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Review Article

Embodied learning and teaching approaches in language education: A mixed studies review

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ABSTRACT

The notion of embodied learning has gained ground in educational sciences over the last decade and has made its way to language education with researchers acknowledging language learning as an embodied process. This mixed studies review aggregates and reviews empirical research, published from 1990 to 2020, using embodied learning approaches in language education. The review focuses on embodied approaches in learning and teaching first, second, and foreign languages at various educational levels. It encompasses 41 empirical studies with a majority published between 2019 and 2020, suggesting that the research area is growing rapidly. The results show that the studies align with two strands: (1) embodied learning through orchestrating embodied language learning and teaching, and (2) embodied learning in naturally occurring language learning interactions. The review identifies various embodied learning activities and presents how they contribute to language learning and teaching in different ways. The review proposes an understanding of *embodied language learning* that holds potentials to engage learners holistically, while simultaneously promoting language learning skills and adding emotional and motivational benefits to language learning.

1. Introduction

An interest in the mind-body connection has increased in various disciplines since the 1990's (Kosmas & Zaphiris, 2018; Varela, Thompson, & Rosch, 1991/2016), and the notion of *embodied learning* has seemingly gained ground over the last decade. Recent literature reviews have investigated embodied learning in various educational contexts (e.g., Aartun, Walseth, Standal, & Kirk, 2022; Fugate, Macrine, & Cipriano, 2019; Georgiou et al., 2019; Hegna & Ørbæk, 2021; Zhang, Chen, & Zhao, 2021), indicating that embodied learning is currently a “hot topic”. Embodied learning and teaching has also been proposed to be understood as a new potential research field (Hegna & Ørbæk, 2021).

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Embodied learning can be broadly defined as a conception of learning where learners are holistically engaged and intertwined in their social and material surroundings (see e.g., Anttila, 2018). This understanding has entered research on language learning with researchers acknowledging the embodied basis for language processing (Atkinson, 2010; Macedonia, 2019). Theoretical and philosophical approaches that address various connections of embodiment, language, and learning are well-established (Di Paolo, Cuffari, & De Jaegher, 2018; Johnson, 2017; Thompson, 2017), and the empirical research base is seemingly increasing. Several experimental studies outside educational contexts have addressed embodied cognition (see Section 1.1) in language learning (e.g., Macedonia & Mueller, 2016; Repetto, Pedroli, & Macedonia, 2017), often focusing on hand gestures. There is also a growing interest in studying embodiment in language use in social interaction, with an embodied turn identified in the beginning of the 21st century (Neville, 2015). Further, a recent meta-analysis on studies applying embodied cognition in education in the 2010s—where language education was one investigated field—demonstrated that embodied designs helped to improve learning efficiency and academic performance (Zhang et al., 2021). However, the meta-analysis only addressed a single theoretical perspective on embodied learning and did not cover all empirical research on embodied learning in language education. No review so far has focused comprehensively on empirical research on embodied learning in language education. The number of studies with such a focus has seemingly increased which indicates that the field is mature for interrogation.

Embodied learning is currently seeking ways to be enacted and applied in education (Georgiou & Ioannou, 2019; Nathan, 2022), but pedagogical practices seem to respond slowly to developments in this research area (Macedonia, 2019; Macrine & Fugate, 2021). A research synthesis offers a way to promote research-pedagogy dialogues because practitioners outside academia can obtain an overview of the field (Chong, 2020). Thus, to promote research-informed pedagogy and advance pedagogical practices, knowledge is needed about the contributions of embodied learning in language education. This topic warrants a thorough review of the literature to advance the field and inform those interested in taking advantage of embodied learning in language education.

This study aims to aggregate and review empirical research, published from 1990 to 2020, using embodied learning approaches in language education. The review addresses first (L1), second (L2), and foreign (FL) language learning and teaching at various educational levels to gain a comprehensive understanding of previous research. Examination of the characteristics in such research is needed to gain understanding of where, with whom, and when embodied learning approaches are used in language education. Investigation of the embodied learning activities used—i.e., activities implemented to facilitate language learning and teaching—contributes understanding about how embodied learning can be implemented in language education. Further, knowledge of what is empirically established and what remains unexplored can provide directions for further research and practice. Therefore, the research questions (RQ) motivating the review are: (1) What characterizes embodied learning approaches in language education in previous studies; (2) What kind of embodied learning activities are explored in previous studies; and (3) What are the empirical results in studies using embodied learning approaches in language education?

2. Embodied learning in language learning and teaching

This review approaches embodied learning as a comprehensive conception of learning, theoretically and philosophically rooted in the so-called embodied turn. This turn originated within the field of phenomenology, with the emphasis on the inseparability of body and mind (e.g., Husserl, 1998; Merleau-Ponty, 1945/2014). This development has been fueled significantly by the seminal publication “The Embodied Mind” by Varela et al. (1991/2016), among others. Embodied learning entails that the human body—i.e., the learner’s body—is actively engaged in learning processes (Anttila, 2018; Anttila & Svendler Nielsen, 2019; Nathan, 2022). Therefore, the often-presented claim stating that all learning is embodied, because the brain is part of the body, can be contested. However, the notion of embodied learning can be substantiated through more detailed argumentation, leaning on contemporary research in several fields, such as neuroscience, neurophenomenology, and cognitive psychology (Barsalou, 2020; Thompson, 2010, 2017; Varela et al., 1991/2016).

Understanding cognition as embodied, which recent literature supports, connects the brain with the body and the environment (Thompson, 2017), emphasizing that the brain is not a separate module where the mind is situated. Barsalou (2020), along with several cognitive psychologists, challenges the modular view of cognition, where cognition is seen as operating independently from other modules, like vision, audition, action, and emotion, and thus “sandwiched” between perception and action. Barsalou refers to extensive research, claiming that cognition utilizes the perceptual modalities and the motor system for representation and processing purposes and emerges from the coupling of the brain, body, and environment (e.g., Hutchins, 1995; Newen, Bruin, & Gallagher, 2018; Thompson, 2010; Varela et al., 1991/2016).

Barsalou (2020), however, challenges the term *embodied* cognition. For him, “embodied” entails that the “body must necessarily be engaged during cognition” (p. 2), seemingly referring to motor engagement or physical activity. However, the authors of this study maintain that bodily engagement is a broader notion than just physical activity. Barsalou (2020) argues that the non-modular perspective should be referred to as *grounded cognition* or *4E cognition* because the body offers only one form of grounding, with other forms of grounding being different modalities and the physical and social environment. Again, modalities are seen as part of the embodied system that, in turn, is intertwined with the physical and social environment exactly through the modalities.

A view of embodied learning articulated in fields of education, arts education, and dance education (Anttila, 2018; Anttila & Svendler Nielsen, 2019; Giguere, 2021; Henley, 2021) is closely aligned with the 4E perspective where “cognition, affect, and behavior emerge from the *body* being *embedded* in environments that *extend* cognition, as agents *enact* situated action reflecting their current cognitive and affective states” (Barsalou, 2020, p. 2). This view underscores that embodied activity goes beyond visible, bodily activity (i.e., actual movement) to also account for inner bodily sensations, experiences, and physiological changes. Modalities and all bodily systems are responsible for generating changes in bodily states and may lead to embodied activation, engagement, and sensory

experiences that are understood as “partners” in learning processes. These modalities and bodily systems connect the body with the physical and social environment. Barsalou’s (2020) proposal about the importance to “move beyond viewing embodiment as only action” (p. 6) has thus already been prominent in these research fields where engaging the body is seen as more than motor action. It can thus be argued that embodied learning extends beyond learning through movement and that a more suitable term for learning through motor action could be bodily learning.¹ Moreover, kinesthetic learning refers to pedagogical practices that emphasize the role of sensory (kinesthetic) experiences generated through bodily activity (e.g., Lengel & Kuczala, 2010).

The combination of the body, physical activity, and language learning is not new in language education. Since the 1960s, alternative language teaching methods have sought to activate the body as part of the language learning process. Particularly the Total Physical Response approach (Asher, 1969) invites learners to listen and react with their bodies to target language commands (Macedonia, 2019). In research on second language acquisition, the importance of verbal and bodily means for communication was already acknowledged in the Interaction Hypothesis (Long, 1996). However, the social turn shifted emphasis from the individual’s cognition as a brain-bound phenomenon to more holistic views on cognition and language learning (Block, 2003, 2007; Firth & Wagner, 1997, 2007). The social view understands language learning as a situated social practice where cognitive processes linked to learning are intertwined with language use. In language teaching, there has also been a shift to communicative approaches, and, later, to action-oriented approaches that view learners as social agents acting in real-life situations (Council of Europe, 2018).

Recently, the role of bodily and material resources, such as body movements, facial expressions, gestures, gaze, and the use of relevant objects for meaning-making in L2 interactions, have attracted increased attention in research analyzing L2 learning (e.g., Eilola & Lilja, 2021; Greer, 2019; Kasper & Burch, 2016). Such an expanded approach to language is also emphasized in the socio-semiotic approach to multimodality (e.g., Kress, 2010; Kress & van Leeuwen, 2006), prevalent within L1 education research. In L2 teaching, the multimodal view of language is central in approaches such as action-based pedagogies, which also emphasize embodied and multisensory engagement in language learning (van Lier, 2007). Another approach gaining ground, especially in multilingual contexts, is the translanguaging approach. It invites transgressing borders not only between named languages, but also between linguistic and other semiotic modes in communication (Li, 2018). Although these recent approaches strongly resonate with an embodied approach, this dimension has not yet been fully recognized, for instance, in translanguaging (Pennycook, 2017). Embodied learning approaches thus align with and contribute to ongoing trends in language education.

In sum, understanding embodied learning requires the ability to distinguish learning as holistic, utilizing the bodily faculties fully, and thus connecting learning processes with the learner’s environment. This understanding underpins the analysis in this review. This discernment may contribute to the development and implementation of novel pedagogical approaches. Against this background, an embodied approach to language learning and teaching can draw on various theoretical perspectives, motivating why this review is open towards different theoretical frameworks. This openness enables the review to capture different perspectives of the investigated topic.

3. Methods

The study was conducted as a systematic mixed studies review, seeking to systematically aggregate, appraise, and synthesize empirical studies with different research designs (Booth, Sutton, & Papaioannou, 2016; Pluye, Gagnon, Griffiths, & Johnson-Lafleur, 2009).

In January 2021, exhaustive literature searches were conducted in seven databases: ERIC, Academic Search Complete, Web of Science, PsycINFO, PubMed, Finna,² and Google Scholar.³ Different search terms were piloted to determine the scope of the review. Two clusters of search terms were utilized in the databases with Boolean operators: (“embodied learning” OR “embodied pedagogy” OR “embodied cognition” OR “embodied education” OR “embod*” OR “embodied teaching” OR “bodily learning” OR “kinaesthetic learning” OR “embodied instruction” OR “embodied practice*” OR “movement-based” OR “bodily”) AND (“language education” OR “language learning” OR “language teaching” OR “language pedagogy*” OR “language acquisition” OR “language development”). The searches did not specify educational levels due to the broad educational focus of the review. The database searches yielded 6507 hits after removing duplicates.

Manual hand-searches were performed in a selection of relevant journals to enhance the comprehensiveness of the searches. The following journals were hand-searched: Topics in Cognitive Science; Frontiers in Psychology; Applied Linguistics; Language and Education; Linguistics and Education; Innovation in Language Learning and Teaching; Studies in Second Language Acquisition; Language Learning; Research on Language and Social Interactions; Modern Language Journal; Language Teaching Research; Learning, Culture and Social Interaction; TESOL Quarterly; and Language Teaching. The hand-searches yielded 22 additional hits. Relevant meta-analyses and literature reviews found in the searches were used to search for studies not found in the original searches. Altogether, 6529 references were exported to the systematic review tool Covidence for the screening process.

¹ Utdanningsdirektoratet [Norwegian Ministry of Education] (2020), within the Læreplan i kroppsøving (KRO01-05) (Curriculum for Physical Education), defines bodily learning as: versatile motor learning, development of body awareness and stimulation of joy in movement.

² Finna is a collection of search services for Finnish universities that includes several databases.

³ Google Scholar was used to search for articles published in non-indexed journals, anthologies, and conference proceedings.

3.1. Inclusion and exclusion criteria

The selection was determined by predefined inclusion and exclusion criteria (Table 1). The review covered studies published between 1990 and 2020 to gain a comprehensive overview of the topic. The study included studies reported in languages mastered by at least two of the authors. The review included peer-reviewed empirical studies, published as journal articles, chapters, and conference proceedings. Because chapters and conference proceedings are not always peer-reviewed, the review only included studies that were explicitly labelled as peer-reviewed or if the authors knew that the studies were peer-reviewed.

The review included studies with various educational framings provided that they focused explicitly on learning or teaching language(s). As teacher education has an effect on teaching practices in school, the review included studies addressing language pedagogy for student teachers. Consequently, participants in the reviewed studies could range from children to adults. The review included studies in first (L1), second (L2), and foreign (FL) language contexts and studies focusing on learning and teaching spoken languages (in comparison to signed languages). Ultimately, the review included studies that theoretically used an embodied framework for learning and teaching (see Section 2), thus excluding studies where embodied learning and teaching was only mentioned or not actively used.

3.2. Selection procedure and quality appraisal

The selection procedure is illustrated in Fig. 1. In the screening phase, all titles and abstracts were screened independently by two authors to avoid selection bias, ensuring that the inclusion criteria were met. Possible conflicts were resolved by a third author. A total of 6379 references were excluded based on title and abstract screenings.

Altogether 150 full-text studies were read for eligibility by the first author and another author. After applying the criteria, 34 studies were assessed as eligible. To expand the review, citation tracking was applied to the studies, checking both reference lists and if the studies were cited in relevant articles, as well as researcher checking to find relevant studies from known scholars in the field. This yielded seven additional studies eligible for review. The synthesis ultimately included 41 studies (23 qualitative, 12 quantitative, and six mixed methods).

The included studies underwent quality appraisal using a scoring system for mixed studies reviews developed by Pluye et al. (2009). The quality appraisal tool included 15 quality criteria, proposed to be the minimum set of criteria for concomitant appraisal of qualitative, quantitative, and mixed methods research (Pluye et al., 2009). The studies' quality scores were calculated by dividing the scores (0–1) by the number of relevant criteria for the used research design x 100. This tool addressed similar aspects of methodological quality that have been proposed for language education.⁴ All studies were appraised independently by two authors. No studies were excluded based on the quality appraisal, because the intention was to evaluate possible limitations of the studies that might affect the synthesis.

3.3. Data extraction and analysis

Data was extracted independently by two authors using a data extraction form, piloted before using it on all studies. The following data was extracted: aims, research questions/hypotheses, theoretical framework, research design, educational context, participants, data collection method, method of analysis, and results in response to the review's research questions. Discrepancies were discussed between the authors until consensus was reached.

Thematic analysis was conducted to create a narrative synthesis (Booth et al., 2016; Braun & Clarke, 2006). Because a majority used qualitative designs, the synthesis used an assimilated approach by qualifying and merging quantitative findings with qualitative findings (Pluye et al., 2009), while still reporting effect sizes from quantitative studies when relevant for the synthesis. The data was transferred to NVivo, where the data was coded in relation to the research questions by the first author. Building on similarities in the coding, the first author grouped the codes into subthemes, upholding a close dialogue between all authors. Possible differences in opinion were discussed until reaching a consensus. The identified subthemes were checked against the original articles several times and ultimately compared with each other to identify patterns and create themes and subthemes in response to the research questions. The structures of the thematic analyses are explained in relation to the research questions.

4. Results

4.1. Study characteristics

In response to RQ1, a thematic and descriptive overview of the included studies in terms of year of publication, languages, educational levels, participants' language proficiency levels, and investigated language areas is presented. The analysis of the characteristics of the used embodied learning approaches resulted in a thematization that the studies belonged to two different strands.

⁴ See TESOL Quarterly's recommendations for quantitative, qualitative, and mixed methods research: <https://onlinelibrary.wiley.com/page/journal/15457249/homepage/forauthors.html>.

Table 1
Inclusion and exclusion criteria.

Criteria	Included	Excluded
1. Year of publication	1990–2020	Before 1990 and after 2020
2. Language use	English, Swedish, Finnish, Norwegian, and Danish	Other languages
3. Scientific quality and type of study	Peer-reviewed, empirical studies (journal articles, chapters, and conference proceedings) using any type of research design	Non-peer-reviewed studies, meta-analyses, literature reviews, theses and dissertations, theoretical studies, only descriptions of practice and teaching tips
4. Educational framing	Explicit focus on learning and/or teaching language(s) in preschool, kindergarten, primary education, secondary education, and higher education, adult education, and non-formal education	Non-educational settings (e.g., laboratory settings), homes, hospitals, speech therapy, and rehabilitation centers
5. Language focus	Any language as first, second, or foreign language	Sign language, and speech or cognitive impairments
6. Embodied approach	Using an embodied framework to learning and teaching	Only mentioning embodiment or embodied learning and teaching without using it theoretically

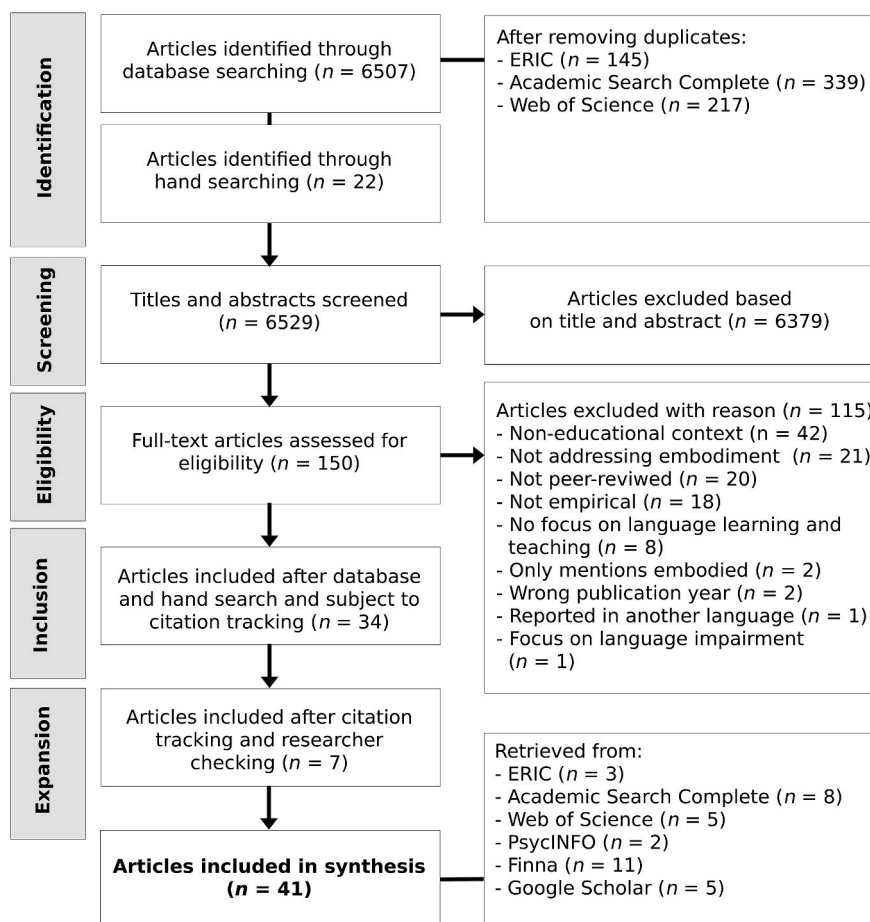


Fig. 1. Flow Chart of the screening procedure.

4.1.1.1. Overview of the studies

Table 2 presents an overview of the included studies. All studies were published after 2010, except one from 2008. The number of studies increased towards the end of the 2010s, with 35 (85%) studies published between 2015 and 2020, whereas 19 (46%) studies were published between 2019 and 2020. Learning of English was mostly represented (56%) and other target languages were German, French, Greek, Romanian, Swedish, Chinese, Finnish, Italian, and Japanese.

Altogether, 14 studies were conducted in higher education, 11 in primary and elementary education, seven in preschool and kindergarten, four in adult education, three in non-formal education, and two in secondary education. Furthermore, 18 studies (L2 and FL) targeted beginner or low proficiency students, and eight studies targeted intermediate or advanced levels. All seven L1 studies targeted children aged 3–10, and the remaining eight L2 and FL studies did not mention a proficiency level.

Various terms in relation to embodied learning were used: embodied learning, embodied pedagogy, embodied teaching, embodied

Table 2
Overview of included articles.

Study	Aim	Theoretical framework	Research design	Context
Andrä et al. (2020)	To compare the effects of gesture and picture enrichment on L2 vocabulary learning; to investigate whether gesture or picture enrichment has the potential to boost children's learning of both concrete and abstract word types; and to investigate long-term influences of gesture and picture enrichment on school children's L2 vocabulary retention by comparing the effects of the two types of enrichment up to 6 months post-learning.	Cognitive and neuroscientific theories of multisensory and sensorimotor enrichment focusing on embodiment, dual coding, and simulation and imagery accounts.	Quantitative experimental within-subjects study. Experiments 1 and 2 compared gesture enrichment with a non-enriched condition, while experiment 3 compared gesture enrichment with picture enrichment. Recorded vocabulary and free recall test sessions at three points: 3 days, 2 months, and 6 months following the completion of the learning phases.	Three experiments in a primary school (grade 3) in Germany with a focus on L2 (English). 54 students in experiment 1; 43 students in experiment 2; and 51 students in experiment 3.
Bara and Kaminski (2019)	To test the proposal that holding the real object while saying the corresponding word, without performing any specific gesture, allows an efficient encoding in memory and facilitates the retrieval of the name of the object.	Embodied cognition and language, and cognitive load theory.	Quantitative, quasi-experimental study with a within-participant design where the children participated in both conditions with images as non-verbal aids and objects. Assessment through a post-vocabulary test.	108 children (5–10-year-olds) in grades 1–3 in a primary school in Rwanda with a focus on L3 (French).
Cannon (2017)	To investigate the use of drama-based pedagogy to reach linguistically diverse students.	Bakhtin's categories of language: authoritative and internally persuasive discourse; embodied learning; and multimodal literacy.	Qualitative, ethnographic case study with participant observation, video-recordings, group interviews with students, and one-to-one interviews with the teacher.	18 seventh- and eighth-grade students (aged 12–14) in a middle school in the US and their teacher with a focus on L2 (English).
Duncan et al. (2019)	To pilot a combined movement and story-telling intervention; examining the effect of a combined movement and story-telling intervention, movement only intervention or story-telling only intervention on motor competence and naming vocabulary in British preschoolers.	Embodied cognition.	Quantitative, cluster randomized intervention design with (1) a combined movement and story-telling intervention; (2) a movement only intervention; and (3) a story-telling only intervention, using pre-, post-, and delayed post-tests for Test of Gross Motor Development – 2 through video-recordings; and British Ability Scales – 3 to assess language ability.	74 preschool children (aged 3–4) in three preschools in the UK with a focus on L1 (English). 22 children in intervention group 1; 25 children in control group 2; and 27 children in control group 3. All children participated in pre- and post-tests, and 37 children participated in delayed post-tests.
Eilola (2020)	To analyze the use of different linguistic, embodied, and material resources in word explanation sequences following dictations exercises in language classrooms for adult second language and literacy learners.	Theories of multimodality, embodied enactment, and social interaction.	Qualitative, longitudinal ethnographic design, applying conversational analysis on video-observations.	5 teachers and their adult students at an adult education center in Finland with a focus on L2 (Finnish).
Eskildsen and Wagner (2013)	To explore the return gesture as a resource of embodied competence in more detail in three different situations in which participants make use of gestures to complete turns and produce return gestures in different ways.	Theories of gesture studies and a conversation analytical paradigm.	Qualitative conversation analysis study applying a longitudinal perspective on non-elicited classroom data using observation and video-recordings.	Adult L2 learners (English) at a community college in the US. 1 focal student.
Eskildsen and Wagner (2015)	To investigate the coupling of specific linguistic items with specific gestures in second language (L2) learning over time.	Usage-based approaches to language learning; and theories of gesture studies and conversation analysis.	Qualitative, longitudinal conversation analysis study using video-recordings.	Adult L2 learners (English) at a community college in the US. 1 focal student.
Guerrettaz et al. (2020)	To analyze the ESOL lesson that Anne Marie (Author 1) employed and her teacher-learners' responses.	Sociocultural theory and experiential learning with a focus on embodiment.	Qualitative lesson study with embodied lessons with nine learning tasks using audio-recordings of embodied lessons; audio-recorded focus group	19 undergraduate students (aged 18–28) in a teacher education program in the US with a focus on L2 pedagogy (English).

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Table 2 (continued)

Study	Aim	Theoretical framework	Research design	Context
Hanks and Eckstein (2019)	To determine whether students found the dance curriculum beneficial in its own right and whether they reported any change in their enjoyment, motivation, or confidence in English language learning due to their participation in a dance-based curriculum.	Theories of motivation, self-determination theory, kinesthetic learning, synaptic trace of memory, and cognitive-affective theory of learning from media.	sessions; written reflections, and background questionnaires. Quantitative questionnaires and qualitative feedback from a 4-week dance-based English curriculum. Pre- and post-course questionnaires with Achievement Emotions Questionnaire and Motivation Orientation of Language Teaching; and focus groups and interviews with 10 students.	26 students (aged 19–37) at a language school for learners of English (L2) at a university in the US.
Haught and McCafferty (2008)	To argue that language is not a separate domain from communication, that language in use is necessarily an embodied phenomenon that includes mimetic properties that are part and parcel of the language culture mix, such as facial expressions, gestures, posture, body language and so forth; and that body, language, and mind are unified in the engendering of a thought and its production in linguistic and imagistic form through speech and gesture.	Socio-cultural theory, and embodied mind.	Qualitative design focusing on drama workshops with video-recordings, student notes, and changes made to scripts in the workshop.	6 adult students in a voluntary drama workshop at a university in the US, with a focus on L2 (English).
Hellermann (2018)	To address two different aspects of the conceptualization of interactional competence; to add to the discussion of practice-based approaches to the conceptualizations of learning; to illustrate evidence how the focal participant (Li) is learning how to be a student in a language classroom; and to illustrate how language is learned in the context of learning a particular task.	Theories of cognition as distributed and enacted and ethno-methodological conversation analysis.	Qualitative ethnomethodological conversation analysis with a longitudinal design using observation and video-recordings.	Adult participants in a community college English class in the US with a focus on L2 (English). 1 focal student.
Hua et al. (2020)	To explore the role of embodied repertoires in teaching and learning in a multi-ethnic karate club in East London and its implications for language teaching and learning; and to show how the translanguaging approach helps to highlight the significance embodied repertoire in teaching and learning.	Theories of translanguaging and embodied repertoires.	Qualitative ethnographic research design using ethnographic observations, audio- and video-recordings, field notes, and interviews.	Two multilingual karate clubs in the UK with 1 sensei, 1 helper, and 20 karate children (aged 4–16) learning Japanese karate terms (FL) while practicing karate moves.
Ionescu and Ilie (2018)	To explore whether language learning in preschoolers is more efficient if it is based on using the sensorimotor system of the child when they first encounter abstract expressions.	Theories of embodied cognition; grounded cognition; embodied learning; and theory of cognitive development.	Quantitative, pretest/posttest quasi-experimental design with (1) an embodied learning group and (2) a traditional learning group using pre- and post-tests of children's knowledge and recognition of new words in a story.	25 kindergarten children (aged 4–5) in Romania with a focus on L1 (Romanian): 14 children in group 1 and 11 children in group 2.
Janzen Ulbricht (2020)	To report the results of a 7-week experiment that tested the effects of gesture-based L2 instruction on long-term spatial term learning; and to test the long-term effects of learning a text using two	Theories of gesture studies and embodied simulation.	Quantitative experimental study with two experimental conditions: codified gesture condition and scenic learning condition using testing materials with objects (e.g., teddy bear, ball, blanket) which the children	76 children (aged 8–13; $M = 10.9$ years) in two primary schools, one in Germany ($n = 29$) and one in Poland ($n = 47$) with a focus on English (FL).

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Table 2 (continued)

Study	Aim	Theoretical framework	Research design	Context
	English language teaching methods, one with teacher gestures at the level of morphology without access to the written text (CG), and one with gestures at the sentence level with access to the written text (SL).		performed tasks with to receive points for different actions and how they succeeded.	
Kaščák et al. (2012)	To discuss German language acquisition at an early age: the discovery of the interconnection between language and corporeality is the key component of the analysis based on video studies.	Theories of the anthropology of the body; phenomenology; and habitus.	Qualitative ethnographic videography study using video-observations of 59 lessons and in-depth interviews with teachers.	Children (aged 3–6) and teachers in four kindergartens in Slovakia with a focus on German (FL).
Kern (2018)	To explore, using the methodology of conversation analysis, what first graders learn about words and syllables when they are asked to clap whilst vocalizing them.	Theories of ethnomethodology.	Qualitative conversation analysis study using videotaped examples.	5 first-grade children and 2 teachers in primary school in Germany with a focus on L1 (German).
Kosmas and Zaphiris (2019)	To examine if the embodied interaction delivered through the use of motion-based games (i.e., Kinect educational games) can facilitate the collaboration between students; and to examine if the delivery of embodied learning through technology can support the collaboration between students in the classroom within the language learning.	Theories of embodied interaction and cognition.	Mixed methods study implementing embodied learning as part of the learning activities in a real classroom environment using an attitudinal Likert scale questionnaire to assess students' overall experience and perceptions of the learning approach; and teachers' observation protocols and semi-structured interviews with teachers.	52 students (mean age 8.2) and five teachers from four elementary classrooms in two primary schools in Cyprus with a focus on L1.
Kosmas and Zaphiris (2020)	To investigate a new approach to classroom interventions from an embodied perspective; and to provide a new teaching paradigm for teachers and researchers to use in their exploration of embodied learning-driven technology as a learning tool.	Theories of embodied cognition.	Mixed methods study with a three-month movement-based intervention using pre and post language and vocabulary tests Word Finding Vocabulary Test and personalized PanBoy vocabulary test; student questionnaires; and semi-structured interview with the teachers.	118 students (62 first-graders, 56 s-graders) and 6 teachers in elementary schools in Cyprus with a focus on L1 (Greek).
Kosmas et al. (2019)	To examine how using Kinect-based educational games, as one example of implementing embodied learning in a classroom context, can become a reality in an authentic classroom environment with documented gains for students.	Theories of embodied learning; embodied interaction; and embodied cognition.	Mixed methods intervention study with 13 intervention sessions during a four-month period using pre- and posttests with "Psychometric criterion of cognitive adequacy for children" to assess short-term memory skills; "Word finding vocabulary test" to assess language skills; collecting learning analytics from the Kinect game to examine the children's progress; teacher's reflective diaries; and semi-structured interviews with teachers.	52 third-graders (aged 7–10) and five teachers, involved in the research procedure, at four elementary classrooms in two primary schools in Cyprus, with a focus on L1 (Greek).
Lan et al. (2018)	To investigate the learning effects of different types of embodied movements, real body versus 3D avatar, on elementary school EFL students' learning comprehension of phrases about sports.	Theories of embodied cognition; embodied language processing; and human's motor system.	Quantitative quasi-experimental design with three treatment groups in an 11-week experiment: (1) Kinect; (2) Second Life; and (3) paper, using an EFL performance pre-test (week 1) and delay-tests (week 6 and 11).	69 fifth-grade students in two elementary schools in Taiwan with a focus on English (FL): 25 students in Kinect group; 22 students in Second Life group; and 22 students in paper group.

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Table 2 (continued)

Study	Aim	Theoretical framework	Research design	Context
Lan et al. (2015)	To investigate the learning effects of different modalities on elementary school EFL students' learning of phrases about sports; and to investigate how the fitness between learners' learning styles and adopted learning modalities influences the learning of English as a foreign language (EFL) by elementary school students.	Theories of embodied cognition.	Quantitative experimental design with three modality groups: (1) video; (2) gesture-based; and (3) 3D avatar-based using a performance test and a learning style questionnaire.	87 fifth-grade students in an elementary school in Taiwan with a focus on English (FL); 27 students in video group; 32 students in gesture group; and 28 students in avatar group.
Lilja et al. (2020)	To increase understanding of language use and moments of language learning in social circus interaction.	Theories of embodied demonstration, action, and resources and a conversation analysis paradigm.	Qualitative video-ethnography study with multimodal conversation analysis using video-observations and researchers' notes.	Adult immigrants and instructors in social circus in Finland with a focus on L2 (Finnish).
Majlesi (2014)	To show, in detail, how awareness about grammatical glosses, relations, and rules are progressively accomplished in face-to-face teaching moments; and to demonstrate how instructing second language grammar and accomplishing grammatical understanding on a worksheet are underwritten by embodied practices.	Theories of ethnomethodological conversation analysis and dialogical and praxeological perspectives.	Qualitative ethnomethodological conversation analysis study using video-recordings.	Adult immigrants in Swedish for immigrant classes in Sweden with a focus on L2 (Swedish).
Majlesi (2015)	To demonstrate the use of teachers' responsive matching gestures in different interactional sequence types as part of intertwined resources (e.g., prosody, body orientations, etc.) to foreground and highlight what is learnt.	Theories of ethnomethodological conversation analysis.	Qualitative ethnomethodological conversational analysis study using video-recordings.	Adult immigrants in Swedish for immigrant classes in Sweden with a focus on L2 (Swedish).
Majlesi (2018)	To show how multimodality, that is, the use of multiple communicative resources, such as talk, body, and available artifacts, is indispensable to action-building in human activities including language teaching, here the teaching of grammar.	Multimodal analysis of classroom interaction from an ethno-methodological conversation analysis perspective.	Qualitative ethnomethodological conversational analysis study using video-recordings.	Adult immigrants in Swedish for immigrant classes in Sweden with a focus on L2 (Swedish).
Marian et al. (2019)	To explore the role positive emotions might play in language learning in the preschool period; and to see if the previous results can be replicated.	Theories of embodied cognition and grounded cognition; and the broaden-and-build theory.	Quantitative quasi-experimental design with four conditions: Sensorimotor condition with emotions (SME); traditional learning condition with emotions (E); sensorimotor condition (SM); and control group (C), using pre- and post-tests to assess the number of newly learned words and idioms, and the number of narrative sequences retold in the correct order.	Children (aged 4–5) from two kindergartens in Romania with a focus on L1: 20 children in SME group; 14 children in E group; 7 children in SM group; and 10 children in C group.
Matsumoto (2019)	To investigate moments when embodied actions and gestures become prominent interactional resources for teaching in the context of a L2 writing classroom.	Theories of multimodality, embodiment, and non-verbality; and a conversation analytical paradigm.	Qualitative conversation analysis study using video-recordings and observations.	19 university students and 1 instructor at a university in the US, with a focus on L2 (English).
Mavilidi et al. (2015)	To investigate the effects of enacting words through full-body movements in the form of physical exercise and part-body movements in the form of	Theories of grounded or embodied cognition.	Quantitative mixed experimental design with four conditions: (1) integrated physical exercise condition; (2) non-integrated physical exercise condition; (3)	125 preschool children (mean age 4.94) from fifteen childcare centers in Australia, with a focus on Italian (FL): 31 children in

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Table 2 (continued)

Study	Aim	Theoretical framework	Research design	Context
	gesturing on learning a foreign language vocabulary.		gesturing condition; and (4) conventional condition, using measurement of memory performance (free-recall and cued recall tests); measurement of physical activity with accelerometer to assess the children during, directly after, and follow-up.	group 1; 23 children in group 2; 31 children in group 3; and 26 children in group 4.
Nguyen (2016)	To describe how a teacher uses talk, the body, and material artifacts to teach pronunciation in an intensive ESL classroom.	Theories of social interaction.	Qualitative conversational analysis study using participant observations and video-recordings.	University students and their teacher at a university in the US, with a focus on L2 (English).
Pasfield-Neofitou, Huang, & Grant (2015)	To examine student interaction in a virtual environment customised for foreign language learning to examine “virtually” embodied and extended cognition.	Theories of embodied cognition and extended embodied cognition.	Qualitative case studies with two cases: (1) focus group interviews after a lesson when navigating the avatar in Second Life; and (2) video-recordings of students using avatars to buy traditional dish in Second Life, and one-on-one stimulated recall interviews.	Students (aged 18–25) in computer lab lessons at a university in Australia, with a focus on L2 (Chinese): 14 students in case 1; and 11 students in case 2.
Rosborough (2014)	To investigate the mediational role of gesture and body movement/positioning between a teacher and an English language learner in a second-grade classroom.	Sociocultural theory and ecological learning.	Qualitative observational study using video-recordings, observation and field notes, classroom documents, and two interviews with the teacher.	19 s-grade students and 1 teacher in elementary school in the US, with a focus on L2 (English). 1 focus student in the study.
Rothwell (2011)	To explore the potential of a process drama pedagogy in the language classroom to enhance engagement and achievement in additional language learning in its early stages; and to examine any links between this process and the current emphasis on improving learners’ experiences of the language culture nexus through what is called intercultural language learning.	Socio-cultural model of language and multimodality.	Qualitative action research study using video-recordings of classes, questionnaires, and interviews with students.	21 eight-grade students (aged 12–13) and 1 teacher-researcher in a secondary school in Australia, with a focus on German (FL).
Scally (2019)	To investigate the application of theatre devising strategies to create a heightened awareness of non-verbal language and embodied experience of words in second language acquisition (SLA) learning and teaching.	Theories of linguistic habitus, phenomenology, and a socio-cognitive approach to SLA.	Qualitative ethnographic study with a four-week theatre workshops, using video documentation of the sessions to complement the researcher’s reflections and observations of the sessions; a project blog, a pre- and post-project electronic survey; and audio-recorded semi-structured interviews.	10 participants (aged 26–44) in a theatre workshop with a focus on L2 in Switzerland.
Schmidt et al. (2019)	To investigate the effects of specifically designed physical activities on primary school children’s foreign language vocabulary learning and attentional performance.	Theories of embodied cognition and cognitive load theory.	Quantitative intervention study with three experimental conditions: (1) meaningful physical activity; (2) nonrelated physical activity; and (3) without physical activity (control), using a pre d2-R test of attention and a questionnaire including background variables immediately after the one learning session; ratings of enjoyment and cognitive exertion after second session; wearing accelerometers and a post d2-R test of attention after third learning session; and cued recall test after the fourth session. Enjoyment measured with	Third-grade students (mean age = 9.04) in six elementary school classes in Switzerland, with a focus on French (FL): 34 students in group 1; 38 students in group 2; and 33 students in group 3.

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Table 2 (continued)

Study	Aim	Theoretical framework	Research design	Context
Shiang (2018)	To explore the impact of embodied cognition on EFL reading instruction via a comics production activity, comparing its effects on EFL reading comprehension to those of a translation activity.	Grounded cognition and embodied cognition.	Physical Activity Enjoyment Scale and cognitive exertion measured with Self-Assessment Manikin. Comparison of two groups: (1) comics production group that illustrated texts; and (2) translation group that translated texts, using a true or false reading test and a semi-structured post-experiment focus group interview.	71 freshmen students at two universities in Taiwan, with a focus on English (FL): 35 students in group 1; and 36 students in group 2.
Sila and Lenard (2020)	To determine how essential it is for children to include movement support in teaching them to produce words and alliteration after being given the initial sound of a word (vowels/æ/,/e/,/i/,/o/,/u/) in English.	Theories of kinesthetic learning and embodied cognition.	Qualitative descriptive design with two teaching sessions using video clips, a semi-structured interview, and a word and alliteration production test.	13 children (mean age = 5.8) with a teacher and a dance teacher in a preschool in Slovenia, with a focus on English (FL).
Smotrova (2017)	To examine the ways the teacher and students employ body movement in an ESL classroom in order to identify its instructional functions and implications for pedagogy.	Sociocultural theory; Vygotsky's <i>obuchenie</i> ; a neurological lens to imitative learning through mirror neuron mechanisms; and classification of gestural dimensions.	Qualitative conversation analysis study using video-recordings and a semi-structured follow-up interview with the instructor.	12 students and 1 teacher in a course at a university in the US, with a focus on L2 (English).
Suñer and Roche (2019)	To investigate the effectiveness of multimedia animations for the visualization of embodied concepts related to so-called light verb constructions in German (e. g. Germ. <i>eine Rede halten</i> , 'to give a speech').	Theories of embodied cognition, concept-based approach to grammar, and cognitive linguistics.	Quantitative experimental study with two groups: (1) concept-based approach with image-schematic approach; and (2) traditional approach with a formalistic approach, using tasks with pre- and posttests and a questionnaire on the experience with the teaching materials and activities, and the perceptions of the importance of grammar in the context of language learning.	39 students (mean age = 22.3) at two universities in Belgium, with a focus on L2 (German). 20 students in group 1; and 19 students in group 2.
Tai and Brandt (2018)	To gain a detailed understanding of the possibilities of employing embodied enactments as a pedagogical strategy to respond to learner initiatives in an L2 classroom.	Theories of embodied enactment and learner initiatives.	Qualitative conversational analysis study using video-recorded classroom data.	4 students and 1 teacher in a class at a university in the US, with a focus on L2 (English).
Toumpaniari et al. (2015)	To examine whether preschool children's learning of a foreign language vocabulary by embodying words through task-relevant enactment gestures and physical activities would be perceived as the preferred teaching method and lead to higher learning outcomes than learning by embodying words through task-relevant enactment gestures only and learning in a conventional way without gestures and physical activities.	Theories of cognitive, physiological, and affective gains and processes; and physical activity and academic performance.	Quantitative quasi-experimental study with three experimental conditions for four weeks: (1) embodying words through gesturing; (2) embodying words through physical activity and gesturing; (2) and control group, using individual post-test with to evaluate the teaching method and to determine how many words they could remember with cue-recall format.	67 children (aged 4) in three kindergarten classes from two kindergartens in Greece, with a focus on English (FL): 23 children in group 1; 23 children in group 2; and 21 children in group 3.
Wei et al. (2019)	To study the specific effect of embodied interactive action games to second language vocabulary acquisition.	Theories of game-based learning; gamification; and embodied interaction.	Comparison of two group: (1) experimental group with Kinect; and (2) control group with reading cards, using pre- and post-test questionnaires with an assessment of sustainable learning motivation, academic performance, learning anxiety of	13 college students in China, with a focus on L2 (English): 16 students in group 1, and 15 students in group 2.

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Table 2 (continued)

Study	Aim	Theoretical framework	Research design	Context
			second language vocabulary acquisition; and semi-structured interviews.	

cognition, embodied enactment, embodied actions, embodied interaction, embodied practice, embodied instruction, kinesthetic learning, and corporeality in learning. Five studies specifically referred to embodied language learning, but from different perspectives: the implemented intervention (Ionescu & Ilie, 2018; Marian, Rogobete, Vescan, Ilie, & Ionescu, 2019), the tasks implemented (Guerrettaz, Zahler, Sotirovska, & Boyd, 2020), a keyword (Lan, Sung, Chen, & Liu, 2015), and the title of the theory section (Haight & McCafferty, 2008).

The studies investigated embodied learning with different approaches to language education. L1 teaching was represented in seven studies, focusing on preschool, kindergarten, and primary school, and encompassed learning and remembering new words and idioms, spelling and listening skills of new words, recognizing syllables, and retelling narrative sequences in the correct order.

L2 teaching was represented in 22 studies, focusing primarily on higher and adult education, but preschool, primary, and non-formal education were also prominent. L2 teaching for adults or adolescents focused mostly on vocabulary learning with concrete and abstract nouns, verbs, prepositions, lexical phrases, and specific types of vocabulary (e.g., academic vocabulary). The focus was also on pronunciation (e.g., syllables, word stress, and rhythm), grammar (e.g., adjectives, adverbs, and light grammar constructions), and sentence structure (e.g., requests and conditional statements). The studies included language use in performing different tasks (e.g., navigating and buying items) and in student-teacher interactions, such as answering questions and teachers' explanations, formulations, and corrections. L2 teaching also had a broader L2 pedagogical approach through an embodied language pedagogy in teacher education. Finally, the focus was vocabulary (abstract and concrete nouns) and student-teacher interactions in L2, within the context of solving math problems, in primary school.

FL teaching (including third languages) was represented in 12 studies and evident on all educational levels, but primarily in preschool, kindergarten, and primary school. In preschool and kindergarten, FL teaching focused on rhymes, alliteration, and vocabulary (nouns, adjectives, verbs). In primary school, the teaching had varied foci: vocabulary, listening comprehension of sports-related phrases, and spatial terms with sentences, and lexical chunks. In other education levels, the focus was on karate terms as formulaic language in non-formal education and reading comprehension in higher education.

4.1.2. Two strands of embodied learning in language education

The studies could be divided into two strands: (1) embodied learning through orchestrating embodied language learning and teaching, and (2) embodied learning in naturally occurring language learning interactions. In both strands, L1, L2, and FL studies were identified.

Within these two strands, different characteristics of embodied learning in language learning and teaching were distinguished, partly derived from the theoretical and methodological approaches used. The first strand, with 25 studies, compared varied learning conditions to investigate the effect of different embodied learning interventions (see Table 2) or investigated an embodied language learning approach in educational practice. This strand included quantitative, qualitative, and mixed method designs. The second strand encompassed 16 qualitative studies that examined how language learning involves different embodied aspects (e.g., gestures and embodied actions).

Across these two strands, an understanding that cognition and body are connected and that language and meaning are embodied

Strand 1: Embodied learning through orchestrating embodied language learning and teaching (25)	Strand 2: Embodied learning in naturally occurring language classroom interactions (16)
<i>Activities using technological resources (8)</i>	<i>Gestures and embodied actions in classroom activities (13)</i>
<i>Arts-based activities (7)</i>	<i>Movement and arts teaching activities (2)</i>
<i>Activities with physical activity and movement (6)</i>	<i>Gestures and material artifacts in classroom activities (1)</i>
<i>Activities using materials, gestures, and pictures (3)</i>	
<i>Activities within language teacher education pedagogy (1)</i>	

Fig. 2. Overview of the embodied learning activities and number of studies in the themes.

phenomena was identified. The embodied learning approaches acknowledged the body's role in language learning from different theoretical perspectives. Studies within the first strand mainly, but not exclusively, drew on embodied cognition, whereas studies within the second strand mainly, but not exclusively, drew on theories from an ethnomethodological, a sociocultural and/or a multimodal theoretical paradigm (see Table 2). Differences as regards methodological designs were mainly, but not exclusively, using experimental designs in the first strand and conversation analysis in the second strand (see Table 2).

There were traces of acknowledging that language and embodied actions did not have prominence over the other, which was linked with perceiving language as embodied. For example, verbal utterances can complement body movements (Hua, Li, & Jankowicz-Pytel, 2020), and gestures were not merely a tool to strategically resort to, but played a facilitative role in the learning process and changed alongside the learning process (Eskildsen & Wagner, 2015). Some studies applying a conversation analytical approach (Eskildsen & Wagner, 2013, 2015; Hellermann, 2018; Kern, 2018; Majlesi, 2015; Rosborough, 2014) portrayed learning as a construction of intersubjectivity.

4.2. Embodied learning activities

The explored learning activities were clustered into several themes in relation to the two strands (Fig. 2). Although some studies included a combination of different activities, the studies had a certain focus regarding the activities. The analysis maintained a holistic approach to the activities, indicating that they were categorized to only belong to one theme. Splitting the activities into several themes could lead to a misleading understanding of the original research agendas.

4.2.1. Activities orchestrating embodied learning in language education

The 25 studies with activities orchestrating embodied language learning and teaching were divided into five themes.

Activities using technological resources. Eight studies explored activities using technological resources at varied educational levels. Kinect was used with primary school children and adults to learn vocabulary and sports-related phrases (Kosmas, Ioannou, & Zaphiris, 2019; Kosmas & Zaphiris, 2019, 2020; Lan et al., 2015; Lan, Fang, Hsiao, & Chen, 2018; Wei, Yang, Wang, Zhang, & Li, 2019). For example, children watched movements displayed with words in Kinect and imitated the movements (Kosmas & Zaphiris, 2020). Second Life was used with fifth-graders and adults to learn phrases or perform tasks in a FL environment (Lan et al., 2015, 2018; Pasfield-Nefitou et al., 2015). For example, university students used avatars to navigate and buy a traditional dish in the FL environment in Second Life (Pasfield-Nefitou et al., 2015). Ultimately, university students learned light verb constructions when watching multimedia animations (Suñer & Roche, 2019).

Arts-based activities. Seven studies explored activities with drama, dance, or comic production⁵ at varied educational levels. Various drama activities (e.g., improvisations, working with written dramatic scripts, mime) were used when teaching languages in secondary, higher, and non-formal education (Cannon, 2017; Haught & McCafferty, 2008; Rothwell, 2011; Scally, 2019). For example, secondary school students used drama to learn academic language (Cannon, 2017). Dance activities were used to teach vocabulary and alliteration to preschool and university students (Hanks & Eckstein, 2019; Sila & Lenard, 2020), and comic production was implemented with university students producing comics as an embodied reading comprehension activity (Shiang, 2018).

Activities with physical activity and movements. Six studies investigated physical activity and movement activities with young children in preschool and kindergarten. Children used physical activity in vocabulary learning (Mavilidi, Okely, Chandler, Cliff, & Paas, 2015; Schmidt et al., 2019; Toumpaniari, Loyens, Mavilidi, & Paas, 2015) and combined movements with story-telling to learn vocabulary (Duncan, Cunningham, & Eyre, 2019; Ionescu et al., 2018; Marian et al., 2019). For example, children enacted movements indicated by animal names (e.g., kangaroo; Schmidt et al., 2019) and listened to a story and imitated new words and idioms (e.g., to scuttle away) in the narrative (Ionescu & Ilie, 2018).

Activities using materials, gestures, and/or pictures. Three studies compared the use of materials, gestures, and/or pictures in primary school students learning vocabulary or prepositions. Children held various objects (e.g., school objects, clothes, food) to learn vocabulary (Bara & Kaminski, 2019). Using objects was also compared with using gestures to learn prepositions (Janzen Ulbricht, 2020). In turn, gestures and pictures were compared when learning vocabulary (Andrä, Mathias, Schwager, Macedonia, & von Kriegstein, 2020).

Activities within language teacher education pedagogy. One study had student teachers participate in an embodied lesson with various embodied tasks (Guerrettaz et al., 2020). The embodied tasks built on a novel, and included freewriting to an image, timed reading and drama enactments of an excerpt from the novel, filming and watching drama enactments, group discussions, watching movie versions of the novel, and reading authentic student reflections from participating in the embodied lesson.

4.2.2. Activities in naturally occurring language learning interactions

The 15 studies addressing embodied learning in naturally occurring language learning interactions were divided into three themes.

Gestures and embodied actions in classroom activities. 13 studies, primarily conducted in higher education, addressed students' and teachers' use of gestures and embodied actions. Gestures and embodied actions (e.g., bodily actions contributing to meaning-making) were performed by students and teachers in word and sentence explanations (Eilola, 2020; Hellermann, 2018; Majlesi, 2015; Matsumoto, 2019), word searches (Eskildsen & Wagner, 2013), conversational tasks (Eskildsen & Wagner, 2015) and

⁵ Comic production is thematized as a form of art (cf. Zanettin, 2008).

when asking and answering questions (Hellermann, 2018; Tai & Brandt, 2018). Teachers used gestures and semiotic resources when teaching pronunciation (Smotrova, 2017) and grammar (Majlesi, 2014, 2018) and in correction, formulation, and reformulation sequences in student–teacher interactions (Majlesi, 2015).

With children, embodied actions were used as spontaneous educational strategies with rhymes and rhythms (Kaščák, Pupala, & Kovalčíková, 2012). Further, gestures were used in student and teacher L2 interactions (Rosborough, 2014), and speaking-and-clapping in combination with various board games were used to teach and highlight words and their syllabic structure (Kern, 2018).

Movement and arts teaching activities. Two studies had an embodied approach to language learning interaction through engagement in various movement practices in non-formal education. One study encompassed students (aged 4–16) learning Japanese karate terms while practicing karate moves (Hua et al., 2020). Another study with adults encompassed social circus activities (e.g., juggling and clowning), followed by the participants summarizing the lesson with an end circuit (Lilja, Laakkonen, Sariola, & Tapaninen, 2020).

Gestures and material artifacts in classroom activities. One study addressed a university teacher's gestures and material artifacts when teaching pronunciation (Nguyen, 2016). For example, the teacher showed the students how to use the rubber band as a tool in language learning.

4.3. Empirical results

In response to RQ3, two major themes with respective subthemes and three minor themes were identified. The studies belonged to several themes depending on the diversity in the studies' results. These major themes were improvement in and experiences of language learning and facilitating and scaffolding language learning, whereas the minor themes were emotional and motivational benefits to language learning, authentic and meaningful situations, and fostering and reaching multilingual students.

4.3.1. Improvement in and experiences of language learning

The most prominent theme, encompassing 21 studies from the first strand, indicated that embodied learning approaches improved language learning or that participants experienced that they learned language. Gains in vocabulary learning were most prominent, especially with children.

Technological resources for learning vocabulary, phrases, and grammar. This subtheme, with six studies, showed varied language learning gains when using technological resources. Using Kinect improved children's L1 vocabulary learning between pre- and post-testing ($d = 0.65$ in grades 1–2; Kosmas & Zaphiris, 2020; $d = 0.28$ in grade 3; Kosmas et al., 2019), and teachers experienced it to benefit children's vocabulary acquisition. Despite these vocabulary learning gains for children, Kinect was not more effective for older children learning phrases or for adults learning vocabulary. Fifth-graders' listening comprehension of FL phrases seemingly benefitted more from watching virtual avatars doing motions in Second Life than moving their bodies using Kinect (Lan et al., 2018), and college students' use of reading cards led to higher L2 vocabulary performance than Kinect, but also higher levels of anxiety (Wei et al., 2019). Still, a beneficial outcome was that bodily engagements with multimedia animations led to better L2 grammar performance for university students (Suner & Roche, 2019).

Experiences of and improvement in language learning through arts-based activities. Six studies indicated that drama, dance, or comic production could contribute to language learning. Drama and dance produced subjective experiences of learning L2, while comic production appeared to be efficient for FL reading comprehension.

Participants in drama and dance activities experienced memory and learning of L2 vocabulary, pronunciation, and prosody (Cannon, 2017; Hanks & Eckstein, 2019; Haught & McCafferty, 2008; Rothwell, 2011; Scally, 2019). For example, students experienced that drama made learning more memorable (Rothwell, 2011) and that using dance movements helped them learn vocabulary better than they normally would (Hanks & Eckstein, 2019). Comic production was significantly superior to a translation condition, indicating that it enhanced university students' FL reading comprehension (Shiang, 2018).

Improvement in children's vocabulary learning through physical activity and movements. Six studies demonstrated that engagement in physical activity and movements improved children's vocabulary learning in L1 and FL. First, physical activity significantly improved children's FL vocabulary memory and performance (Mavilidi et al., 2015; Schmidt et al., 2019; Toumpaniari et al., 2015). For example, using meaningful physical activity (large effect; $d = 1.12$) and nonrelated physical activity (moderate effect; $d = 0.51$) improved third-graders' memory performance of vocabulary (Schmidt et al., 2019).

Second, combining movements and story-telling improved children's (aged 3–5) L1 vocabulary learning. This combination was more effective than story-telling or movement alone ($\eta^2 = 0.469$; Duncan et al., 2019). Similarly, embodied learning was significantly more effective than traditional learning of words, idioms, and narrative sequences (Ionescu & Ilie, 2018; Marian et al., 2019).

Learning vocabulary and prepositions using materials, gestures, and pictures. Three studies identified mostly similar gains when comparing the use of materials, gestures, and/or pictures in primary school students' learning of vocabulary and prepositions.

Using gestures and materials (e.g., teddy bear, ball, blanket) led to similar gains when learning prepositions, but the gain was more immediate when exposed to one gesture per morpheme (Janzen Ulbricht, 2020). Regarding vocabulary learning, gesture and picture enrichment had long-term benefits for students' L2 vocabulary without a significant difference between gesture and picture enrichment (Andrä et al., 2020). However, students recalled FL words learned by holding real objects six times more often than using images (Bara & Kaminski, 2019).

4.3.2. Facilitating and scaffolding language learning

The second most prominent theme, explicated in 18 studies, concerned the facilitation and scaffolding of language learning. These studies mainly belonged to the second strand—with two exceptions—and were thematized into three subthemes.

Gestures and materials facilitating second language learning. Ten studies indicated that teachers' and students' use of gestures, and also materials, facilitated students' L2 learning. Some studies implied that gestures could contribute to language learning over time. This subtheme focused on adult language learners, with one exception.

Gestures could help solve comprehension trouble, explain words, facilitate question–answer sequences, and teach pronunciation (Eilola, 2020; Eskildsen & Wagner, 2013, 2015; Hellermann, 2018; Majlesi, 2015; Nguyen, 2016; Smotrova, 2017; Tai & Brandt, 2018). For example, teachers' matching gestures could remedy adult students' productions, reformulations, or explanations (Majlesi, 2015), and second grade teachers and students used gestures to embody meaning and establish strategies for solving future communication problems (Rosborough, 2014). Gestures influenced adults' language learning over time, since gesture-talk combinations deployed by students at a particular time to display understanding were also used in later occasions in the language classroom (Eskildsen & Wagner, 2013, 2015).

Gestures could make the intangible language phenomena of pronunciation (e.g., syllables, stress, and rhythm) visible and graspable and help students identify and produce pronunciation and recognize errors and how to correct them (Nguyen, 2016; Smotrova, 2017). Introducing materials, more specifically rubber bands, in language education also facilitated the learning of pronunciation (Nguyen, 2016).

Embodied scaffolding in language learning. Six studies demonstrated that embodied scaffolding from teachers, peers, and drama contributed to language learning. This subtheme mainly focused on adults' L2 learning, with one exception. Scaffolding encompassed various semiotic resources to promote the understanding of linguistic phenomena and entities.

The scaffolding included various embodied actions and semiotic resources (e.g., verbal, visual, gestural, and material resources). Teacher scaffolding occurred, for example, when a teacher initiated an interactive, embodied scaffolding sequence when teaching grammar on a worksheet to help adult, immigrant students see and understand grammatical features of L2 words (Majlesi, 2014). Further, when learning syllables through speaking-and-clapping, first-grade children synchronized bodily and verbally (L1) with the teachers, but this activity might still not provide reliable knowledge about students' learning of phonetic knowledge (Kern, 2018).

Peer scaffolding occurred especially within arts-based activities (Haught & McCafferty, 2008; Lilja et al., 2020; Rothwell, 2011). For example, trusting in and relying on one's peers—which is central in social circus activities—was reflected in participants helping and seeking help from each other in shaping linguistic entities (Lilja et al., 2020), and drama in itself acted as a scaffold as it enabled students to play safely with language (Rothwell, 2011).

Attention to the body in language learning. Three studies showed how attention to the body was crucial for students' learning and that verbal language alone was not enough in language learning. Attention to the body and embodied actions influenced both children and adults. For example, the effectiveness of the FL learning situation in a kindergarten classroom began to fade if the bodily engagement faded in the teaching (Kaščák et al., 2012). Similarly, university students paid more attention to the teacher's verbal explanations in L2 teaching when using embodied actions that contributed to the meaning-making (Matsumoto, 2019). Furthermore, language also appeared to complement body movements. Doing Japanese karate terms (FL) through repeating, copying, and polishing the terms became part of the embodied performance of drilling moves, whereas the L1 became the language of discipline, explanation, elaboration, and reinforcement (Hua et al., 2020).

4.3.3. Emotional and motivational benefits to language learning

With 12 studies identified from both strands, this theme indicated that embodied learning can have emotional and motivational benefits to language learning. It highlighted positive contributions of implementing embodied learning approaches that move beyond solely acquiring language skills to emphasize a positive take on learning languages. Activities such as physical activities, Kinect, dance, social circus, and drama were considered enjoyable in comparison to “conventional” language learning methods (Hanks & Eckstein, 2019; Kosmas & Zaphiris, 2019, 2020; Lilja et al., 2020; Rothwell, 2011; Schmidt et al., 2019; Sila & Lenard, 2020). They could contribute to strengthening motivation, enthusiasm, confidence, engagement, interest, overall well-being, and overcome anxiety (Cannon, 2017; Hanks & Eckstein, 2019; Kosmas & Zaphiris, 2020; Rothwell, 2011; Wei et al., 2019). For example, kindergarteners evaluated the embodying of words through physical activity and gesturing as significantly more positive than the conventional teaching method (Toumpaniari et al., 2015). Further, bodily engagement through multimedia animations contributed somewhat to changing university students' attitudes about grammar learning (Suñer & Roche, 2019).

4.3.4. Authentic and meaningful situations

Identified in both strands, the fourth theme included seven studies, demonstrating how using embodied learning approaches could create authentic and meaningful situations for learning and use. It could contribute to students' performing themselves as language users despite limited language repertoires.

Using drama was particularly evident when it came to the authenticity in language learning (Cannon, 2017; Rothwell, 2011; Scally, 2019), and it could contribute to performing oneself as a language user (Haught & McCafferty, 2008; Rothwell, 2011). For example, drama gave students (grade 7–8) freedom to express themselves in meaningful situations and could ground the L2 vocabulary in a meaningful and authentic context (Cannon, 2017). Further, student teachers' participation in language teacher education pedagogy of embodiment, partly including drama enactments, can enable incorporation of the knowledge into their lived experiences (Guerrettaz et al., 2020).

Situations of pretending and creating imaginary contexts for language use were not, however, limited to drama activities. For

example, university students may not distinguish between themselves and their avatars in the quasi-authentic FL-oriented Second Life environment (Pasfield-Neofitou et al., 2015). Additionally, teachers created hypothetical scenarios and imaginary contexts for students to understand how the language can be used in real life outside the classroom, which lead to students taking ownership of their language learning processes even though their L2 repertoire was limited (Tai & Brandt, 2018).

4.3.5. Fostering and reaching multilingual students

The final theme was identified in both strands and indicated that embodied learning approaches could help to foster and reach multilingual students. It included three studies with varied focuses, such as language teacher education pedagogy of embodiment and language learning in drama and karate. More specifically, participation in the language teacher education pedagogy of embodiment increased student teachers' empathy for L2 learners (Guerrettaz et al., 2020), and implementation of drama had potential to reach linguistically diverse students (Cannon, 2017). Further, consideration of embodied repertoires in multilingual environments in terms of translanguaging could provide a lens to overcome monolingual bias in teaching and learning (Hua et al., 2020).

5. Discussion

This study aggregated and reviewed empirical research on embodied learning approaches in language education, focusing on study characteristics, learning activities, and empirical results. The review identified two strands: (1) embodied learning through orchestrating embodied language learning and teaching, and (2) embodied learning in naturally occurring language learning interactions. These strands are characterized by different theoretical and methodological underpinnings, which, in turn, affect the different outcomes. Despite recognizing the mind-body connection ontologically and epistemologically, embodied learning approaches to language education seem to hold two different meanings. Embodiment was either something added to language education (i.e., specific learning activities) or something that was already there in language education (i.e., language learning is embodied). In the first strand with mostly experimental studies using embodied cognition, the synthesis reveals an understanding of language learning as measurable and quantifiable and that there exists language learning that is not embodied. However, understanding embodiment as already there in language learning—like in the second strand with studies using mostly ethnomethodological and conversation analytic approaches—suggests a more holistic approach, acknowledging language and meaning-making as embodied phenomena. Evidently, the applied theoretical and methodological approaches affect these different understandings and capture different aspects of embodied learning in language education as a phenomenon. The boundaries between the two strands are, nevertheless, overlapping as the theories used accentuate the body's important role in learning.

The synthesis identified various learning activities with respective outcomes in language education. There was a trend to focus on vocabulary learning across the educational levels, emphasizing the trend to apply embodied teaching for beginner learners. An interpretation for why such a large focus was on vocabulary is that language education with beginner learners devotes much time to developing vocabulary. Gestures were used in all age groups, except for adolescents, with significantly proven outcomes for children's language learning and empirical results pointing towards facilitation and scaffolding of language learning for children and adults. Physical activities and movements seemed to be beneficial to children's vocabulary learning with studies showing significant effects. In non-formal educational settings, movements in combination with language learning also held facilitating and scaffolding features for children, adolescents, and adults. Similarly, when using technology, Kinect could be more effective for children's language learning compared to older students, whereas other technological resources might be more suitable for older students. Further, material objects appeared to significantly benefit children's language learning, and could act as a tool to support language learning for adults. Participants in arts-based activities experienced benefits in language learning. Results also showed that embodied learning approaches using gestures, physical activity, technological resources, and arts-based activities had emotional and motivational benefits for language learning. Additionally, embodied learning approaches, especially using drama, could create authentic and meaningful language learning situations. Another contribution of embodied learning is to foster and reach multilingual students. In sum, although the review reveals that embodied learning can contribute to different aspects of language learning, it suggests that embodied learning approaches can contribute to improving mainly vocabulary learning in terms of measurable outcomes and subjective experiences, while simultaneously adding emotional and motivational benefits to language learning. These results are important for practice from student and teacher perspectives, due to the question of how students can be motivated and engaged in language education (Mercer, 2019).

The results draw attention to contexts where embodied learning approaches might not be the most efficient approach in language education. Some embodied learning approaches appear to be more suitable for certain age groups. In turn, the potentials of embodied learning approaches to facilitate and scaffold language learning, as well as to provide and create authentic and meaningful situations for language learning, also emphasize qualitative contributions of this kind of approach to language education. Embodied learning approaches to language education can enable a holistic approach to language learning that actively engages learners, not focusing solely on acquisition of language skills, but on language in a broader sense.

Embodied learning was often considered somewhat a counter-weight against conventional teaching approaches, and there were prevailing arguments that language education could be developed by implementing various embodied learning activities. However, there is no one "conventional" teaching approach in language education. The studies often referred to sedentary activities as conventional teaching approaches, even though the notion of embodied learning extends beyond learning through physical, motor activity. It still appears that understanding learning as embodied often entails physical movements. Further, the fact that orchestrating embodied learning activities was often proposed to deviate from conventional language learning and teaching approaches was often connected to arguments about easy implementation, especially with children. Many activities might not be new for teachers, but

teachers might still feel unprepared and unqualified to implement them in practice (e.g., drama and dance; Buck & Snook, 2020). This emphasizes a need to introduce diverse kinds of language teaching approaches already in teacher education to prepare future teachers to work with embodied learning approaches.

Overall, the quality of the studies was mostly strong. However, three particular methodological quality aspects require attention. First, a majority of the qualitative studies did not discuss the researchers' reflexivity. Whereas this consideration is crucial when the researcher is actively involved in the data collection, it is not always valid for all types of qualitative designs (e.g., conversation analysis). Second, experimental or quasi-experimental studies rarely concealed or blinded the participants when performing tests and measurements. This is not necessarily a limitation, especially in quasi-experimental designs, as concealment might not be desirable when researching this phenomenon in authentic educational practices. Third, whereas mixed methods designs presented opportunities to examine the phenomenon from multiple perspectives, the use of such designs was not always described or justified. Therefore, this study argues for the value of investigating embodied learning in authentic language educational contexts to contextualize the research results in the practices to which they intend to contribute and impact.

Another important result is what remains unexplored. The studies were primarily focused on orchestrating embodied learning activities in L1 and FL teaching with children and naturally occurring L2 teaching with adults. Adolescents in secondary education and intermediate and advanced language learners therefore remain understudied groups. For example, no studies addressed gestures, technological resources, or material objects in secondary education. With younger students, it is more common to have a creative and playful approach to language learning (e.g., movements). Secondary education is often governed more extensively by standardized testing and curricula that do not bend as easily to cross-disciplinary approaches, as in primary education. This might explain why embodied learning approaches have not been investigated more in secondary education. There is not sufficient knowledge in this review about embodied learning approaches to language education in secondary education and with intermediate and advanced language learners to be able to articulate its possible contributions.

Decades after the origination of the embodied turn, embodied learning approaches in language education seem to be gaining critical momentum, as evidenced by the growth of studies in the late 2010s. This growth is also visible regarding embodied learning in related areas of educational sciences (Aartun et al., 2022; Georgiou et al., 2019; Hegna & Ørbæk, 2021) and applied linguistics (Nevile, 2015), and more studies were published in 2021 (e.g., Bauer, 2021; Chicho, 2021; Kosmas, 2021). However, the number of included studies was expected to be larger, which can be explained through scrutiny of related research areas. A major reason for the small number is that much research was excluded—for example about gestures and arts in language education—because it did not explicitly use an embodied framework. For example, the small number of studies with the arts is surprising because of the body's important role in the arts. Additionally, the synthesis does not necessarily reflect the reality of pedagogical practices as embodied learning approaches might be used by teachers. For example, the language-teaching methodology of Total Physical Response (Asher, 1969) is well known, but its theoretical foundation does not draw on embodied learning. This review presents the present state of the art of the research-based knowledge of embodied learning approaches in language education and an important result is thus that empirical research base is currently increasing.

5.1. Limitations

We acknowledge some limitations to this study. The review aggregated a wide area of research. This provides breadth and range, which is a purpose of mixed studies reviews (Pluye et al., 2009), but also prevents a concentrated focus. We systematically searched databases, hand-searched journals, used citation tracking, and researcher checking, but relevant studies might have escaped our attention. The focus was limited to peer-reviewed studies, indicating that the review did not include "grey literature" (Booth et al., 2016), which possibly impacted the results. Because we limited the search to peer-reviewed studies, our selection may have been subject to publication bias. However, we argue that peer-reviewed studies can aid in guaranteeing that the studies have undergone some kind of quality check, which is sometimes difficult to determine when it comes to grey literature (e.g., doctoral dissertations are not always published or peer-reviewed). Further, the hand-searches were complementary to the database searches that already covered a large range of scientific journals and no included study was retrieved from the hand-searches (Fig. 1). Nevertheless, expanding the hand-searches could possibly have generated additional studies to be included.

One might argue that a limitation concerns the surprisingly small number of studies included in the review. This can be explained by the inclusion and exclusion criteria utilized in the review. This limitation has the advantage of reviewing the research area more clearly, but simultaneously, it leaves out important research that sheds light on embodied learning in language learning from other perspectives. Firstly, the review only focused on empirical research in educational settings. There is, however, a large body of experimental and conversation analytical research addressing embodied learning in language learning outside educational contexts. Although such studies contribute important knowledge about language learning, it is still important to actually examine embodied learning approaches in real educational contexts with students and teacher to contextualize the research results in the practices to which they intend to contribute.

Secondly, the review included studies that explicitly stated that embodied learning or teaching was used theoretically. Although some excluded studies can be interpreted to have an implicit embodied approach, we chose to follow the authors' wordings. We did not want to add an embodied emphasis to other scholars' work, as scholars can have different meanings for the wordings. We still acknowledge that different wordings can refer to embodiment (Nevile, 2015) or embodied learning and teaching. If including studies with an implicit or underlying—i.e., not stated clearly in writing—approach to embodied learning and teaching, the review could have ended up with a larger data sample and other results. As such, we chose to be stringent with this inclusion criterion to capture empirical research that specifically addresses embodied learning explicitly in language learning and teaching.

5.2. Conclusions and future directions

This review provides knowledge about the current state of the art of empirical research on embodied learning approaches in language education. What arises as an interesting question based on the review is: How can embodied learning approaches to language education be understood and characterized as *embodied language learning*? It is highly likely that this concept holds different meanings because of what philosophical, theoretical, and pedagogical underpinnings are used. Still, it is possible that the concept could be helpful to conceptualize and gather embodied learning approaches in language education. The review shows that embodied language learning holds potentials to engage learners holistically while simultaneously having the possibility of promoting language learning skills and adding emotional and motivational benefits to language learning.

The review identifies certain research gaps. Secondary education arises as the most understudied research area. More research is needed to determine if and how embodied language learning can contribute to this educational level. In addition, research is needed to investigate the effects that embodied learning approaches have for intermediate and more advanced language learners and in other areas of language use than vocabulary.

The results have implications for educational practice. Embodied language learning can benefit language learners on different educational levels, but some learning activities seem to be more effective for certain age groups. The review aggregates various learning activities, which can contribute in promoting research-pedagogy dialogues (Chong, 2020). This is important because pedagogical practices seem to respond slowly to developments in this research area (Macedonia, 2019; Macrine & Fugate, 2021), although embodied learning approaches might already be used in classroom practices, which is not necessarily shown in empirical research. To affect this slow response, the knowledge gained through advances in this research area needs to be translated to classroom practices (Macrine & Fugate, 2021). Consequently, the argument about easy implementation in educational practice is very much relevant here. Importantly, for embodied language learning to gain foothold in language educational practices, more research about implementation in educational practice is needed and pedagogical approaches need to change (cf. Nathan, 2022). Therefore, the knowledge presented in this review is useful for research-based teacher education. Pre-service and in-service teacher education could act as catalysts in introducing and preparing teachers for implementing embodied language learning in educational practices.

In conclusion, it is likely that this research area will continue to expand and develop due to its rapid growth. Based on this review, embodied language learning presents a valuable approach to language education by enabling a holistic approach to language learning that actively engages learners. As shown in the review, it can be implemented in various ways and contexts to support language learning and renew language pedagogies.

Authorship statement

All persons who meet authorship criteria are listed as authors, and all authors certify that they have participated sufficiently in the work to take public responsibility for the content, including participation in the concept, design, analysis, writing, or revision of the manuscript.

Authorship contributions

Sofia Jusslin: conceptualization, methodology, data collection, formal analysis, writing – original draft, writing – review & editing, visualization.

Kaisa Korpinen: conceptualization, data collection, writing – original draft, writing – review & editing.

Niina Lilja: conceptualization, data collection, writing – original draft, writing – review & editing.

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Johanna Lehtinen-Schnabel: conceptualization, data collection.

Eeva Anttila: conceptualization, writing – original draft, writing – review & editing, project management.

Declaration of Competing interest

We have no conflicts of interest to disclose.

Data availability

The data is presented in [Table 2](#) in the article.

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