Quantitative (Structural equation modeling)		Descriptive: cross-sectional	<u>Academic factors</u> <ul style="list-style-type: none"> • Concentration, • Vocabulary • Working memory <u>Demographic factors</u> <ul style="list-style-type: none"> • Age <u>Family factors</u> <ul style="list-style-type: none"> - Home language 	*Listening comprehension test (Module from Klassencockpit + HarmoS test)	Focuses on <u>understanding</u> (e.g. What does the word mean?)	Significant positive relationship with: <ul style="list-style-type: none"> • Concentration (+*) (p=.02) • Vocabulary (+*) (p<.001) • Home language (-*) (p<.001) Non-significant relationship with: <ul style="list-style-type: none"> • Gender (Boys +) (p=.019) • Working memory (-) (p=.18) • Academic self-concept (-) (p=.52)
27	Kim (2016)	South Korea	1 st grade (n=201)	Quantitative (Structural equation modeling)		Descriptive: cross-sectional	<u>Academic factors</u> <ul style="list-style-type: none"> • Working memory • Attention • Vocabulary 	* Oral listening comprehension test	Focuses on <u>understanding</u> and <u>interpreting</u>	Significant positive relationship with (p<.05) <ul style="list-style-type: none"> • Working memory * • Attention * • Vocabulary * • Grammatical knowledge * • Theory of mind *