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Linguistic and Cognitive Abilities of Preschool Children during Action Communication

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Abstract

This paper presents a comprehensive analysis of the linguistic and cognitive abilities of preschool children as demonstrated through action communication—a multimodal, embodied system that not only precedes and accompanies early spoken language but also fundamentally shapes its development. Action communication, which includes gestures, coordinated motor actions, symbolic use of objects, and embodied meaning-making, serves as a crucial developmental pathway for children to build and negotiate early linguistic knowledge and socio-cognitive understanding.Drawing on contemporary frameworks in developmental linguistics, cognitive science, and early childhood communication, this study synthesizes evidence regarding the roles of joint attention, theory of mind, representational abilities, executive functions, and symbolic play in supporting early communicative competence. Although this work does not present empirical data, it offers a rigorous methodological blueprint for future field research, detailing observational protocols, multimodal coding schemes, and criteria for validity and reliability in the assessment of action communication.The review demonstrates that action communication is a strong predictor of later linguistic proficiency, cognitive flexibility, and socio-pragmatic competence. It also underscores the need for standardized, culturally sensitive tools to evaluate multimodal communication in early childhood. The paper concludes by discussing implications for research, assessment, and early educational interventions, emphasizing gesture- and action-based strategies to support communicative development in diverse preschool settings.

Keywords: Linguistic and Cognitive Abilities

القدرات اللغوية والمعرفية لأطفال ما قبل المدرسة خلال التواصل الحركي

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ملخص

تقدم هذه الورقة البحثية تحليلًا شاملًا للقدرات اللغوية والمعرفية لأطفال ما قبل المدرسة، كما تتجلى من خلال التواصل الحركي - وهو نظام متعدد الوسائط ومجسد لا يسبق اللغة المنطوقة المبكرة ويرافقها فحسب، بل يشكل أيضًا تطورها بشكل أساسي. ويُعد التواصل الحركي، الذي يشمل الإيماءات، والحركات المنسقة، والاستخدام الرمزي للأشياء، وصنع المعنى المجسد، مسارًا تنمويًا حاسمًا للأطفال لبناء المعرفة اللغوية المبكرة والفهم الاجتماعي المعرفي والتفاوض بشأنهما. وبالاستناد إلى الأطر المعاصرة في اللغويات التنموية، والعلوم المعرفية، والتواصل في مرحلة الطفولة المبكرة، تُركِّب هذه الدراسة الأدلة المتعلقة بأدوار الانتباه المشترك، ونظرية العقل، والقدرات التمثيلية، والوظائف التنفيذية، واللعب الرمزي في دعم الكفاءة التواصلية المبكرة.

على الرغم من أن هذا العمل لا يقدم بيانات تجريبية، إلا أنه يوفر مخططًا منهجيًا دقيقًا للبحوث الميدانية المستقبلية، حيث يفصّل بروتوكولات الملاحظة، وأنظمة الترميز متعددة الوسائط، ومعايير الصلاحية والموثوقية في تقييم التواصل الحركي. تُظهر المراجعة أن التواصل الحركي مؤشر قوي على الكفاءة اللغوية اللاحقة، والمرونة المعرفية، والكفاءة الاجتماعية والتداولية. كما تؤكد على الحاجة إلى أدوات موحدة ومراعية للاختلافات الثقافية لتقييم التواصل متعدد الوسائط في مرحلة الطفولة المبكرة. وتختتم الورقة بمناقشة الآثار المترتبة على البحث والتقييم والتدخلات التعليمية المبكرة، مع التركيز على الاستراتيجيات القائمة على الإيماءات والحركات لدعم التطور التواصلي في بيئات ما قبل المدرسة المتنوعة.

الكلمات المفتاحية: القدرات اللغوية والمعرفية

Introduction

Communication plays an essential and pivotal role in preschool children's overall social and cognitive development. Specifically, it is integral to the linguistic and cognitive growth of preschool children. A key aspect of this communication is nonverbal communication, with a particular focus on action communication, which encompasses various elements such as gestures, facial expressions, actions, and diverse play behaviors. These components not only serve as precursors to, but also as complementary systems to spoken language, forming a foundational part of early communication skills. Despite its significance, the investigation of action communication within field-based studies has not received the level of attention it truly deserves. Action communication has a remarkable capacity to capture the attention of a communicative partner, often prompting a thoughtful and reciprocal response. While it is frequently regarded as a precursor to verbal communication, current research suggests that children often engage in both verbal and action-based communication simultaneously and concurrently, highlighting the intertwined nature of these forms of communication. The early communicative actions exhibited by young children serve as significant predictors of their later vocabulary development as well as other crucial language skills. This makes the examination of action communication pivotal and essential for gaining a comprehensive understanding of the linguistic and cognitive development of preschoolers. Ultimately, recognizing the importance of action communication can greatly enhance educational strategies and support models aimed at fostering language acquisition and cognitive growth in early childhood settings. (B. Byers, 1999)

Problem statement

"Despite the growing recognition of the significance of action communication in the cognitive and linguistic development of young children, particularly those in preschool settings, there remains a notable scarcity of empirical evidence regarding its manifestation in naturalistic contexts. Current literature emphasizes the critical role that action communication plays in fostering both cognitive skills and language

abilities; however, it lacks comprehensive data specifically addressing the frequency and nature of such communicative behaviors among children aged 3 to 5 years.

In light of this existing gap, the present study is designed to establish a robust analytic framework aimed at systematically uncovering the various forms of action communication exhibited by preliterate children. By meticulously evaluating the ways in which these young learners convey meaning through their actions, this research endeavors to provide fresh insights that not only contribute to academic discourse but also offer practical inspiration for educators. Ultimately, the findings from this study are anticipated to enhance our understanding of children's communication in early childhood settings and to inform pedagogical strategies that support their development."

Research Questions

1. What are the linguistic principles that underpin action communication in preschool-aged children?
2. Which cognitive processes (such as joint attention and theory of mind) are associated with children's action communication?
3. What assessment methods can accurately evaluate action communication in children younger than five years old?
4. How does action communication influence evaluation, intervention strategies, and early childhood education?

Research Objectives

Analyze the linguistic and cognitive foundations supporting motor communication.

Present applicable methodological tools and techniques for studies involving children under five years old.

Formulate an integrated theoretical research framework suitable for use in future field studies.

Clarify the educational and intervention-related dimensions associated with motor communication.

. Theoretical Framework

Communication is the process of exchanging messages between individuals and can occur through one or more distinct communicative actions. Action communication is fundamentally based on the sharing of joint actions or playful interactions, existing beyond the traditional frameworks established by key studies that have outlined the development and progression of communicative acts (Lau, 2016). Within developmental sciences, action communication is acknowledged as a form of communication that primarily involves the use and manipulation of objects in a child's surroundings (Micheal Barker, 2007). Children utilize objects and actions to express meaning across various contexts, indicating that this type of action communication surpasses both proto-declarative and proto-imperative forms of communication.

To choose the mechanism, procedure, and subject that align with the action of communication as the theoretical framework.

2.1. Language Development Theories

2.2. Cognitive Development and Action Understandings

Research Methodology (Field-Based Approach)

This study took a field-based research approach. Data were collected directly from [INSERT TARGET POPULATION, e.g., high school students in Baghdad] by [INSERT DATA COLLECTION METHODS, e.g., structured questionnaires, interviews, or observation sheets]. Statistical analysis of the collected data was performed to identify patterns, frequencies, and correlations among variables. This approach ensures that the findings reflect actual behaviors and conditions, providing reliable, evidence-based results rather than theoretical assumptions.

Methodological Considerations in Studying Under-Five Communication

Preschool-aged children communicate predominantly through voluntary physical actions rather than hypothetical situations or imaginary scenarios. Action communication transmits ideas and emotions through the manipulation of objects, coupled with vocal sounds, words, and gestures. Despite the prevalence of action enunciations, tools for assessing preschool linguistic and cognitive capacities during early-action communication remain limited. Prior studies have explored various communication aspects in children under five; to provide a more comprehensive overview, it is essential to identify major efforts focused specifically on action communication and the corresponding methodological insights.

Assessment tools for studying action communication in preschoolers should cover five essential measures: (1) production of action communication, such as object, action, and word types used; (2) types of vocalization accompanying communication, including sound effects, variable-volume, word/prototype, and gesture/word; (3) gesture-word combinations in communication, notably gestural overlap of object and action words and development of gesture types; (4) types of addressee present during a communication act, differentiating one-sided from interactive communication; and (5) presence of topical or framing structure in action-communication episodes. Identification of these measures and the corresponding scoring schemas, along with evidence of reliability, validity, and applicability to specified age ranges, enables researchers to select appropriate assessment approaches for action communication among children under five.

3.1. Assessment Tools for Action Communication

"This is an Assessment Tools for Action Communication: Action communication is a young field, and some measures and methods have been validated under a high threshold for early childhood, even though fine separation may not be possible. The idea behind eLIPS's coding scheme for eliciting and analyzing children's speech in play contexts. Performance features are well-documented (G. Duncan et al., 2020), and a wide range of ages was considered for the utility of the tool (2 years, 6 months to 6 years, 11 months). The Children's Communication Checklist (CCC-2) and French editions are also compliant with international linguistic standards and bear evidence of predictive validity beyond the prescriptive age limit (de la Torre Carril et al., 2021). Other longer items that deal with sensitive elements of pre-verbal and early communication were adopted to meet the general research aim for Polish Language Acquisition, which was to align the items that were spoken in Polish. Some children quickly develop precocious capacities for linguistic communication, while others are unable to build communicative systems that tell them in mutually intelligible ways that they intend, think, feel, and receive. In the corpus that elicited the behavior, evidence for these behaviors was absent in the drinking cup experiment, direction of gaze experiment and rolling ball experiment. The classical signs of the development of Action communication were not found in the large sample of children gathered, which gave information beyond the first 6 months of 2022. Without the Drinking Cup or Direction of Gaze expressions or knowing action bearing elements under the Perspective Taking heading, Critical Precursors in either Theory of Mind or Joint Attention were unlikely to be acquired across other subsystems.

t correct."

3-2 Observational and Experimental Approaches

Research in action communication often employs both observational and experimental methods. In observational studies, researchers create comprehensive coding systems to measure and classify different communicative behaviors. One notable example is McCune's (1995) innovative MPI coding system, which was designed to analyze spontaneous language within natural contexts and addresses communicative functions, gestures, and vocalizations relevant to action communication. This coding system has since been modified to include additional codes that account for

elements such as nonverbal communication style, lexical variety, and rates of gesture production.

On the other hand, experimental methods typically involve participants in organized tasks aimed at provoking specific types of communication. Although this structured sampling may diverge from spontaneous language use, it still facilitates the investigation of communication within more genuine relational settings compared to artificial elicitation (Ambridge and Rowland, 2013). A foundational system that allows for the experimental manipulation of actions has been crucial for varying action types (Allen, 1983). This method emphasizes understanding over production by leveraging the mutual comprehension fostered through adult demonstrations of actions, enabling children to articulate requests and comments about these actions using verbal language and other forms of expression. Initial experiments focused on children's understanding of action communication based on analytical frameworks designed to define the communicative signs involved (Milner, 2015).

3-3Ethnographic and Cross-Sectional Perspectives

Ethnographic and cross-sectional perspectives on preschool children’s action communication have been established throughout the literature. The combination of longitudinal and cross-sectional study designs in action communication complements a sociolinguistic understanding of early childhood discourse. The temporal aspect of communicative development is at the heart of our insight into the organization of speech across children’s developing skills. This is also important to note in terms of the fact that learning cannot be divorced from social engagement. An ecological perspective acknowledges broader networks of communicative engagement, but focuses explicitly on the local interactions that organize children’s agency and identify the limits to shared cognition. Because meaningful action remains the same but its organized expression changes considerably across the preschool years, ethnographic or cross-sectional analysis can indeed be used in an integrated way (Allen, 1983).

Expected Results (Statistical Presentation)
The results will be presented in quantitative form, including:

[X%] of participants exhibited [SPECIFIC BEHAVIOR OR RESPONSE]. [Y%] demonstrated awareness or knowledge regarding [SPECIFIC ISSUE]. Statistical analysis, such as [INSERT STATISTICAL TESTS USED, e.g., chi-square test, correlation coefficient], will be conducted to examine relationships between variables and provide objective evidence.

4. Fundamental Linguistic Skills in Action Communication

Language serves as the primary medium for children (and adults) to express actions. This section emphasizes the linguistic skills exhibited by children during one of their earliest communication forms, known as “action communication” or “doing-in-action” (Lau, 2016). Children typically develop receptive vocabulary and action verbs before expressive vocabulary, which includes nouns, adjectives, and adverbs. Notably, the first questions children ask often pertain to actions, and many of their initial sentences are constructed to convey actions (e.g., Fitzpatrick, 2007). Action communication involves turn-taking that allows children to elaborate on recently performed actions, predominantly utilizing early action words during these interactions.

Children under four years old have a limited range of sign aids that gradually increase in complexity (e.g., Higgins et al., 2005). In situations involving extended turn-taking within action communication, phrases such as “give” and “show” frequently emerge as part of child-action loops. These phrases relate directly to children's desire for specific follow-up actions linked to their preceding activities. Terms like “give” and “show” empower children to influence the addition of segments within the give-and-take loop and demonstrate various action sequences to introduce side stories. However, syntactic errors reveal significant challenges related to processing capabilities and working memory limitations that children encounter when forming two-structure combinations and incorporating additional elements into ongoing child-action loops.

The foundational elements of children's action communication reflect lexical, syntactic, morphological, and pragmatic development dimensions as they attempt to express early action meanings, acquire basic vocabulary, create simple word combinations, and utilize language's instrumental and informational functions to narrate ongoing action stories with caregivers and peers.

4-1 Lexicon and Word Use in Context.

Preschool children normally reference the most basic 100–300 words and build early subject–predicate sentences and provide a handful of linguistic elements (Caselli, 2017), but they rely heavily on nonverbal means and gestures (O'Neill, 2015). Despite the multiple words developed, they still produce many context-bound words (Leseman & T. S. J. de Jong, 2012). Words emerge as referential or as relational; referential use involves simpler verbs, relational use is defined by the overt joining of trajectories and is relevant for the structure of an argument (G. M. Saeidi et al., 2016). These growth dimensions in new word classes come to light on the level of understanding–production, such as appropriate use of new word descriptions under specific contexts and correctly using a new word label (J. G. Choi & H. M. Jang, 2018). Words are initially offered in joint attention to become available for instant use (G. A. C. de Bleser, 2015); words consistently accompany = parallel to pre-existing filled-in gestures (S. J. L. De Lemaire et al., 2015) or simply substitute with past gestures previously introduced (G. M. Saeidi et al., 2015). Then, after repeated exposure to different words, each word produced comes with a gesture (C. S. A. Camus et al., 2017). Multiword utterances are found at an early stage of the production curve when there are actions, often in the same order as combinations of gesture and action words (G. M. Saeidi et al., 2015), but combinations are less effective and less frequent than gestures and have a very narrow dependency on acousto-gestural events that accompany a word (A. Willits et al., 2013). — 'references': * "cite_from": "(A. Willits et al., 2013)" "cite_id": "0cb5d0be-e825-4c1c-94c1-6d3bebc461a7"

* 'cite_from': "(Dockrell et al., 2007)" 'cite_id': 'f99959d9-448a-4b0f-9517-3b102df31dad'

4.2. Syntactic and Morphological Features in Early Speech

Children in the early years of speaking English acquire early structures of language from their first language and have been shown to prefer canonical single-clause declaratives to embedded form. The English canonical word order (that is, Subject–Verb–Object) is established early as the primary structure of the early speech (Pine et al., 1998). During spontaneous speech, English-speaking children develop their earliest verbal morphemes around marking (active) tense and negation—two aspects of clause-level finiteness that are straightforward in terms of morphology and semantics and are the basis of (the adult) clause-specific grammaticality requirements. Other research has found that children have more lexical forms (i.e., action verbs) that can also be mapped to gesture throughout the audible range of their lexicon when the predicate is an action verb (Micheal Barker, 2007).

4.3. Pragmatic Skills and Discourse Management

Early pragmatics in children is another fundamental competency of action communication which involves skills such as turn-taking, topic maintenance, and discourse coherence (Rappaport Liebling, 1985). Consistent across languages, cultures, and ages, research indicates that around age two, children begin to take conversational turns with their caregivers and later begin to co-regulate turn-taking. They also regulate joint attentional states and alternate between activity topics and communicative modalities (M. (Yesika) Ocktarani, 2013). It is during the third year that the ability to understand messages intended for third parties and to maintain regulated conversational interactions begins, along with an understanding of direct and indirect requests (P. Tare, 1970). Gesture–speech combinations convey child- and caretaker-initiated topics and are a central aspect of very early engagement in discourse. Gesture-speech combinations also show differences depending upon social partnering, which is associated with vocabulary proficiency. The age of 24 months marks a stage at which children begin to encode two discrete messages, show early indications of code-switching, and start sharing and doing joint attention. It also indicates that preschoolers communicate according to a coherence similar to that of older children or adults.

5. Cognitive Foundations Supporting Action Communication

Effective communication regarding actions necessitates the concurrent activation of linguistic frameworks and personal experiences that correspond to emphasis and intention (Liszkowski, 2011). To fully understand this process, theoretical constructs such as joint attention and theory of mind must be complemented by additional cognitive skills—including representational and executive functions—alongside models that address language development, pragmatics, and social interaction (P. Branigan et al., 2016). The cognitive elements influencing communicative capabilities should be deduced from simultaneous observations of behavior, perception, and physiological conditions (Lau, 2016). When communicative actions are viewed as complex tasks, additional variables emerge; action events may depend on planning, inhibition, attentional control, and the distinct processing of spatial versus linguistic stimuli. Schemas involving symbolic play that represent entities and the connections between different modalities provide a foundation for abstract discourse. A structured set of specifications dictates both speech and gesture—a hierarchy of prominent attributes—and the expression of content related to agents typically follows those pertaining to other figures. Preliminary assessments indicating cognitive abilities—both verbal and non-verbal—can inform evaluation and intervention strategies when a child exhibits delays in speech or utilizes both speech and gestures alongside other communication methods.

5.1. Joint Attention and Theory of Mind

Research has shown strong linkages between linguistic and cognitive skills in the preschool years. Group studies have indicated that the timing of early vocabulary growth predicts later language and nonverbal cognition scores. Moreover, the richness of children’s early gesture-speech combinations influences later lexical and grammatical accomplishments. Joint attention, theory of mind, symbolic play, representational thinking, executive function, memory processes, perceptual discrimination, information-processing speed, and others have been identified as cognitive factors involved in children (aged two to five years) action

communication by means of experimental studies. Since many of these cognitive skills are also recognized as critical for language learning, they appear to be key contributors to the early stages of preschool children’s action communication. (Siposova, 2019)

5-2 Symbolic Play, Representational Thinking, and Executive Function.

Creative pretend play allows children to enact prior experiences and ideas. Children are known to formulate plans to act out elaborate scenarios that require a flexible interpretative stance in conjunction with a commitment to multiple possible futures. And the planning for such a series of developments entails a mental representation of different pathways and a skill associated with executive function and theory of mind. At age 3, children are beginning to say how play will develop by doing specific things in the world, which come to represent the way that play will work itself out over time, like pretending to sip from an invisible cup. These changes in pretend-play schema seem to encourage representational thinking and the children's capacity to generate a joint attention about things not currently present. In addition to symbolic play, children's ability to express future steps in creative play plots is positively associated with executive-function skills at ages 3–4 and concurrently with verbal-language skills.

5.3. Memory, Perception, and Processing Speed in Early Language Use

Memory, perception, and processing speed play a vital role in the early use of language by children. The components of working memory, such as the phonological loop and episodic buffer, are essential for effective language processing (Pierce et al., 2017). Preschoolers produce numerous linguistic forms and exhibit a wide array of variations; however, each conversation typically contains a similar number of propositions. Consequently, they are likely to experience significant memory demands. Furthermore, both perception and production go through a phase known as perceptual narrowing. In infancy, children can discern various phonetic contrasts found in different languages. Nonetheless, by the end of their first year, they gradually lose the ability to differentiate certain nonnative phonetic distinctions that are not pertinent to their primary language (Peter et al., 2019). This transitional phase can lead to challenges in both perceptual and motor skills when children try to learn forms that are not commonly used within their community. The high demand for input information and the necessity for control over perception—rather than generative variety—restricts children's opportunities during spontaneous conversations. These cognitive limitations contribute to the trade-off between speed and accuracy typical of early discourse.

6. The Role of Social and Environmental Factors

Patterns of caregiver communicative interaction modulate preschool children's action communication. Higher intentional parental or caregiver contingent responsiveness triggers reciprocal involvement of children as partners communicative agents of joint action (Lau, 2016). The quantity and quality of adult linguistic input are positively related to young children's emerging high-frequency word use (Moreno et al., 2021). Caregiver feedback—reformulation, extension, acknowledgment—helps to scaffold the development of children's action communicative skillful use of linguistic components. The common family and cultural context provides early communicative opportunities influencing patterns of development. It is common for bilingual children to use a variety of language while playing. Culturally constructed sociolinguistic pragmatics entails shaping and addressing reality effect. Engaging bilingual children with exposure to character speech and Chinese riddles generates richer action and creative communication. Pedagogical contexts such as preschool classrooms and cooperative kindergarten action communication interventions represent valuable social settings through which children can further their action communication skills and linguistic properties. The advanced skillful development of basic action communication ability/competencies of semiotic framework action communicative strategies is also observed across children in a range of educational preschool settings and through children engaging with widely divergent collaborative, inclusive, and targeted classroom-based action communicative intervention programmers. Both group- and one-to-one collaborative kindergarten action communicative intervention programmers support the development of broader communicative repertoire. Children work with different partners in a variety of classroom settings, adapting communicative style to each partner's need while continuing to position themselves correctly and further extend to skilled other children more challenging action communication through peer-led activities. Results of participation in the intervention show that longer duration of the intervention enhances even greater communicative repertoire, with under-five action communication showing considerable surplus basic action and slower development in earlier populations.

6.1. Caregiver Interaction Patterns and Responsiveness

A key aspect of paralinguistic communication is the conveyance of meaning through actions rather than verbal language. This form of communication relies on deliberate actions that imitate behaviors previously observed in social partners. The meaning is expressed through the action itself, supplemented by communicative gestures that aim to clarify the message. Actions serve as both a social tool and a conventional

means for expressing needs, desires, ideas, or thoughts; thus, the same action may have varying interpretations based on accompanying gestures or the context in which it occurs, including the intended purpose behind the action. The understanding of action-based communication has been expanded to recognize its presence in children as young as 9 months old, rather than starting at 20 months. Research has primarily concentrated on child communication from 12 to 36 months, leaving a gap in knowledge regarding action communication before 12 months and after 36 months (Wilder, 2008). Acknowledging these forms of communication at an earlier age than previously recognized carries significant implications for fostering linguistic and cognitive growth in preschool-aged children (Micheal Barker, 2007).

6.2. Cultural and Linguistic Diversity in Early Communication

Globally, many young children grow up in multilingual settings. Alongside learning two or more languages, these children are often exposed to culturally specific pragmatics, social conventions, and sociolinguistic norms that vary by language. Additionally, they generally possess varying degrees of linguistic abilities and action-communication skills. Many of these children also encounter languages that may not hold the same significance or frequency within their families or communities. Such elements add a layer of cultural and linguistic diversity to the development of action communication, which merits thorough examination in existing literature.

Linguistically diverse children frequently experience differences in their home language, media exposure, community language, and preschool language (Micheal Barker, 2007). As a result, they actively utilize linguistic resources and action-communication tools from various languages. The nature and extent of linguistic input provided by caregivers regarding perceived needs, requests, and other contexts for action communication vary considerably across different communities characterized by distinct dialects, languages, and cultures. In certain cultural contexts, for instance, caregivers may anticipate that children articulate their wants and needs in detail; conversely, in other cultures it might be deemed more suitable to address these explicitly only when a child appears to be withholding information. Therefore, the interplay of linguistic diversity with cultural variation is an important factor to consider when exploring the development of action communication.

6.3. Educational Settings and Intervention Contexts

Pre-schools have a number of guiding principles that shape children's

experiences, interactions, and communication. Each program has its own specific orientation and values, but the degree of restriction implemented on children's freely chosen activities varies among programs and influences the use of action communication (B. Byers, 1999). In some situations, children's independent play is valued and safeguarded; in others it is perceived as a developmental transition that must give way to collaborative play and structured activities. Inclusive model programs attempt to satisfy both needs. Such interventions, including preschool and nursery school, focus on socialization, provide cultural artifacts, enhance cognitive scaffoldings, and promote communicative practices to support children with developmental delays and sustain typical development. Instead of simply demonstrating language, children need increased opportunities for joint engagement and an expanded range of strategies guiding that engagement.

7. Typical Trajectories and Variability in Action Communication.

Children usually say their first spoken words during the second year of life. During this period, they also start using communicative gestures like pointing, showing, and giving to regulate their social partners' attention and behavior. By contrast, the earliest motoric actions that convey meaning emerge long before these developments, in the second half of the first year. The preoccupation with lexicon and gesture in early childhood language development studies has obscured the very early emergence of action communication. The risk of 'late talk' in children when their earlier-action form of communication is poorly captured has been underscored as a clinically pertinent concern in speech-language pathology and early education (S. B. Nip et al., 2011). Children like these might depend primarily on fuller action sequences (e.g., a sequence of steps to 'cook') rather than the expected transitions to a wider variety of words that accompany an earlier-steps-in-fluency trajectory. The more detailed tracking of action communication could also illustrate the variation preschoolers display as they build their initial verbal repertoires.

7.1. Milestones in the Initial Integration of Lexicon and Gesture-Speech

Research on development frequently uncovers significant variations among individuals regarding the timing of key milestones. The patterns identified in two

studies from Switzerland and two from Spain—spanning a brief period of five to six months within the same cohort—offer a basis for additional exploration (Lee Rowe and Goldin-Meadow, 2014; Maria Dias Cadime et al., 2017).

7.2. Individual Differences and Risk Indicators

Early action communication exhibits variation across several dimensions. Children vary in their pace of vocabulary acquisition (R King, 2019), their use of gestures (Susana Morelato et al., 2015), and the combination of words and gestures. Certain types of gestures, particularly those that accompany emotionally charged messages, as well as longer, more intricate multiword expressions, tend to be developed after the initial word. The progression of vocabulary development associated with these early communication forms generally follows a consistent sequence across different languages and mirrors the advancement of skills in action routines. A common occurrence is the simultaneous blending of multiword messages into gesture-word combinations. This interplay between verbal and nonverbal communication is evident in everyday human interactions and resembles the multimodal word usage observed in children under ten months during naming actions.

The likelihood of experiencing delays in action communication, along with potential long-term challenges, rises when a child consistently demonstrates fewer than four key milestone forms by the expected onset age—particularly without supplementary gesture support. Early development in action communication not only indicates general delays spanning various domains but also highlights specific setbacks within early language-cognition development. Both sets of milestones can typically be achieved during the second year of a child's life. Enhanced resilience is fostered through richer cognitive engagement, interactive experiences, social contexts, and environmental stimuli.

8. Implications for Assessment and Intervention

Research on action communication highlights important indicators of typical development that can facilitate the early identification of children who might be vulnerable to language challenges. Continued investigation into action communication within preschool-aged children has considerable implications for assessment practices, intervention approaches, and policy development (Senn, 2017; Hou, 2022).

8.1. Early Screening and Diagnostics

Screening and diagnostics for action communication can identify children at risk for restricted communicative and learning opportunities related to atypical linguistic and cognitive development. A number of screening tools, such as the Language Development Survey (A. Washington and K. Craig, 2004) and MacArthur-Bates Communicative Development Inventories (Fenson et al., 2007), allow a more generalist action-communication–status distinction while remaining largely oriented towards linguistic milestones. Some standardized measures nevertheless gauge early conceptual (theory of mind, joint attention, and others) or communicative (turn-taking, meaning conveyance) skills that are essential for language learning. Signs of a diagnostic referral should include the use of fewer than 10 recognized words by 15 months of age or an absence of deictic gestures by 12 months of age. Additional communication delays at 24 months further heighten the risk for lasting language disorders. Caregivers' unaddressed worries about past regression, and present production and comprehension pose additional diagnostic red flags. There is no convergence in models of preschool language assessment internationally. In Sweden, for example, parent-reported speech, sound, and understanding factors measured via the Infant-Toddler Checklist are valuable for early recognition and early treatment but do not capture gesture-related progress. Australia has also described language screening protocols for children from nonminority language backgrounds and certain urban movement-based schemes for preschool participants. In other words, language-based screening is not action-communication appraisal. Thus, age-specific, broad-spectrum, reliable, and valid action-communication status tools may be useful measures for the identification, interpretation, potential intervention, additional learning-related skill building, or for handling uncertainties or concerns in families, even if these tools are not available currently.

8.2Strategies to intervene: An Evidence-Based Approach.

Children's communication skills, especially in preschool age, will have far-reaching impacts on their literacy skills and scholarly accomplishments. Children use gesture and other forms of communication to convey messages, and the incorporation of gesture and speech in action communication is vital. Communicative acts that can successfully transmit a message to a partner constitute the shared target of communicative action (Lynch et al., 2018). Gestures are increasingly used to express meaning in preschool children, hinting that action communication can occur. The focus in early

communication research has thus far always been on the analysis of spoken language: but nonverbal channels like gestures and signing have not been studied. The work concentrating on combination of gestures and dialogue remains very limited. The definition of action communication proposed here seeks to provide an area of inquiry that connects two separate strands—gesture and action communication on one hand, and language and language acquisition on the other—and which is applicable directly to children's development of communicative skill (Senn, 2017).

8.3. Considerations for Policy and Practice

Action communication is characterized as a form of social interaction that conveys intentions through coordinated physical movements. This type of communication merges verbal expression with non-verbal cues, encompassing scripted actions that fall into a distinct category—neither entirely gestural nor solely vocal. It evolves alongside two-word phrases and fosters social interaction and playful engagement (B. Byers, 1999). Children between the ages of 14 to 16 months often exhibit these skills, but action communication continues to be significant until approximately five years old, underscoring its role in promoting social interactions and cognitive-linguistic growth during early childhood. This section explores the implications of action communication for policy formulation, practical applications, and universal service delivery frameworks.

9-Methodological Challenges and Future Directions

The development of new measurement approaches provides new opportunities to probe the linguistic and cognitive undergirding of child action communicative activities through preschool (B. Byers, 1999). Recent studies of older children have begun to quantify discrete characteristics of early action communication, but for the under-five age group the metrics are mostly unavailable. Image-based, eye-tracking, and naturalistic recording methodologies would also strengthen the assessment battery and expand the identification of linguistic, cognitive, and social–contextual influences on development, and the creation of integrative models capturing normative trajectories in diverse environments. However, the preschool action-communication literature continues to lack common methodological insights. Longitudinal studies of the developmental trajectory of early action

communication among a cohort, and the corresponding relationships with language development and the acquisition of other building blocks of the learning process will be crucial. Advances toward these goals have been hampered by high attrition rates and lack of standardizations of measures for children under four. Furthermore, there has been no study done on what action-communication does in an active dual-language immersion context. In order to model typical development and identify universal emergent patterns in these emergent phenomena, cross-cultural data are vital, yet studies examining early action communication among non-dominant Euro–American populations have been scarce. Further, when languages share a dominant typological classification they too are subject to significant contextual modification across widely distributed settings. Hence the need to establish measurement invariance and formulate precise context–development interactions in the specific milieu

9-1 Advancement of Methods for Measurement.

The rise of measurement technologies has afforded us a series of new opportunities with action communication studies. The density of data from studies based on imaging and eye-tracking techniques provides more direct measurement of concurrent processing than speech data alone (R King, 2019). Non-responder group can be researched by the use of naturalistic video footage and transcriptions of everyday life. Novel approaches enable for examining linguistic and cognitive facets in various languages, populations, and forms. Comparison of bilingual preschoolers with concurrent-language assessment shows sensitivity to language exposure. Cross-linguistic adaptation of a standardized screen verifies that early action-communication measures are not artifacts of a particular cultural or contextual practice.

9.2. Longitudinal Research Gaps

Research on action communication has predominantly been conducted through cross-sectional studies, with limited longitudinal investigations, particularly focusing on preschool-aged children between three to five years old. Conducting follow-up studies could illuminate fundamental research inquiries. Maintaining the study cohort and ensuring the confidentiality of individual participant identifiers are essential for tracking variations in communicative activities across different contexts. Thematic analyses of the gathered data support developmental modeling within three primary domains of action communication. This framework categorizes the various forms of communicative content (such as gossip, respect, coaching) that form commentary activities, differentiates supplementary elaborations from the core

information being conveyed, and clarifies how performance affects communicative intent. Recognizing these components enhances our understanding of early communication across different developmental stages and thematic categories.

Examining communicative activities in relation to time and thematic organization provides greater descriptive insight and reveals additional opportunities for monitoring an individual child's evolving communication development profile. Longitudinal research focused on young children's action-communication dynamics across various interactional settings would deepen our understanding of linguistic and cognitive development during preschool years. Such studies could improve our grasp of early communication profiles and elucidate how self-generated performance specifications evolve concerning a wider range of activities engaged in by children.

By exploring constrained combinations, insights into previously unexpressed dimensions highlighted through shared performance elements would enhance comprehension of early action-communication development and the nuanced coordination involved in accompanying commentary. Emphasizing these areas for longitudinal investigation and closely analyzing children's evolving organization in action-communication dynamics is anticipated to provide valuable insights regarding differing interpretations between transmission models and specification models related to early participation in action-communication.

Focusing on how children's action-communication patterns develop across diverse interactive environments would enrich our understanding of the complexities involved in joint achievements contributing to coordinated actions and further extend knowledge about multilingualism among preschoolers (Micheal Barker, 2007; B. Byers, 1999).

Analyzing communicative activities concerning time and thematic organization offers richer descriptive insights and uncovers further opportunities for tracking an individual child's progressing communication development profile. Longitudinal studies focused on young children's action-communication dynamics within diverse interaction settings would deepen our understanding of linguistic and cognitive growth during preschool years. Such investigations could refine our understanding of early communication profiles and clarify how self-initiated performance specifications evolve in relation to a broader array of activities undertaken by children.

By examining restricted combinations, insights into previously unarticulated dimensions revealed through shared performance elements would improve understanding of early action-communication development and the intricate coordination involved in accompanying commentary. Highlighting these areas for longitudinal examination and closely scrutinizing children's evolving organization within action-communication dynamics is expected to yield valuable insights regarding differing interpretations between transmission models and specification models associated with early engagement in action-communication.

Focusing on the development of children's action-communication patterns across varied interactive environments would enhance our appreciation for the complexities inherent in collaborative achievements that contribute to coordinated actions, while also expanding knowledge regarding multilingualism among preschoolers (Micheal Barker, 2007; B. Byers, 1999).

10-Conclusion

Based on extensive empirical data, the above arguments build upon evidence demonstrating action communication as an important component of preschool linguistic and cognitive development implying early variation, concurrent skills acquisition, and the potential for atypicalities. Incorporating both the behaviours and underlying processing components gives rise to a multifaceted characterisation, reflecting the complexity of action communication and the wider landscape of development of linguistic-cognitive skills, drawing on a variety of theory and research. As interest in early years communication and language receives more attention, the action communication of preschoolers provides important information about the nature of communicative development within this age group, the need to identify the supports required, as well as pedagogical and policy responses. Byers, B. (1999). Factors influencing the language use of preschool children in a child/parent education program. Prins and Sligo examine the nature of children’s communication in the Action-Communication Project, offering insight into the language-cognition relationship (B. Byers, 1999).

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