


REVIEW

A realist synthesis of interprofessional collaborative practices in early intervention for children with speech, language and communication needs

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Abstract

Background: Interprofessional collaborative practices (IPCP) are considered to be a crucial factor in the optimal support of young children (3–6 years) with speech, language and communication needs (SLCN) in inclusive early childhood education and care (ECEC).

Aims: To investigate IPCP in interventions using a collaborative approach for young children with SLCN in ECEC, by identifying mechanisms within IPCP and how these mechanisms relate to specific context factors and professional and child-related outcomes.

Methods: A realist review of 22 empirical intervention studies, published between 1994 and 2019, was conducted to synthesise context-mechanism-outcome (CMO) configurations, combining context factors, IPCP mechanisms and outcomes at staff and child level.

Main Contribution: Reciprocal IPCP mechanisms were reported together with interprofessional intervention practices, whereas one-directional IPCP mechanisms were restricted to gains in professional development. Our review further suggests that collective ownership of intervention goals, combined with personal cooperation and communication skills of staff, is vital for inclusive practices and functional communication of children with SLCN.

Conclusion: Our review has revealed indications for effective IPCP mechanisms, context factors at staff level, and positive outcomes for the professional development of staff working with children with SLCN. In addition, our findings support a link between IPCP and child-related outcomes regarding speech, language and communication development. Future studies should increase our insight into how practitioners, children and families profit from daily collaborative practices.

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KEYWORDS

interprofessional collaborative practices, speech language and communication needs, early childhood education and care, IPCP mechanisms

WHAT THIS PAPER ADDS

What is already known on this subject

- Interventions using a collaborative approach for young children (3-6 years) with SLCN in ECEC are considered to be part of the optimal support of these children.

What this paper adds to existing knowledge

- Conducting a realist review of 22 empirical studies on collaborative intervention offered the possibility to identify specific context factors, IPCP mechanisms and professional and child-related outcomes and to synthesise CMO configurations. Findings suggest multiple routes from effective delivery of SLCN services to improvement of speech, language and communication development, supporting the suggested beneficial function of collaboration between multiple professions. Collective ownership of intervention goals, combined with personal cooperation and communication skills of staff, seems to be vital for inclusive practices and functional communication of children with SLCN. Reciprocal IPCP mechanisms were reported together with interprofessional intervention practices, whereas one-directional IPCP mechanisms were restricted to gains in professional development.

What are the potential or actual clinical implications of this work?

- High-quality collaborative intervention for children with SLCN in requires awareness of and critical reflection on IPCP mechanisms in order to improve outcomes for both professionals and children. Both, institutional structural support and individual communicative and cooperative skills are required to increase interprofessional collaboration with the aim to meet the needs of every individual child with SLCN.

INTRODUCTION

Over the past few decades, integration of health, education and social care provision in the early years to promote best outcomes for health, education, well-being and inclusion for all children has been mandated by policies around the world (American Speech-Language-Hearing Association (ASHA), 2016; European Agency for Development in Special Needs Education, 2013; UNESCO, 1994; WHO, 2010). This global advocacy closely coincided with a shift towards interprofessional collaboration to support the provision of inclusive and effective services that acknowl-

edge the holistic nature of children's development and contribute to improved outcomes and increase of social inclusion for children with special needs (Bartolo et al., 2019; Wong & Press, 2017). One particular group of young children with special needs is the group with SLCN. It is estimated that approximately 10% of all children have persistent SLCN, including a subgroup of around 7% of 5–6-year-olds with specific and primary speech and language impairments, a subgroup of around 2% with SLCN related to co-existing conditions (i.e., autism, general learning difficulties, hearing impairment etc.) and an estimated 1% of children with most complex SLCN (Law et al.,

2000; Tomblin et al., 1997). The SLCN of this heterogeneous group of children are linked to their various problems with the use or processing of speech sounds and the comprehension or production of language at semantic, morpho-syntactic or pragmatic level. Higher risks of poorer social, emotional and cognitive development, behaviour problems and academic achievements as well as under-identification, followed by a lack of support provision are reported for these children (Gascoigne & Gross, 2017; Norbury et al., 2016).

To realise optimally integrated intervention services for young children with SLCN, collaboration between health support services and ECEC is regarded a vital part of international common principles for intervention (Guralnick, 2008; McKean et al., 2019). The aim of this review is to investigate interprofessional collaboration in interventions using a collaborative approach for young children with SLCN in ECEC. By applying the conceptual framework for IPCP from Stutsky and Spence Laschinger (2014) as a priori framework for our analyses, specific structural and individual context factors, collaborative process mechanisms, and child and professional related outcomes are considered. The purpose of this study is to contribute to the understanding of the complex nature of collaborative intervention provision and the benefits of these services for children with SLCN. Findings of the study result in practical implications for professionals at the individual and interprofessional level.

Integrated intervention for SLCN in ECEC

In general, integrated early years services are characterised by complexity and diversity. Health support services and ECEC services are embedded in their own cultural, social and political contexts with nationally diverse policies, practices, qualifications and aims (Phillipson, Harju-Luukkainen & Garvis, 2018). ECEC delivery systems differ with regard to legislative responsibility, the focus on and integration of care and education for different age groups, the variation of mandatory and non-mandatory provision, as well as the kind of curriculum or framework mirroring different pedagogical approaches. The latter can favour a more holistic or systematic school preparatory perspective on ECEC.

In the context of SLCN, integrated intervention services brings together professionals from different disciplines within health services and ECEC, for example, early childhood teachers and practitioners, community-based health service professionals, special educators and speech-language therapists (SLT). A large variation of terms is used to describe collaboration between multiple professionals, for example, multi-/trans-/interdisciplinary,

cross-/inter-/multi-agency, co- or multi-professional. In this study, the term 'interprofessional' is used as an umbrella term to describe intervention delivery by multiple professionals from different disciplinary backgrounds. Collaborative practices are understood as individual and collective actions addressing a specific aim, embedded in a certain situation or context and based on personal and professional values and attitudes (Kemmis et al., 2014). Research on this subject is needed to gain a deeper insight into the complex nature of interprofessional collaboration. Therefore, this review focusses on IPCP defined as the delivery of comprehensive and integrated child and family intervention services by multiple stakeholders, that is, professionals from different disciplinary backgrounds from within education and/or health care and support services as well as family/caregivers, to meet the needs of the child and family (ASHA, 2016; D'Amour & Oandasan, 2005; WHO, 2010).

Focus on the age group of 3- to 6-year-old children is closely related to an increase in identification and provision of intervention services for SLCN as difficulties with speech, language and communication development often become more apparent (Law et al., 2012). Language growth was found to stabilise after the ages of 5–6 years for children with SLCN (Norbury et al., 2017). However, the principle of early plasticity for advanced cognitive functions, including speech, language and communication development, is still valid, and it is recommended to focus on social activity and participation (National Council on the Developing Child, 2007). For young children, the ECEC setting becomes more important as the (mandatory) daily social context for speech, language and communication development in interaction with peers and caregivers (Eadie et al., 2022). In addition, this setting becomes available as a place for intervention for SLCN, enabling a holistic and collaborative intervention approach. Benefits of provision of intervention services by professionals in the child's daily social context involve possibilities for a higher frequency of input, generalisation of skills, working with functional communication, less time away from peers and reduced stigmatisation (McKean et al., 2019). However, evidence of the effectiveness of interventions with IPCP approaches is conflicting (McGinty & Justice, 2006; Schooling et al., 2010). In addition, research into such interventions for SLCN is limited to the measurement and comparison of child outcomes for specific interventions or service delivery models on the one hand (e.g., Archibald, 2017), and collection of practitioner experiences/perceptions on the other hand (e.g., Glover et al., 2015; McKean et al., 2017).

Therefore, to examine the complex nature of IPCP intervention approaches and IPCP, we conducted a realist review. This type of review seems suitable, as the

context of these interventions is varied and may have significant implications for implementation in practice. Realist reviews focus on a more comprehensive understanding/unravelling of the nature of complex practices like IPCP, by exploring their context, operating mechanisms and related outcomes, in contrast to more traditional systematic reviews that focus on reporting intervention outcomes (Reeves, 2015). Recently, realist reviews have been used successfully to investigate collaboration between parents and SLTs and between early years professionals (Fukkink & Lalihatu, 2020; Klatte et al., 2020). The current review adds to the body of existing literature, as it addresses the gap in SLCN research with regard to the exploration of operating IPCP mechanisms in relation to specific contextual circumstances, and outcomes for professionals and children, as reported in SLCN intervention studies using an IPCP approach.

Interprofessional collaboration and practices in SLCN context

Reeves et al. (2010) identified key elements for collaborative work, for example, clear roles, tasks and goals, interdependence and shared responsibility. Theoretically, an inclusive model of service delivery using the ‘team around the child’ approach to manage children’s SLCN in daily activities has the potential to provide a holistic, accessible and effective intervention approach that is adjusted to the individual child and intervention setting, and values the contribution of competent professionals to the achievement of intervention goals (Gascoigne, 2006). For such a systemic intervention approach “to be effective it must provide opportunities to reflect on practice, engage in dialogue, be based on actual work with participants and provide opportunities for peer observations, coaching and feedback ...” instead of a limited focus on knowledge transmission (Lindsay & Dockrell, 2008).

Decisions related to collaborative service models, are both complex and decisive for the success and effectiveness of the intervention, which requires high levels of support (Lindsay & Dockrell, 2008; McKean et al., 2019). Concerns with regard to the realisation of optimal IPCP on contextual (macro), institutional (meso) and practitioner (micro) level have been discussed in the SLCN literature (McKean et al., 2017). For example, research into professionals’ perceptions and experiences of collaboration identified challenges and facilitators for IPCP. Challenges include requirement of joint working, collaborative agreements, complex coordination and lack of time, as well as developing a common language, effective communication, sharing responsibilities and knowledge about professional values, perspectives and priorities (Gallagher et al., 2019; McKean et al., 2017). Facilitators at the individual and organisational

level include sufficient communication skills and trust, as well as time, resources, leadership and support structures (Glover et al., 2015; McKean et al., 2017; Wong & Press, 2017). Related to the interprofessional level, facilitators involve reflection on the ‘child with SLCN-at-the-centre’ principle, professional roles and responsibilities, and on the realisation of practice, as well as recognition of individual and distributed knowledge and skills (Forbes et al., 2019). According to Forbes et al. (2019), IPCP becomes visible as affective relational expertise in mutually supportive talk and affective behaviour between professionals, supported by trust and professional confidence. This requires time and opportunities for sharing and communication to build up collaborative competence, agency and an interprofessional identification. In this way, it allows for open and consistent communication about responsibilities, roles, support and practices for meeting children’s SLCN with individualised solutions potentially contributing to their educational and social inclusion (Forbes et al., 2019). Some identified challenges, facilitators and key elements for collaborative work are included in Stutsky and Spence Laschinger’s (2014) conceptual framework for IPCP. This framework was developed to study how professionals from different disciplines work together to meet the needs of the child and family within health care.

Previous reviews have addressed the effectiveness of collaborative service delivery models on children’s speech, language and communication development (Archibald, 2017; Cirrin et al., 2010; McGinty & Justice, 2006; Schooling, Venediktov & Leech, 2010). These reviews have examined and compared service delivery models, but with slightly different focus. While McGinty and Justice (2006) compared classroom-based or collaborative to pull-out interventions for 2- to 8-year-old children with language impairment, Schooling et al. (2010) focused on younger children (0–5 years) with communication disorders and Cirrin et al. (2010) on older children (5–11 years) with primary or secondary speech language impairments. Archibald (2017) conducted a comprehensive review on classroom-based collaborative services for a broad age range targeting different aspects of speech and language development. However, the conclusions of these reviews are inconsistent. Beneficial findings of classroom-based or collaborative intervention addressing vocabulary, phonological awareness and curriculum-based language (Archibald, 2017; McGinty & Justice, 2006;) as well as no significant differences (Cirrin et al., 2010; Schooling et al., 2010) are reported. However, these reviews focused on child-related outcomes, and their results are to be interpreted with caution due to methodological challenges and difficulty in distinguishing between interconnectedness of intervention location and professional involvement. In conclusion, findings suggest that effectiveness may vary at

the individual child level, related to the type and location of intervention and aspect of speech language development. In contrast, our review provides a complementary and contextualised perspective on IPCP intervention. In this study, we focus on specific individual and structural factors as contextual factors, collaborative process mechanisms, and child and professional related outcomes. Although macro-level factors (i.e., cultural, social and political context) are relevant, analyses of these are beyond the scope of this review.

Interprofessional collaborative practices: A conceptual framework

Various conceptualisations and typologies of IPCP are described in the literature. Stutsky and Spence Laschinger (2014) offer a comprehensive model for IPCP as it reflects relevant aspects of IPCP at micro- and meso-level, as described previously. Consequently, it provides a useful framework for the purpose of this study that, as mentioned, seeks to identify context conditions, operating IPCP mechanisms and how these may be related to outcomes at both the level of children and professionals involved in IPCP for SLCN children in ECEC. The framework distinguishes between contextual conditions for IPCP, IPCP components, and consequences at the professional and service user level. Contextual conditions include personal aspects, that is, relational skills of trust, cooperation and communication; flexibility and beliefs in IPCP, and situational aspects, for example, support structures; leadership including promotion of collaboration and effective team culture. Components of IPCP are defined as understanding of roles (UoR), interdependence, knowledge exchange (KE) and collective ownership of goals (COG) (including shared responsibility for the joint achievement of goals throughout the intervention process; see Appendix A for component description by Stutsky and Spence Laschinger). IPCP may be related to outcomes for the child and family (e.g., participation and other child outcomes, collaboration with professionals) and/or to the professionals (e.g., commitment and work satisfaction at the personal level and perceived effectiveness and conflict management at team level).

The present study

In this study, we investigated the role of IPCP as a contributing factor to the delivery of collaborative interventions for children aged 3 to 6 years with SLCN in ECEC. The main research question is: What mechanisms of IPCP are reported in intervention studies using an IPCP approach for children with SLCN aged 3–6 years,

and what (situational and personal) contexts and professional and/or child-related outcomes are reported with these mechanisms? We conducted a realist review of intervention studies using an IPCP approach. With this, we aim to address the gap in the literature with regard to collaborative intervention delivery for young children with SLCN by specifically focusing on identification of reported IPCP mechanisms, contextual conditions and outcomes for professionals and children.

METHOD

A realist review is a qualitative, systematic method aiming at synthesising evidence from complex interventions as reported in various sources providing an explanatory analysis: what works how and why for whom, and in what circumstances (Pawson et al., 2005; Wong et al., 2013;). Epistemologically, realist synthesis can be situated between a positivistic and constructionist philosophy of science (Wong et al., 2013). A realist review is aimed at an evidence-informed theory about intervention mechanisms, outcomes and their implementation contexts (Jagosh, 2019), which are summarised in CMO configurations (i.e., context + mechanism = outcome). Initial program theories concerning intervention mechanisms are tested in an iterative process for their appropriateness. Empirical evidence found within the review process can support, contradict or modify the initial program theory, resulting in a combination of theoretical understanding and empirical evidence focusing on CMO configurations. The realist review was also judged appropriate for our study into the complexity of IPCP for SLCN in ECEC because it makes it possible to systematically analyse methodologically various studies and differentiate between contexts, mechanisms and outcomes based on a theoretical model (Reeves, 2015).

Our initial program theory is derived from the framework of Stutsky and Spence Laschinger (2014) (see Figure 1), because it provides a comprehensive overview of IPCP in the specific context of SLCN. In addition, it distinguishes besides IPCP related categories, different contextual factors and outcomes at professional, child, and family level, and, hence, it fits in with the basic structure of CMO configurations.

Literature search and selection of studies

A systematic search for relevant studies was conducted in Web of Science, ERIC, PsycInfo and Medline with a time frame covering 1994–2020; the final search was in March 2020. We chose 1994 as a historical starting point of the principle of social inclusion for all children, as formalised

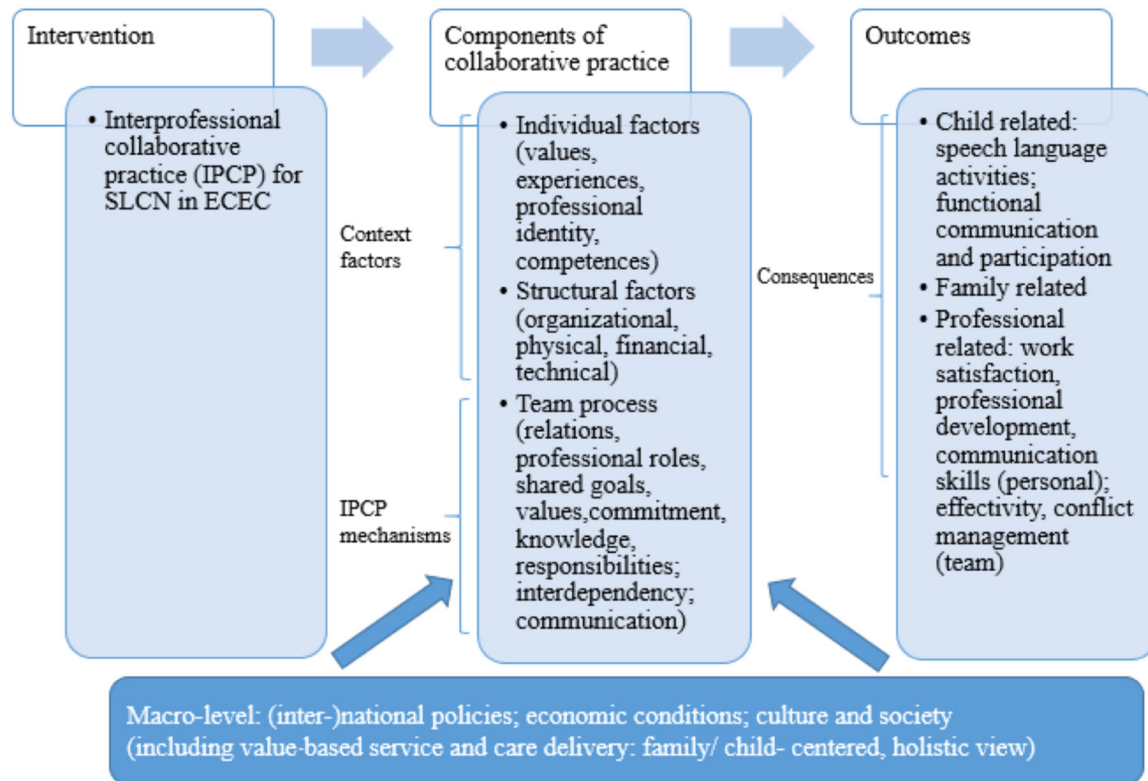


FIGURE 1 Initial framework for conceptualisation of IPCP for SLCN in ECEC [Colour figure can be viewed at wileyonlinelibrary.com]

by the Salamanca Statement and Framework for Action on Special Needs Education (UNESCO, 1994). The search allowed for English and German, Dutch and all Scandinavian languages (Danish, Norwegian, Swedish), because of our proficiency in these languages and because these countries focus on IPCP to include all children in their educational systems.

The search profile included variations of keywords related to the key concepts of SLCN, ECEC and IPCP (see Appendix B for the complete profile). After deduplication, 414 identified articles were screened on title and abstract by the first author, based on the following criteria: (1) participants of the study include children with SLCN (focus on language disorders either as primary disorder (not associated with other biomedical conditions) or as associated with differentiating (like Autism Spectrum Disorder (ASD), intellectual disability or sensorineural hearing loss or Down syndrome) or co-occurring conditions (Attention-Deficit/Hyperactivity Disorder (ADHD), Developmental Coordination Disorder DCD)) (Bishop et al., 2016; Bishop et al., 2017; McGregor, 2020); studies using the term ‘at risk’ for developing language disorder/delay were included), (2) the participants’ age range includes children between 3–6 years old, (3) description of collaboration in terms of form, activities, structure or process, and (4) child-related outcomes, including functional communication (verbal or non-verbal; aimed at communicative participation; based on test measure or as perceived by parents, teachers, pro-

fessionals) or speech and language domains (receptive and/or expressive language skills, related to phonological, semantic, grammatical, syntactic skills. Screened studies were categorised as included, excluded or undecided. The authors discussed and agreed upon undecided studies and reviewed categorisation together. Finally, 22 studies were included (see Figure 2).

Coding of studies

For the analysis of the included studies, an extensive coding scheme was developed by the authors to chart (1) study methodology; (2) SLCN, intervention and service delivery characteristics; (3) eventually identified theoretical approach, framework or taxonomy for IPCP; (4) preceding factors for IPCP; (5) IPCP mechanisms; and (6) outcomes related to child and family and/or professionals. This coding scheme allowed us to assess study characteristics (1,2), to code frameworks for IPCP (3) and to identify CMO configurations (4,5,6).

Methodological characteristics of the study design, setting (special education or regular ECEC and kindergarten, preschool or primary school-K-grade), study sample (e.g., children, professionals, parents), data collection/sample, and phase of service delivery (e.g., prevention, assessment, early intervention) were listed. Characteristics of children’s SLCN (category/type/kind/degree), service delivery

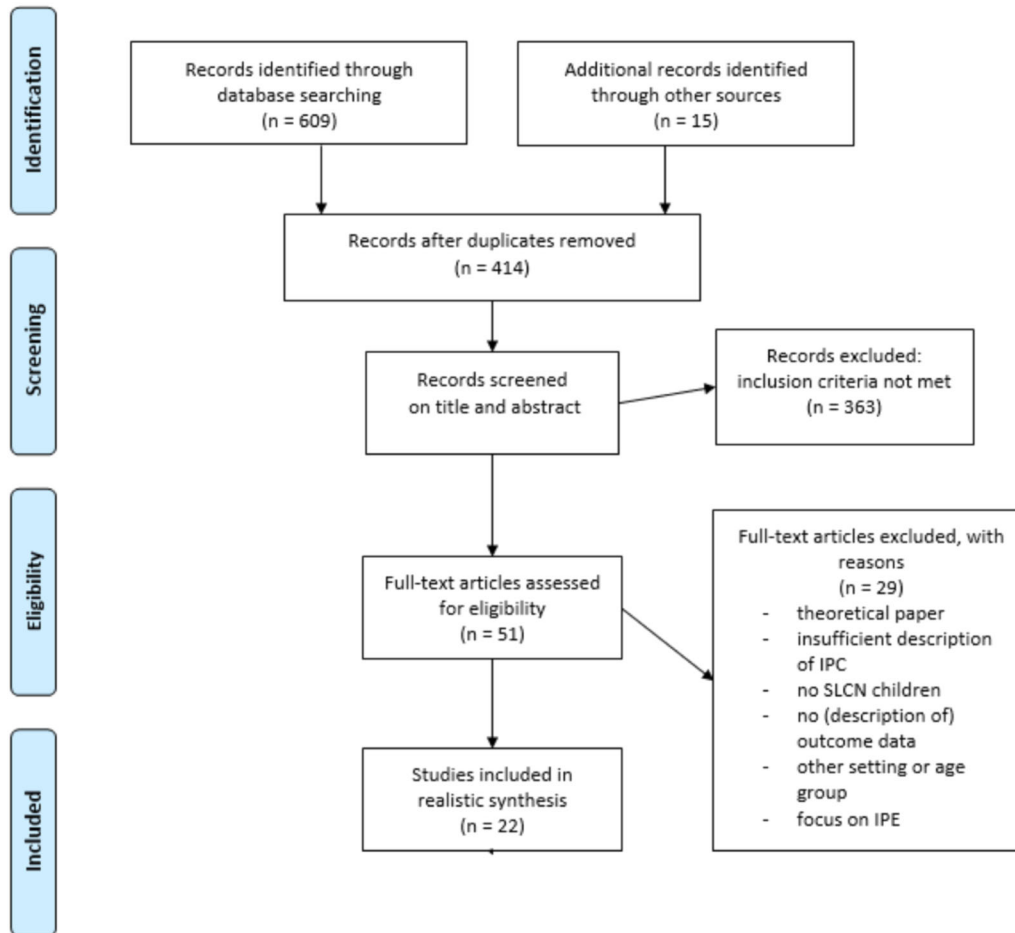


FIGURE 2 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram of study selection. IPC, interprofessional collaboration; IPE, interprofessional education. [Colour figure can be viewed at wileyonlinelibrary.com]

model (direct/indirect, pull-out/integrated, individual/small group) and intervention strategy/child-centred/practitioner-centred/hybrid) and focus (receptive/expressive, phonology/emergent literacy skills/morpho-syntax/semantics/pragmatics/functional communication) were coded. After both authors did this for six of the 22 studies, an adequate level of agreement about codifying was achieved. The other studies ($n = 16$) were coded by the first author. In regular joint meetings the authors discussed coding difficulties and made joint decisions on them (see Appendix C for descriptives of the included studies).

Context-mechanism-outcome patterns and configurations

The IPCP context information was coded as either situational or personal, distinguishing between structural support (S), leadership (L) and empowerment (E) for the situational factor and differentiating between trust (T), cooperation (COOP), communication (COM), flexibility

(F) or belief in interprofessional collaboration (B) for the personal factor. The descriptions of mechanisms from the reports were coded as COG, KE, interdependence (I) and UoR (see Appendix D for the coding examples). Outcomes were coded as related to professionals (e.g., work satisfaction, professional development) and/or the child and family (e.g., speech, language and communication outcomes, satisfaction, empowerment, participation, perception of service quality/continuity). The degree to which CMO components were described in the included studies varied from a concise description (e.g., few phrases or sentences) to a thorough description (e.g., rich description of the intervention in the Method section with additional information in the Results and Discussion section). In most cases, codings were based on explicit descriptions, but each study required interpretation from the coder. We coded each study in a conservative manner and only assigned codes if the reports provided relevant information.

For each study, description of the IPCP mechanisms were rated from 1 (i.e., less extensive/+ when at least one mechanism, including subcategories, was described)

to 4 (i.e., very extensive/++++ when all mechanism-categories COG, KE, I and UoR were described). In this way, an individual configuration with CMO components was identified for each included study (e.g., for Wilcox et al., 2011: context: situational factors identified (e.g., support structures), mechanisms: less extensive descriptions of KE, COG and interdependence identified and rated as ++, outcomes: related to child (oral language and early literacy skills improvement) and staff (increased knowledge/professional development)).

In an inductive analysis of the identified configurations from the different studies, individual configurations were aggregated into a concise set of CMO configuration with support from multiple studies. For this purpose, we first grouped identical mechanisms. For example, all studies reporting the IPCP mechanism COG were clustered/assembled ($n = 12$). Subsequently, contexts and/or outcomes, as identified for each individual configuration, were matched if these were mentioned multiple times (at least by two studies). For the COG mechanism, the following context factors and outcomes were matched: personal context factors of cooperation ($n = 5$) and communication ($n = 4$); professional-related outcome of trans-/interdisciplinary/inclusive practice ($n = 4$); child-related outcomes of the contributing studies. This process was carried out for each of the different mechanisms.

Peer review

Following methodological recommendations from realist synthesis literature (Pawson et al., 2005) we presented the aggregated CMO configurations, in a preliminary format, to an expert panel ($N = 5$) for discussion and feedback. Participants of the panel were affiliated with either university, applied university or a national association of speech language therapy and audiology and they represented various disciplines (i.e., pedagogy, educational science and speech language therapy). Panel feedback, comments and questions were summarised and, after a member check, they were used to reflect on the analysis process, to refine the first draft of our preliminary results and to assist the discussion of implications for intervention services and professional practice.

RESULTS

Description of studies

We included 22 studies in the review from various disciplines, that is, speech language communication, education and special education or other social sciences, representing

a variation of professions including themes like early intervention, linguistics and social inclusion. Included studies represent different countries, with the largest part from the US ($n = 12$, 55%), followed by the UK ($n = 4$, 18%), Australia/New Zealand ($n = 3$, 14%) and other countries ($n = 3$, 14%). Studies used a quantitative ($n = 12$, 55%), qualitative ($n = 5$, 23%) or mixed-methods approach ($n = 5$, 23%) and predominantly a quasi-experimental design ($n = 11$, 50%), followed by a case study design ($n = 7$, 32%) and a randomized clinical trials-design ($n = 4$, 18%; see Appendix C for an overview).

The professionals from the included studies had various disciplinary backgrounds (e.g., teacher/special teacher education, speech language therapy/pathology, psychology, but also special child care, assistants, students and research staff). The teams comprised between two and six professions/disciplines, with SLT involved in IPCP in 19 studies, followed by ECEC teachers involved in 18 studies, other disciplines involved in 14 studies and special educators being part of the interprofessional team in five studies.

The children with SLCN attended a child care centre, preschool, kindergarten, elementary school, child development centre or special needs preschool. SLCN included Speech Language Impairment, Language Disorders, speech and language delay, language or speech difficulties, communication delay or impairments, pragmatic language difficulties, sometimes associated with Autism Spectrum Disorder, Cerebral Palsy or a behavioural disorder. The interventions targeted a broad linguistic spectrum, including receptive and/or expressive skills on different linguistic dimensions like phonology, morpho-syntax, semantics and pragmatics, emergent literacy skills and functional communication. The mean length of intervention was 19 weeks, ranging from 6 weeks to a school year. Ten of the interventions were short term, defined as durations less than 3 months. Intensity of intervention was calculated if possible as length of the intervention (in weeks) \times frequency of sessions per week \times minutes per session. The intensity of the interventions ranged from 4 h (i.e., 8 weekly sessions from 30 min) to 400 h (i.e., sessions of 2.5 h on 4 days per week during the full school year).

Outcomes at child level

Child intervention outcomes were categorised into speech-language skills (reported intervention outcome measures for semantics, morpho-syntax or phonology either as receptive or expressive skill) and participation (reported outcomes regarding functional communication within interpersonal interactions or relationships) according to the International Classification of Functioning,



Disability and Health (ICF) framework. Specifically, speech-language skills as covered by the ICF category ‘activity and participation’, subcodes d1 (learning and applying knowledge) and d3 (communication), and participation as covered by ICF category ‘activity and participation’, subcode d7 (interpersonal interactions and relationships). Positive speech-language skill outcomes were reported in 13 studies (11 quantitative and two mixed method studies), whereas favourable participation outcomes were reported in 12 studies (five qualitative, three quantitative and four mixed method studies). Only three studies reported both speech-language skills and functional communicative participation outcomes (see Appendix C).

CMO configurations

Table 1 presents the identified CMO configurations as reported by individual studies. The configurations are ranked by the study’s description of the IPCP mechanism, ranging from very extensive (++++, i.e., all IPCP mechanisms were described) to less extensive (+, i.e., at least one mechanism, including subcategories, was described).

Context

All studies mentioned explicitly contextual-situational factors for IPCP, like support structures in combination with empowerment and/or team leadership. Only six studies reported contextual-personal factors: cooperation (five studies), followed by communication and flexibility (four studies each), and trust and beliefs related to IPCP (three studies each).

Mechanisms

Descriptions of IPCP mechanisms were found in all studies. Knowledge exchange was reported in 21 out of 22 studies (95%). From the data, two distinct forms of this mechanism emerged: a reciprocal form (described as ‘Sharing technical and descriptive information, materials, data, knowledge, instructional philosophy, goals, process and concerns, rationale for schedule structure, interpretations of child communication’, ‘Professional dialogue and discussion to build up a body of knowledge’) and a one-directional form, (i.e., described as knowledge transfer from one professional to another through training, instruction, advising and devising). The mechanisms of COG (i.e., described as ‘collaborated on identifying children’s difficulties, planning and implementing strategies

and evaluating outcomes’, ‘teacher and SLT partnered to develop and implement an effective plan – they selected focus for intervention, planned activities, confer about shared objectives’) and Interdependence (‘teacher introduces target concept before physical education class’) were both found in 12 studies (55%). The latter had the subcategory ‘dependency’, as a one-directional form of this mechanism (i.e., one professional depends on another instead of reciprocal interdependence). Descriptions of the mechanisms of UoR (i.e., described as ‘SLT and teacher agreed that the SLT would have the primary responsibilities’) were reported in eight studies (see Appendix D for additional examples of the distinct mechanisms).

Outcomes at professional level

Professional-related outcomes were reported in 16 of the studies (73%) and often involved professional development, including increase of knowledge, awareness and empowerment, time efficiency, effective practices including team effectiveness and successful use of learned strategies, trans-/interprofessional and inclusive practices and enhanced collaboration, described as increased interest, enthusiasm and engagement for collaboration, and better coordination of activities and actions.

CMO components: Four patterns

The studies provided different descriptions of the CMO components. Different levels and combinations of CMO components constituted four descriptive patterns (see Figure 3). The studies that reported descriptions of all CMO components (pattern 1A, four studies) gave a detailed picture of effective mechanisms. A second pattern of CMO components (2A; five studies) linked situational context factors, but without personal context factors of the staff, with extensive descriptions of IPCP mechanisms and also child-related outcomes. The third pattern (2B), which is the most common (11 studies), involved situational context factors, but no personal context factors and a relatively modest description of IPCP mechanisms, complemented with effects at child level (three studies) or both child and professional level (eight studies). Finally, the fourth CMO components pattern (1B), which was the least common (only two studies), comprised situational and personal context factors, and child and professional outcomes, but with relatively little information related to the IPCP mechanisms. In total, nine studies described IPCP mechanisms extensively (pattern A), while 13 studies described them moderately (pattern B). Studies with an extensive description of IPCP mechanisms (patterns 1A/2A)



TABLE 1 Summary of CMO configurations for IPCP

Study	Context		IPCP mechanisms					Level of description	Pattern	CMO configuration
	Situational	Personal	CoG	KE	I	UoR	Outcome staff			
Ellis et al. (1995)	Support structures Leadership Empowerment	Cooperation Flexibility	✓	✓	✓	✓	Time-efficiency, Interest in IPCP	1A	D	
Hadley et al. (2000)	Support structures Leadership Empowerment	Cooperation Communication	✓	✓	✓	✓	Time-efficiency Enhanced collaboration/interest	1A	D	
Lamb (2008)	Support structures Empowerment	Trust Cooperation Communication Flexibility	✓	✓	✓	✓	Knowledge/learning Facilitation of child interact Professional. support/ empowerment Enhanced collaboration	1A	A'D	
Payler and Georgeson (2013)	Support structures Leadership Empowerment	Trust Cooperation Communication Belief in IPCP	✓	✓	✓	✓	Effective practice Professional development Transdisciplinary intervention practice Participation and empowerment	1A	A'B'C	
Throneburg et al. (2000)	Support structures Leadership		✓	✓	✓	✓		2A	A'	
Hyter (2003)	Support structures Empowerment		✓	✓	✓	✓		2A	B'	
Roth and Troia (2006)	Support structures Empowerment		✓	✓	✓	✓	Effective practice	2A	C	
Valdez and Montgomery (1997)	Support structures Empowerment		✓	✓	✓	✓		2A	A'	
Pohlman and McWilliam (1999)	Support structures Leadership Empowerment		✓	✓	✓	✓	Interventional practices	2A	B'	
Mecrow et al. (2010)	Support structures Leadership Empowerment		✓	✓	✓	✓	Knowledge/learning Effective practice Inclusive practice	2B	A'B	

(Continues)

TABLE 1 (Continued)

Study	Context		IPCP mechanisms					Level of description	Pattern	CMO configuration
	Situational	Personal	CoG	KE	I	UoR	Outcome staff			
Wilcox et al. (2011)	Support structures Leadership Empowerment		✓	✓	✓	✓	Knowledge/learning Professional development	2B	A'	
Hernandez (2012)	Support structures Leadership Empowerment	Trust Cooperation Communication Flexibility Belief in IPCP	✓	✓			Knowledge/learning Effective practice Enhanced collaboration	1B	A'CD	
Hundert (1994)	Support structures		✓				Facilitation of child interaction Inclusive practice	2B	B'	
Culatta et al. (2010)	Support structures Empowerment		✓				Knowledge/learning	2B	A'	
Smith and Camarata (1999)	Support structures Empowerment		✓				Professional support inclusive practice Effective practice	2B	A'C	
Smith-Loock et al. (2013)	Support structures Leadership Empowerment		✓		✓		Knowledge/learning Professional support	2B	A'	
Tyler et al. (2019)	Support structures Empowerment		✓				Knowledge/learning Time-efficiency Inclusive practice	2B	A'D	
Abdoola et al. (2019)	Support structures Empowerment	Flexibility Belief in IPCP	✓		✓		Knowledge/learning Effective practice Professional support Enhanced collaboration	1B	A'B'CD	
Lam et al. (2019)	Support structures Leadership Empowerment		✓				Professional support/empowerment Enhanced school system	2B	A'D	

(Continues)

TABLE 1 (Continued)

Study	Context		IPCPC mechanisms					Level of description	Pattern	CMO configuration
	Situational	Personal	CoG	KE	I	UoR	Outcome staff			
Gallagher and Chiat (2009)	Support structures		✓					2B	A'	
Hutchinson and Clegg (2011)	Support structures Empowerment		✓					2B	A'	
Carson et al. (2019)	Support structures Empowerment		✓					2B	A'	
Total	Support Structures: 100% Leadership: 45% Empowerment: 86%	Trust: Three studies Cooperation: 5 Communication: 4 Flexibility: 4 Belief in IPCPC: 3	12/22 55%	21/22 95%	12/22 55%	8/22 36%	73% (16/22)	1A: 18% 1B: 9% 2A: 23% 2B: 50%		

Note: Studies are ranked based on the level of description of the IPCPC mechanisms.

Abbreviations: ✓, described in the study; CoG, context-mechanism-outcomes; KE, collective ownership of goals; I, interdependence; IPCPC, interprofessional collaborative practices; KE, knowledge exchange; UoR, understanding of roles.

reported outcomes related to professional development and empowerment, effective and time-efficient practices, enhanced collaboration as well as interprofessional intervention practices at staff level and positive outcome for children at the domains of speech-language activity and communication participation. Studies with a less extensive description of IPCPC mechanisms (patterns 1B/2B) often reported unilateral/one-directional IPCPC mechanisms (i.e., knowledge transfer, dependency), benefits for learning and knowledge increase for the staff and an increase of speech-language skills at the child level. IPCPC characterised by reciprocal mechanisms (e.g., KE, interdependence) became visible in the long-term intervention studies and when more than two professions were involved (often pattern 1A) or when other staff, like assistants, students, administration staff, supported the professionals or supervisors (often pattern 2A).

CMO: Four main configurations

An inductive analysis of CMO configurations as reported by the individual studies (see Table 1) resulted in a concise summary of dominant associations between the different components across the CMOs. We present the four identified configurations in Figure 4a–d.

Configuration A (supported by 16 studies, see Appendix E for the individual studies) describes the studies where KE or transfer (mechanisms) contributes to the professionals' increase of knowledge, in turn contributing to professional development and empowerment (outcomes) (i.e., increased awareness, improved understanding of child, learning by observation of other professionals, improvement of teaching practices by combining direct and indirect intervention practices). Interventions with reciprocal KE (M) between professionals (i.e., sharing information, interpretations of child communication, instructional philosophy, professional dialogue and discussions) were reported with positive outcomes on speech, language and communication outcomes for children. One-directional knowledge transfer (M), in particular, was more often reported together with children's speech-language skills (O) as opposed to functional communication. Twelve of the 16 supporting studies reported a moderate description of IPCPC mechanisms (CMO pattern 1B and 2B).

Configuration B (supported by six studies, see Appendix E) supports a combination of staff- and child-related outcomes: professionals' interprofessional and inclusive practices (O), combined with a COG (M), seem to be accompanied with a generalisation of young children's speech-language skills and functional communication, and a decreased impact of SLC limitations on daily functioning (O). Both configurations A and B underline the

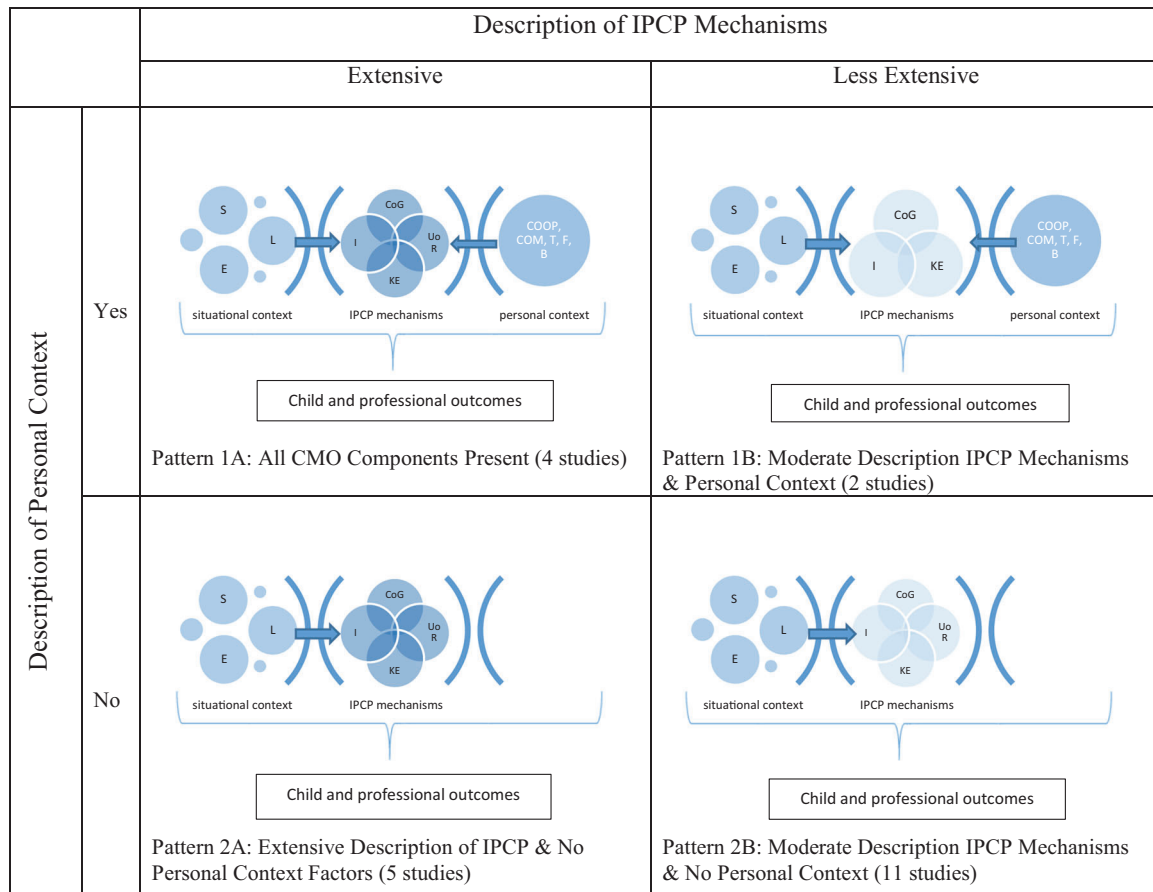


FIGURE 3 CMO components: Four descriptive patterns in included studies. Note: Darker shading indicates more extensive description of IPCP mechanisms. B, belief in interprofessional collaboration; CMO, context-mechanism-outcome; COG, collective ownership of goals; COMM, communication; COOP, cooperation; E, empowerment; F, flexibility; I, Interdependence; KE, knowledge exchange; L, leadership; situational context factors: S, structural support; T, trust; UoR, understanding of roles. [Colour figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.wiley.com/terms-and-conditions)]

importance of cooperative and communication skills (C) for KE and COG (M) for various professional and child outcomes. Supporting studies reported equally moderate or extensive descriptions of IPCP mechanisms (all CMO patterns).

A facilitating role of personal trust (context) for the IPCP mechanism of UoR (M), which is associated with effective practices, characterises Configuration C (supported by five studies, see Appendix E). Supporting studies highlighted, for example, team effectiveness, reduced class-management stress, increased use of strategies by professionals and provision of an integrated educational program. Effective practices (O) were thus linked to professional outcomes at individual and team level. Three of the five supporting studies described IPCP mechanisms moderately.

Configurations A, B and C all involve cooperation as a personal factor. Finally, configuration D (supported by seven studies, see Appendix E) points to the notable importance of personal cooperative skills (C), reported together with the distinguished IPCP mechanisms KE, COG and

UoR, for professional related outcomes of enhanced collaboration and time efficiency (O). While three of the supporting studies described IPCP mechanisms moderately, four studies described them extensively.

The analyses of this review resulted into four main CMO configurations, of which two also entail child-related outcomes. Within this broad spectrum of IPCP mechanisms, KE and COG (M) seemed specifically beneficial for positive outcomes at the child level.

Outcomes of peer review

The experts from the peer review recognised the identified configurations. However, they also underlined that the identified IPCP mechanisms and their components from our analytical approach are contextualised in the daily practice of SLCN. The components are embedded in the regular process of shared decision-making of professionals together with parents and children with SLCN. Relatedly, the relatively abstract components of each configuration

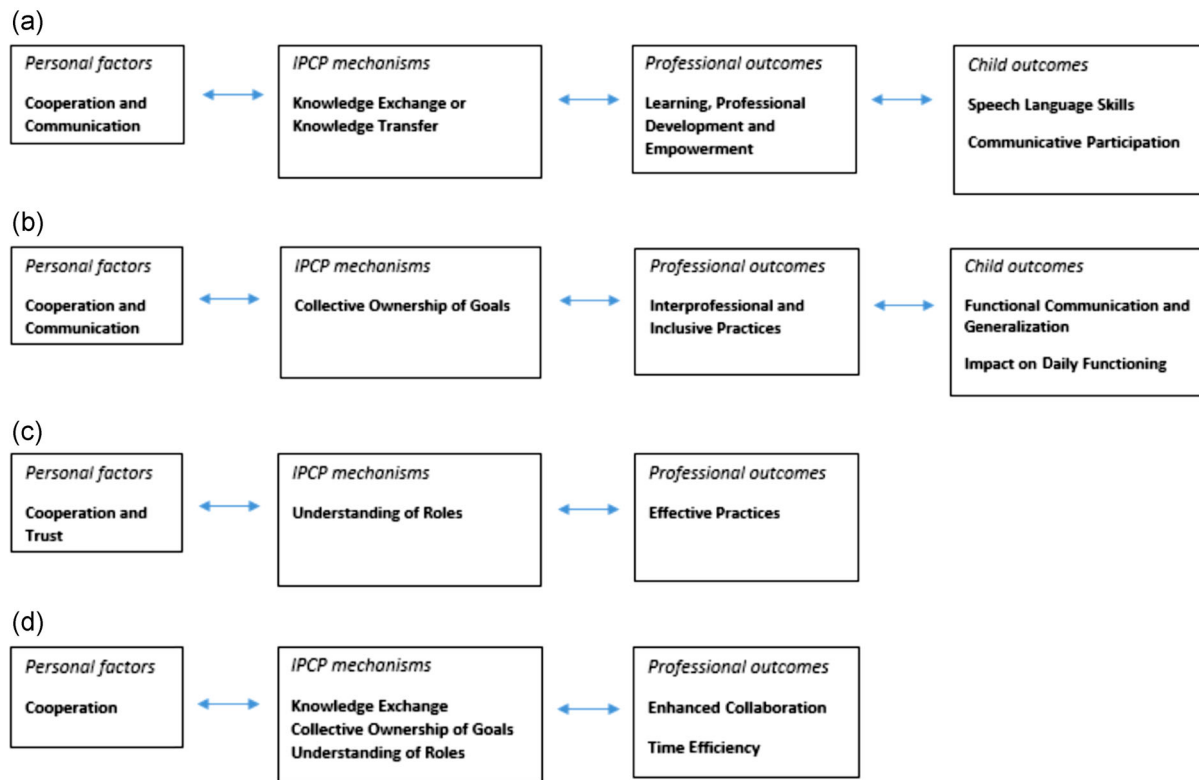


FIGURE 4 (A) Configuration A: From knowledge exchange to professional development to children's improved speech, language and communication (supported by 16 studies, see Appendix E for the individual studies). (B) Configuration B: From collective ownership to interprofessional and inclusive practices and functional communication of the child (supported by six studies, see Appendix E). (C) Configuration C: From understanding each other's role to effective practices (supported by five studies, see Appendix E). (D) Configuration D: From interaction between personal factors and effective IPCP mechanisms to enhanced collaboration and time efficiency (supported by seven studies, see Appendix E). [Colour figure can be viewed at wileyonlinelibrary.com]

(e.g., UoR) may become very concrete for professionals when they reflect on their practice with individual children and their families and when an increasingly effective service delivery by the team results into documented speech, language and communication development of an individual child.

DISCUSSION

Our review suggests that IPCP is a valuable component of some effective SLCN interventions described in the studies included in this review. Professionals from interdisciplinary teams seem to profit from their mutual investment in the delivery of SLCN services at staff level, which is associated with children's speech, language and communication development. Although IPCP may be neither a necessary nor a sufficient condition for effective interventions, our review supports the vital role of IPCP in intervention for children with SLCN in ECEC.

We found that contextual factors, process mechanisms and outcomes at child and staff level are closely con-

nected. Where situational and personal context conditions are present, collaborative practices (i.e., KE, joint responsibility for intervention goals, shared UoR) are important for professional development, enhanced collaboration, time efficiency and the realisation of effective and inclusive practices. Consistent with Ainscow (2016), collaborative working seems to function as a social learning process for developing inclusive practices. Professional development and the realisation of inclusive practices, as facilitated by IPCP, seem important for the development of children's speech and language skills, functional communication and communicative participation. Based on our findings, effective IPCP includes joint learning, joint development and shared responsibility for goals throughout the intervention process, and an increase of knowledge about SLCN and intervention delivery skills through individual learning and guidance from others to meet the child's needs. This seems to reflect previously described potentials of the 'team around the child' approach to deliver holistic and effective intervention to the individual child in his or her daily social context (Gascoigne, 2006; Lindsay & Dockrell, 2008).



Findings from our review suggest a dual route from collaborative intervention services to improvement of speech, language and communication. First, reciprocal IPCP mechanisms (see configurations A and B) were associated with children's communicative participation and a diminished impact of SLC limitations on daily functioning. This supports the assumption that intervention delivered by multiple professionals benefits functional communication (McKean et al., 2019). Second, the one-directional form of KE (i.e., knowledge transfer where a key-professional transfers intervention information or knowledge to another professional) seems specifically related to external collaborative partnerships, intervention delivery at staff level and a positive development of speech-language skills at child level. On the one hand, IPCP takes place with a focus on the improvement of children's speech-language skills and professionals' knowledge and skills related to intervention delivery. On the other hand, IPCP is focused on reciprocal IPCP mechanisms of various professionals with the aim to improve children's communication participation. As pointed out in literature on IPCP from a social capital perspective (McKean et al., 2017), highly collaborative interprofessional teams, characterised by reciprocity and trust across the network, have a greater capacity to individualise practice to the needs of the child. This capacity increases when knowledge and skills of involved professionals are mobilised.

Stimulating interprofessional collaborative practices

We present findings from the included studies, based on the coding of mostly explicitly described factors. Nevertheless, interpretation of findings should be taken with caution, also acknowledging the possibility that IPCP factors were not described in the studies while at play during intervention.

In our review, interventions with a focus on one-directional knowledge transfer were reported with an increase in knowledge development of staff. The facilitation of collaboration as a means of opportunity for one-directional knowledge transfer may be a first step towards IPCP (Clark, 2011). Possibly, individual learning and professional development are needed to rely on one's own competence in the first place before being able to engage in relatively complex interventions with various professionals in a strong team performance (see also Fukkink & van Verseveld, 2020). On the other hand, this seems to depend on the affiliation of the collaborative professionals, that is, internal team versus collaboration of various external professionals. High-quality, extensive training and comprehensive individual support of staff are

presumably required first before gains in child development are realised (McKean et al., 2019). However, longitudinal research is needed to investigate this developmental interpretation of the results from our review.

At an institutional level, IPCP needs support from managers. This includes time resources to create opportunities for professionals to engage in IPCP and time for professional development both individual and collective. For the individual professional, our findings imply that professionals are required to reciprocally coordinate and communicate each other's professional competences and intentions, as well as listening to others, and to actively involve professionals from other disciplines. In the context of IPCP, professionals need to participate and take responsibility in the process of joint definition, development and achievement of intervention goals and understand and respect differences in professional roles and knowledge bases. It also means to engage in professional development, to recognise others' competence, to learn from each other, and to share goals and responsibilities, referred to as 'boundary crossing' by Klatte et al. (2020). The COG should be embedded in shared decision-making by professionals, parents and children in the context of SLCN (Coufal & Woods, 2018), and with attention to different perspectives (Cooper-Duffy & Eaker, 2017).

Our findings support the possibility of a fruitful combination of intervention and inclusive practices (Odom et al., 2011; Underwood et al., 2012). Further, results strongly support that the development of shared interprofessional knowledge, competence and reciprocal professional relationships are vital for effective collaborative practices and services (Dockrell et al., 2017; Hagland & Solvang, 2017).

Strengths and limitations of our study

To the best of our knowledge, this is the first realist synthesis of studies into interprofessional practice for SLCN in ECEC. From our point of view, this methodological choice has been proven valuable to gain deeper insights in the complex nature of IPCP and its connectedness with individual staff and outcomes for children with SLCN. This type of review, which allows the inclusion of both quantitative and qualitative studies, enabled us to focus on the dynamics of interprofessional collaboration in different studies.

Our review aimed to find general mechanisms for the support of children with SLCN in a sample of studies with different interventions and service delivery models using an IPCP approach for a heterogeneous population. For some of the included studies the identification of CMO components was limited due to the brief description of the intervention; for example, only few mechanisms were

reported without personal context factors in some studies (see Table 1 and Figure 3). Therefore, it seems very likely that in our review we have not identified all CMO components that were employed in the studies. We regard detailed descriptions of IPCP mechanisms and context factors in intervention studies using an IPCP approach to be valuable when investigating IPCP as a contributing component to SLCN intervention.

For the purpose of our review, we used an a priori framework with focus on IPCP at the micro- and meso-level. Findings fit in with this framework, specifically with regard to the personal factors trust, cooperation and communication, which were reported to be the most critical predictors of IPCP (Stutsky & Spence Laschinger, 2014). However, this framework does not include context factors at macro-level related to national guidelines and policies for integrated intervention services, funding responsibilities, inter-agency collaboration, or curricula for (inter-)professional education. Suggestions for stimulation of IPCP and analyses of influencing context factors at the macro-level are, therefore, beyond the scope of this review. Most likely, these will differ for national contexts and depend on local premises and needs.

Future research in this domain may profit from mixed-methods designs with rich qualitative and quantitative data regarding the broader context at macro, meso and micro levels, IPCP mechanisms, and outcomes on staff and child level. This line of research may further reveal important facilitators or barriers for effective IPCP to increase our insights in how interprofessional collaboration shapes service delivery.

CONCLUSION

Our analysis of IPCP mechanisms has made clear that professionals from interdisciplinary teams profit from their mutual investment in the delivery of SLCN services at staff level. This seems also to be beneficial for children's speech, language and communication development, acknowledging the need for further experimental research into the effects of IPCP. By using a combination of a theoretical framework for IPCP and a realist review, we explored the field of IPCP in collaborative intervention approaches for SLCN more specifically. We found support for the importance of IPCP mechanisms of KE and COG for the promotion of children's speech, language and communication outcomes. Individual professional and institutional facilitation is needed to support collaborative intervention services, which can meet the needs of the individual child with the aim to improve speech-language skills, social activity, and participation.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The qualitative data that support the findings of this study are available from the corresponding author, J.L., upon reasonable request.

Studies included in the review are marked with an asterisk (*).

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REFERENCES

- *Abdoola, S.S., Mosca, R. & Pillay, B.S. (2019) Responsive communication coaching for early childhood practitioners in underserved South African contexts: clinical perspectives. *South African Journal of Communication Disorders*, 66(1), 1–7.
- American Speech-Language-Hearing Association (2016) *Scope of practice in speech-language pathology*. [online, Scope of Practice]. Available: www.asha.org/policy/
- Archibald, L.M. (2017) SLP-educator classroom collaboration: a review to inform reason-based practice. *Autism & Developmental Language Impairments*, 2, 2396941516680369.
- Bartolo, P.A., Kyriazopoulou, M., Bjork-Åkesson, E. & Gine, C. (2019) (An adapted ecosystem model for inclusive early childhood education: a qualitative cross European study. *International Journal of School & Educational Psychology*, 9(1), 3–15.
- Bishop, D.V.M., Snowling, M.J., Thompson, P.A., Greenhalgh, T. & CATALISE consortium (2016) CATALISE: a multinational and multidisciplinary delphi consensus study. Identifying language impairments in children. *PLOS One*, 11(7), e0158753.
- Bishop, D.V.M., Snowling, M.J., Thompson, P.A., Greenhalgh, T. & CATALISE-2 consortium (2017) Phase 2 of CATALISE: a multinational and multidisciplinary delphi consensus study of problems with language development: terminology. *Journal of Child Psychology and Psychiatry*, 58(10), 1068–1080.
- Cirrin, F.M., Schooling, T.L., Nelson, N.W., Diehl, S.F., Flynn, P.F., Staskowski, M., Torrey T.Z. & Adamczyk, D.F. (2010) Evidence-based systematic review: effects of different service delivery models on communication outcomes for elementary school-age children. *Language, Speech, and Hearing Services in Schools*. 41(3), 233–264.
- *Carson, K.L., Bayetto, A.E. & Roberts, A.F. (2019) Effectiveness of preschool-wide teacher-implemented phoneme awareness and letter-sound knowledge instruction on code-based school-entry reading readiness. *Communication Disorders Quarterly*, 41(1), 42–53.

- Clark, P.G. (2011) Examining the interface between interprofessional practice and education: lessons learned from Norway for promoting teamwork. *Journal of Interprofessional Care*, 25(1), 26–32.
- Cooper-Duffy, K. & Eaker, K. (2017) Effective team practices: interprofessional contributions to communication issues with a parent's perspective. *American Journal of Speech-Language Pathology*, 26(2), 181–192.
- Coufal, K.L. & Woods, J.J. (2018) Interprofessional collaborative practice in early intervention. *Pediatric Clinics*, 65(1), 143–155.
- *Culatta, B., Hall-Kenyon, K.M. & Black, S. (2010) Teaching expository comprehension skills in early childhood classrooms. *Topics in Language Disorders*, 30(4), 323–338.
- D'Amour, D. & Oandasan, I. (2005) Interprofessionality as the field of interprofessional practice and interprofessional education: an emerging concept. *Journal of Interprofessional Care*, 19(Suppl), 8–20.
- Dockrell, J.E., Howell, P., Leung, D. & Fugard, A.J. (2017) Children with speech language and communication needs in England: challenges for practice. In: *Frontiers in education*. Frontiers, pp. 35.
- Eadie, P., Levickis, P., McKean, C., Westrupp, E., Bavin, E.L., Ware, R.S., Gerner, B. & Reilly, S. (2022) Developing preschool language surveillance models – Cumulative and clustering patterns of early life factors in the early language in Victoria study cohort. *Frontiers in Pediatrics*, 10, 826817.
- *Ellis, L., Schlaudecker, C. & Regimbal, C. (1995) Effectiveness of a collaborative consultation approach to basic concept instruction with kindergarten children. *Language, Speech, and Hearing Services in Schools*, 26(1), 69–74.
- European Agency for Development in Special Needs Education (2013) Organisation of provision to support inclusive education – literature review [online]. Odense, Denmark: European Agency for Development in Special Needs Education. Available: <https://www.european-agency.org/resources/publications/>
- Forbes, J., McCartney, E., McKean, C., Laing, K., Cockerill, M. & Law, J. (2019) Co/productive practitioner relations for children with SLCN: an affect inflected agentic frame. *Discourse: Studies in the Cultural Politics of Education*, 40(6), 859–872.
- Fukkink, R.G. & Lalihatu, E.S. (2020) A realist synthesis of interprofessional collaboration in the early years; becoming familiar with other professionals. *International journal of integrated care*, 20(3), 16.
- Fukkink, R.G. & van Verseveld, M. (2020) Inclusive early childhood education and care: a longitudinal study into the growth of interprofessional collaboration. *Journal of interprofessional care*, 34(3), 362–372.
- *Gallagher, A.L. & Chiat, S. (2009) Evaluation of speech and language therapy interventions for pre-school children with specific language impairment: a comparison of outcomes following specialist intensive, nursery-based and no intervention. *International Journal of Language & Communication Disorders*, 44(5), 616–638.
- Gallagher, A.L., Murphy, C. A., Conway, P., & Perry, A. (2019) Consequential differences in perspectives and practices concerning children with developmental language disorders: an integrative review. *International Journal of Language & Communication Disorders*, 54(4), 529–552.
- Gascoigne, M. (2006) *Supporting children with speech, language and communication needs within integrated children's services*. RCSLT Position Paper. London: Royal College of Speech and Language Therapists.
- Gascoigne, M. & Gross, J. (2017) *Talking about a generation. Current policy, evidence and practice for speech, language and communication*. London: The Communication Trust.
- Glover, A., McCormack, J. & Smith-Tamaray, M. (2015) Collaboration between teachers and speech and language therapists: services for primary school children with speech, language and communication needs. *Child Language Teaching and Therapy*, 31(3), 363–382.
- Guralnick, M.J. (2008) International perspectives on early intervention: a search for common ground. *Journal of early intervention*, 30(2), 90–101.
- *Hadley, P.A., Simmerman, A., Long, M., & Luna, M. (2000) Facilitating language development for inner-city children: Experimental evaluation of a collaborative, classroom-based intervention. *Language, Speech, and Hearing Services in Schools*, 31(3), 280–295.
- Hagland, H. & Solvang, P.K. (2017) Qualifying for interprofessional practice. In: Mausethagen, S. & meby, J.-C. (Eds.) *Qualifying for professional practice*. [translation of: Kvalifisering til tverrprofesjonell praksis. I Mausethagen, S. og Smeby, J.-C. (red.) *Kvalifisering til profesjonell yrkesutøvelse*]. Oslo: Universitetsforlaget.
- *Hernandez, S.J. (2012) Evaluation of push-in/integrated therapy in a collaborative preschool for children with special needs. *Journal of the American Academy of Special Education Professionals*, 47, 77.
- *Hundert, J. (1994) The ecobehavioral relationship between teachers' and disabled preschoolers' behaviors before and after supervisor training. *Journal of Behavioral Education*, 4(1), 75–91.
- *Hutchinson, J. & Clegg, J. (2011) Education practitioner-led intervention to facilitate language learning in young children: an effectiveness study. *Child Language Teaching and Therapy*, 27(2), 151–164.
- *Hyter, Y.D. (2003) Language intervention for children with emotional or behavioral disorders. *Behavioral Disorders*, 29(1), 65–76.
- Jagosh, J. (2019) Realist synthesis for public health: building an ontologically deep understanding of how programs work, for whom, and in which contexts. *Annual Review of Public Health*, 40, 361–372.
- Kemmis, S., Heikkinen, H. L., Fransson, G., Aspfors, J., & Edwards-Groves, C. (2014) Mentoring of new teachers as a contested practice: Supervision, support and collaborative self-development. *Teaching and Teacher Education*, 43, 154–164.
- Klatte, I.S., Lyons, R., Davies, K., Harding, S., Marshall, J., McKean, C., & Roulstone, S. (2020) Collaboration between parents and SLTs produces optimal outcomes for children attending speech and language therapy: gathering the evidence. *International Journal of Language & Communication Disorders*, 55(4), 618–628.
- *Lam, S.F., Tsang, N., Keung, Y. C., Tong, Y., Mok, F., Chiu, A., Lai, Y., Yuen, L. & Soh, D. (2019) A comprehensive service delivery model for preschoolers with special educational needs: its characteristics and effectiveness. *Research in Developmental Disabilities*, 85, 20–30.

- *Lamb, J. (2008) Building communities of support around a child with special education needs: the effects of participatory action research. *Kairaranga*, 9, 32–37.
- Law, J., Peacey, N., & Radford, J. (2000) *Provision for children's speech and language needs in England and Wales: Facilitating communication between education and health services*. (DfES research report 239).
- Law, J., Rush, R., Anandan, C., Cox, M., & Wood, R. (2012) Predicting language change between 3 and 5 years and its implications for early identification. *Pediatrics*, 130(1), e132–e137.
- Lindsay, G. & Dockrell, J.E. (2008) Language intervention in the school years: a systemic approach. *Revista de Logopedia, foniatria y audiolgia*, 28(4), 207–217.
- McGinty, A.S. & Justice, L.M. (2006) Classroom-based versus pull-out interventions: a review of the experimental evidence. *EBP Briefs*, 1(1), 1–25.
- McGregor, K.K. (2020) How we fail children with developmental language disorder. *Language, Speech, and Hearing Services in Schools*, 51(4), 981–992.
- McKean, C., Gerrits, E., Tulip, J. & Tolonen, A.K. (2019) Service delivery for children with language disorders across Europe and beyond. In: Law, J.C., Murphy, C.A. & hordardottir, E. (Eds.) *Managing children with developmental language disorder: theory and practice across europe and beyond*. pp. 84–109.
- McKean, C., Law, J., Laing, K., Cockerill, M., Allon-Smith, J., McCartney, E. & Forbes, J. et al. (2017) A qualitative case study in the social capital of co-professional collaborative co-practice for children with speech, language and communication needs. *International Journal of Language & Communication Disorders*, 52(4), 514–527.
- *Mecrow, C., Beckwith, J. & Klee, T. (2010) An exploratory trial of the effectiveness of an enhanced consultative approach to delivering speech and language intervention in schools. *International Journal of Language & Communication Disorders*, 45(3), 354–367.
- National Scientific Council on the Developing Child (2007). The Timing and Quality of Early Experiences Combine to Shape Brain Architecture: Working Paper #5. <http://www.developingchild.net>
- Norbury, C.F., Gooch, D., Wray, C., Baird, G., Charman, T., Simonoff, E., Vamvakas, G. & Pickles, A. (2016) The impact of nonverbal ability on prevalence and clinical presentation of language disorder: evidence from a population study. *J Child Psychol Psychiatr*, 57, 1247–1257. <https://doi.org/10.1111/jcpp.12573>
- Norbury, C.F., Vamvakas, G., Gooch, D., Baird, G., Charman, T., Simonoff, E. & Pickles, A. (2017) Language growth in children with heterogeneous language disorders: a population study. *Journal of Child Psychology and Psychiatry*, 58(10), 1092–1105.
- Odom, S.L., Buysse, V. & Soukakou, E. (2011) Inclusion for young children with disabilities: a quarter century of research perspectives. *Journal of Early Intervention*, 33(4), 344–356.
- Pawson, R., Greenhalgh, T., Harvey, G. & Walshe, K. (2005) Realist review—a new method of systematic review designed for complex policy interventions. *Journal of Health Services Research & Policy*, 10(1 Suppl), 21–34.
- *Payler, J.K. & Georgeson, J. (2013) Personal action potency: early years practitioners participating in interprofessional practice in early years settings. *International Journal of Early Years Education*, 21(1), 39–55.
- Phillipson, S., Harju-Luukkainen, H. & Garvis, S. (2018) Early childhood education and care in the 21st century – a unique global overview. In: Garvis, S., Phillipson, S. & arju-Luukkainen, H. (Eds.) *International perspectives on early childhood education and care: early childhood education in the 21st century vol I*. Routledge, pp. 239–247.
- *Pohlman, C. & McWilliam, R.A. (1999) Paper lion in a preschool classroom: promoting social competence. *Early Childhood Education Journal*, 27(2), 87–94.
- Reeves, S. (2015) The importance of realist synthesis for the interprofessional field. *Journal of Interprofessional Care*, 29(1), 1–2.
- *Roth, F.P. & Troia, G.A. (2006) Collaborative efforts to promote emergent literacy and efficient word recognition skills. *Topics in Language Disorders*, 26(1), 24–41.
- Schooling, T., Venediktov, R. & Leech, H. (2010) *Evidence-based systematic review: effects of service delivery on the speech and language skills of children from birth to 5 years of age*. Rockville, MD: American Speech-Language-Hearing Association.
- *Smith, A.E. & Camarata, S. (1999) Using teacher-implemented instruction to increase language intelligibility of children with autism. *Journal of Positive Behavior Interventions*, 1(3), 141–151.
- *Smith-Lock, K.M., Leitao, S., Lambert, L. & Nickels, L. (2013) Effective intervention for expressive grammar in children with specific language impairment. *International Journal of Language & Communication Disorders*, 48(3), 265–282.
- Stutsky, B.J. & Spence Laschinger, H.K. (2014) Development and testing of a conceptual framework for interprofessional collaborative practice. *Health and Interprofessional Practice*, 2(2), 7.
- *Throneburg, R.N., Calvert, L.K., Sturm, J.J., Paramboulas, A. A. & Paul, P.J. (2000) A comparison of service delivery models: Effects on curricular vocabulary skills in the school setting. *American Journal of Speech-Language Pathology*, 9(1), 10–20.
- Tomblin, J.B., Records, N.L., Buckwalter, P., Zhang, X., Smith, E. & O'Brien, M. (1997) Prevalence of specific language impairment in kindergarten children. *Journal of speech, language, and hearing research*, 40(6), 1245–1260.
- *Tyler, A.A., Osterhouse, H., Wickham, K., Mcnutt, R. & Shao, Y. (2014) Effects of explicit teacher-implemented phoneme awareness instruction in 4-year-olds. *Clinical Linguistics & Phonetics*, 28(7-8), 493–507.
- Underwood, K., Valeo, A. & Wood, R. (2012) Understanding inclusive early childhood education: a capability approach. *Contemporary Issues in Early Childhood*, 13(4), 290–299.
- United Nations Educational, Scientific and Cultural Organization (UNESCO) (1994) *The Salamanca statement and framework for action on special needs education*. Paris: UNESCO.
- *Valdez, F.M. & Montgomery, J.K. (1997) Outcomes from two treatment approaches for children with communication disorders in head start. *Journal of Children's Communication Development*, 18(2), 65–71.
- *Wilcox, M.J., Gray, S.I., Guimond, A.B. & Lafferty, A.E. (2011) Efficacy of the TELL language and literacy curriculum for preschoolers with developmental speech and/or language impairment. *Early Childhood Research Quarterly*, 26(3), 278–294.
- Wong, G., Greenhalgh, T., Westhorp, G., Buckingham, J. & Pawson, R. (2013) RAMESES publication standards: realist syntheses. *BMC Medicine*, 11(1), 21.
- Wong, S. & Press, F. (2017) Interprofessional work in early childhood education and care services to support children with additional



needs: two approaches. *Australian Journal of Learning Difficulties*, 22(1), 49–56.

World Health Organization (2010) *Framework for action on inter-professional education & collaborative practice*. [online] Geneva, Switzerland: WHO. Available: <https://www.who.int/publications/i/item/framework-for-action-on-interprofessional-education-collaborative-practice>

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APPENDIX A: Definition components of IPCP model by Stutsky and Spence Laschinger, 2014

Component	Definition/description
<i>Personal factors</i>	
Trust	The confidence and reliance that interprofessionals have with one another.
Cooperation	The manner in which interprofessionals work together for a common goal.
Communication	The ease and effectiveness with which interprofessionals communicate with each other.
Flexibility	“Deliberate ... role-blurring... and includes reaching productive compromises in the face of disagreement” (e.g., willing to take on tasks outside the job description when that seems important).
Beliefs in IPC	Extent to which professionals identify strengths in interprofessional collaboration.
<i>Situational factors</i>	
Support Structures	Having the physical space, time, policies and procedures, and formal mechanisms to support IPC: adequate time for sharing knowledge and patient-related information, integrating daily collaborative behaviours into day-to-day functioning; can take the form of emotional support, helpful advice, or hands-on assistance from superiors, peers or interprofessional practitioners, written guidelines, various educational opportunities such as in-services and grand rounds.
Leadership	Central and local to promote collaboration, eliminate barriers and promote an effective team culture; needed to create empowering environment; A team leader’s ability to foster IPC and “set and communicate clear goals and expectations and facilitate their implementation.”
Empowerment	Having access to information, support, resources, and the opportunity for growth and mobility.
<i>IPC</i>	
Overall:	“When multiple health workers from different professional backgrounds provide comprehensive services by working with patients, their families, carers and communities to deliver the highest quality of care across settings.” (WHO, 2010, p.13).
Subscale: Understanding of roles	Professionals’ knowledge and understanding of their role and the roles of others within an interprofessional environment.
Subscale: Interdependence	“The occurrence of and reliance in interactions among professionals whereby each is dependent on the other to accomplish his or her goals and tasks.”
Subscale: Knowledge exchange	Perception of the extent to which knowledge is shared between professionals in a given environment.
Subscale: Collective ownership of goals	“Shared responsibility in the entire process of reaching goals, including joint design, definition, development, and achievement of goals ... and includes commitment to client-centred/relationship-centred care whereby professionals from different disciplines and clients and their families are all active in the process of goal attainment.” (e.g., encouraging family members’ participation in the treatment process).

(Stutsky & Spence Laschinger, 2014)



APPENDIX B: Search profile

Key-concept	Key-words
Speech language communication needs (SLCN)	"specific language impairment" OR "dld" OR "language development disorder*" OR "developmental language difficulties" OR "speech language communication needs" OR "speech language and communication needs" OR "communication disorder*" OR "speech language disorder*" OR "language disorder*" OR "language impairment*" OR "speech language disabilit*" OR "language problem*" OR "language difficult*" OR "speech sound disorder*" OR "primary language disorder*" OR "speech language problem*" OR "speech and language problem*" OR "communicat* delay*" OR "language delay*" OR "special education* needs" OR "special need*" OR "children with additional needs" OR "children at risk" OR "SLCN" OR "speech and language needs"
Early childhood education and care (ECEC)	"early childhood education and care" OR "early childhood education" OR "early childhood education and care service*" OR "primary school*" OR "primary education" OR "kindergarten" OR "pre-school*" OR "preschool*" OR "infant school*" OR "early special education" OR "integrated service*" OR "inclusive early childhood education" OR "children's service*" OR "health and education system*" OR "education and health service*" OR "health and education" OR "pre-primary education level" OR "early years"
Interprofessional collaborative practices (IPCP)	"multidisciplinary collaborati*" OR cooperat* OR "interprofessional practice*" OR "interprofessional work" OR "interprofessional collaborat* practice*" OR interprofession* OR "interprofession* service provision" OR "community of practice" OR "service delivery" OR consultative OR collaborative OR "collaborative professional practice*" OR co-productive OR co-professional OR teamwork OR "joint working" OR cross-disciplin* OR multi-disciplin* OR "multi-professional" OR inter-disciplin* OR cross-agency OR inter-agency OR multi-agency OR cross-organi* OR inter-organi* OR multi-organi* OR teacher* OR "speech language therap*" OR "speech language patholog*" OR "early years professional*" OR "early years practitioner*" OR integrated OR "inclusive collaborative intervention*" OR "inclusive practice*" OR "effective team practice*" OR "collaborative practice*" OR "service delivery" OR "service provision" OR "education* support*" OR "children's service integration" OR "special needs support" OR "language support" OR "education* provision" OR "language intervention" OR "early intervention" OR "early childhood intervention*"



APPENDIX C: Descriptives of included studies (in order of child outcome related to ICF framework categories)

Authors	Publ. year	Country	SLCN Focus	Setting and children	Professionals	Design	Type	Duration (weeks) & intensity (h)	Intervention outcome
Smith & Camarata	1999	US	Verbal interaction, intelligibility	Speech language communication (ICF: d1+d3/d7) Kindergarten/preschool ASS with SLCN, $n = 3$	ECEC teacher, Language clinician	Single-subject experiment	Quantitative	≈ 9–15 weeks	Increase in intelligibility and verbal interaction
Gallagher & Chiat	2009	UK	Receptive and expressive language skills	Child centre and nursery, severe SLL, $n = 24$	Speech language therapist (SLT), Nursery staff	RCT: direct group-based vs. collaborative/consultative vs. no intervention	Mixed methods	12–24 weeks 12–96 h.	Significant differences in progress on all clinical measures except expressive grammar, significant difference on parental impact scores
Mecrow, Beckwith & Klee	2010	UK	Speech and/or language skills	Kindergarten, receptive and expressive language and/or speech difficulties, $n = 14$	Special educator, SLT, special teacher assistant, learning support assistant, specialist teacher	Quasi-experimental	Quantitative	10 weeks 40 h.	Significant gains on CELF-Preschool UK receptive and expressive language standard scores, no increase standard scores of speech ability, significant difference on parental/teacher measures on change of speech language difficulties
Ellis, Schlau-decker & Regimbal	1995	US	Concept instruction	Kindergarten, speech language delay, $n = 2$	ECEC teacher, Physical teacher, SLT & univ.phys. educ. as consultant	Quasi-exp.	Quantitative	8 weeks 8 h.	Significantly higher performance on target concepts

(Continues)



Authors	Publ. year	Country	SILCN Focus	Setting and children	Professionals	Design	Type	Duration (weeks) & intensity (h)	Intervention outcome
Valdez & Montgomery	1997	US	Concept development	Head start program, mild, moderate and SLT, severe language disorder, <i>n</i> = 40	ECEC teacher, administrator	RCT: collaborative/consultative vs. pull-out	Quantitative	24 weeks 36 h.	No statistical reported differences on total, receptive and expressive language scores, pull-out: more children showed gains in raw receptive language scores, consultative group: no children within severe category vs. 7% in pull-out
Throneburg, Calvert, Sturm & Paramboulkas	2000	US	Vocabulary	Elementary school grade k-3, SILCN, <i>n</i> = 11	ECEC teacher, SLT, Students in communication disorder and science	RCT: collaborative vs. pull-out vs. classroom based	Quantitative	12 weeks 8-11 h.	Significantly higher test gains in collaborative setting
Hadley, Simmerman, Long & Luna	2000	US	Vocabulary, phoneme awareness	Kindergarten to 1 grade, SLI, <i>n</i> = 5	ECEC teacher, SLT	Quasi-exp.	Quantitative	1 school year	Facilitation development of vocabulary and phonological awareness skills
Wilcox, Gray, Guimond & Lafferty	2011	US	Early literacy and oral language skills	Preschool, developmental speech-language impairment, <i>n</i> = 118	ECEC teacher, Teacher assistant, Research staff (SLT & spec. educator as mentors), SLT, physical and occupational educator available	RCT	Quantitative	1 school year ≈ 400 h.	Significantly greater improvement in the oral language and early literacy skills for intervention group
Hutchinson & Clegg	2011	UK	Receptive and expressive language skills	Primary school, key-stage 1, at risk for receptive and expressive language delays/disorders	ECEC teacher, Special language & language support teacher & SLT as trainers/coach	Quasi-exp.	Quantitative	8 weeks 4 h.	Significant effects on expressive language (sentence length, information, subordinate clauses), no sign. effects on receptive vocabulary

(Continues)



Authors	Publ. year	Country	SLCN Focus	Setting and children	Professionals	Design	Type	Duration (weeks) & intensity (h)	Intervention outcome
Smith-Lock, Leita, Lambert & Nickels	2013	AUS	Expressive grammar	Special education ECEC, SLL, <i>n</i> = 40	Special educator, SLT, Teacher & Research assistant	Quasi-exp.: enhanced collaborative vs. standard collaborative	Quantitative	8 weeks 8 h.	Significant increase of grammar performance for enhanced collaborative group
Tyler, Osterhouse, Wickham, McNutt, & Shao	2014	US	Phoneme awareness	Preschool, SLCN, <i>n</i> = 4	ECEC teacher, SLT, Research assistant	Quasi-exp.: consult vs. control	Quantitative	10 weeks 13 h.	Substantial progress on most trained PA skills, particularly higher level PA, for intervention group
Carson, Bayetto & Roberts	2019	AUS	Phoneme awareness	Preschool, speech-language disorders, <i>n</i> = 13	ECEC teacher, SLT assistant as coach	Quasi-exp.: consult vs. control	Quantitative	10 weeks 13 h.	Increase in phoneme awareness and letter-sound-knowledge skills for all children
Lam, Tsang, Keung, Tong, Mok, Chiu, Lai, Yuen & Soh	2019	Hong Kong	Receptive and expressive language skills	Preschool, speech developmental delay, <i>n</i> = 24	ECEC teacher, SLT, psychologist, Specialist child care worker, Occupational and Physiotherapist Social worker as coach	Quasi-exp.	Mixed methods	1 school year 33 h.	Significant improvement on receptive and expressive language skills for intervention group
Functional communication/participation (ICF: d7)									
Hundert	1994	Canada	Promoting peer interaction	Preschool, SEN <i>n</i> = 5, incl. severe communication disorder	ECEC teacher, Resource teacher	Quasi-exp.	Quantitative	≈ 6 weeks 30 h.	Increased level of verbally/nonverbally peer interaction

(Continues)



Authors	Publ. year	Country	SLCN Focus	Setting and children	Professionals	Design	Type	Duration (weeks) & intensity (h)	Intervention outcome
Hyter	2003	US	Support of language and emergent literacy development	Head Start preschool, at risk for social communication and pragmatic language difficulties, $n = 2$	ECEC teacher, Teacher assistant, SLT student (SLT as supervisor)	Case-study	Qualitative	15 weeks 75 h.	Improved pragmatic and expressive skills, and ability to communicate with peers successfully
Pohlman & McWilliam	1999	US	Social interaction	Preschool at child care centre, SEN, $n = 6$, incl. significant delay in expressive language	ECEC co-teachers, SLT, Teacher assistant, Occupational/physical therapist	Case-study	Qualitative	11 weeks	Promotion of social interactions
Roth & Troia	2006	US	Oral language	Head start preschool program, oral language difficulties, $n = 1$	ECEC teacher SLT	Case-study	Qualitative	-	Improved participation in reading activities, generalisation of new vocabulary
Lamb	2008	New Zealand	Communication with picture exchange communication system (PECS)	Kindergarten, ASD with SLCN, $n = 1$	ECEC teacher, SLT, Education support teacher, Early intervention teacher, Psychologist, Medical specialist	Case-study	Qualitative, participatory action research	1 school year	Increased nonverbal communication; interaction in (un)familiar settings; participation and influence on practice, activities, planning
Culatta, Hall-Kenyon & Black	2010	US	Expository comprehension skills	Preschool, phonological production errors, $n = 8$	ECEC teacher, SLT & ECEC students	Quasi-exp.	Mixed methods	16 weeks. 24 h.	Gains in compare/contrast performance, generalisation of concepts and content

(Continues)



Authors	Publ. year	Country	SLCN Focus	Setting and children	Professionals	Design	Type	Duration (weeks) & intensity (h)	Intervention outcome
Hernandez	2012	US	speech therapy assessment for integrated therapy, collaboration and child benefits	Preschool, delays or disabilities related to communication, articulation, pragmatics, or oral motor or swallowing issues, <i>n</i> = 168	Special education teacher, SLT	Cross-sectional	Mixed methods	6 months ≈ 100 h.	Generalisation, enhanced pragmatic or social communication skills, increased attention during speech activities, vocalisation, sentence length,
Payler & Georgeson	2013	UK	Interprofessional practices for SEN	Preschool, nursery, children's centre, SLCN, <i>n</i> = 4	ECEC teacher, Special educator, coordinator, Early years practitioner, nurse	Case-studies	Qualitative	16 weeks	Increased participation and child agency
Abdoola, Mosca & Pillay	2019	South-Africa	Responsive communication coaching	Preschool, special needs preschool, (at risk of) SLCN (associated with developmental conditions), <i>n</i> = 90 (TD/SLCN)	ECEC teacher, ECEC students	Quasi-exp.	Mixed methods	16 weeks 6–24 h.	Improved communication during daily routines
Total	1994–2019	US: 55% Other: 45%		<i>N</i> _{total} = 583 <i>min-max</i> : 2–168		RCT: 18% Other: 82%	Quant: 54% Qual: 23% Mixed: 23%	≈ 19 weeks.	

ICF, International Classification of Functioning, Disability and Health; Autism Spectrum Syndrome; intensity, frequency × duration intervention × minutes/session (minutes); d1, learning and applying knowledge; d3, communication; d7, interpersonal interactions and relationships (subcategories of ICF category 'activity and participation'); RCT, randomized clinical trial; SEN, Special Education Needs; SLI, speech-language impairment

APPENDIX D: Examples of coded text for each mechanism category

Category	Coded examples
Understanding of roles	'roles' or 'responsibility' or reporting clear agreements related to those terms, for example: "SLT [speech-language therapist] and teacher agreed that the SLT would have the primary responsibilities and which strategies they each would use to support".
Interdependence	"teacher introduces target concept before physical education class" – "physical education teacher emphasised the concept" – "mentioning of concept in incidental instruction" Intensive co-teaching (each professional 2.5 days in class) – professionals educated, works and supported each other (formulate as text) or related to the time-bound sequence of activities (With the teacher's guidance, after modelling and demonstration, the teacher implemented techniques on other days).
Subcategory dependence	"Classroom teacher set up mechanisms for classroom delivery, formal instructions, training" and the procedures concerning implementation fidelity.
Knowledge exchange	"Sharing technical and descriptive information, materials, data, knowledge, instructional philosophy, goals, process and concerns, rationale for schedule structure, interpretations of child communication"; "Sharing allowed for an exchange of ideas"; pooling expertise, helping each other to learn; use of various communication and documentation, team reflection, clarification and planning; "Professional dialogue and discussion to build up a body of knowledge"; discussions including reflection, evaluation, feedback and discussions on needed changes.
Subcategory knowledge transfer	because of its reference to more one-way information flow instead for an mutual exchange. Examples: provided feedback when requested; "Multidisciplinary team met with teacher to devise Individual Education Plan".
Collective ownership of goals	Develop a plan together; discussion of differences followed by revision and final approval; goals and objectives regarding intervention/treatment were jointly identified; to take part in the development of Individual Family Support Plan; joint curriculum planning, common target word identification, common developing of intervention goals, involvement of as many of staff as possible; "collaborated on identifying children's difficulties, planning and implementing strategies and evaluating outcomes"; "teacher and SLT partnered to develop and implement an effective plan – they selected focus for intervention, planned activities, confer about shared objectives"; Team reflection, clarification and planning; Engage in discussions to tailor implementation, influence and adapt targets and interventions; collectively creations of a set of criteria (incl. discussion and consensus/agreement on criteria).

APPENDIX E: Overview of supporting studies for each configuration

Configuration	Supporting studies (in alphabetical order)
A: From knowledge exchange to professional development to children's improved speech, language and communication	Abdoola et al. (2019), Carson et al. (2019), Culatta et al. (2010), Gallagher and Chiat (2009), Hernandez (2012), Hutchinson and Clegg (2011), Lam et al. (2019), Lamb (2008), Mecrow et al. (2010), Payler and Georgeson (2013), Smith and Camarata (1999), Smith-Lock et al. (2013), Throneburg et al. (2000), Tyler et al. (2019), Valdez and Montgomery (1997), Wilcox et al. (2011)
B: From collective ownership of goals to interprofessional and inclusive practices and functional communication of the child	Abdoola et al. (2019), Hundert (1994), Hyter (2003), Mecrow et al. (2010), Payler and Georgeson (2013), Pohlman and McWilliam (1999)
C: From understanding each other's roles to effective practices	Abdoola et al. (2019), Hernandez (2012), Payler and Georgeson (2013), Roth and Troia (2006), Smith and Camarata (1999)
D: From interaction between personal factors and effective IPCP mechanisms to enhanced collaboration and time efficiency	Abdoola et al. (2019), Ellis et al. (1995), Hadley et al. (2000), Hernandez (2012), Lam et al. (2019), Lamb (2008), Tyler et al. (2019)