The Role of Pretend Play in Narrative Development: Comparing Gestural and Symbolic Pathways in Children With and Without Early Unilateral Brain Injury

Kristen M. Johnson

Department of Psychology, University of Chicago

Author Note

Kristen M. Johnson https://orcid.org/0009-0008-3757-5795

Correspondence concerning this article should be addressed to Kristen M. Johnson, Department of Psychology, University of Chicago, 5848 S University Ave, Chicago, IL 60637, Email: kmjohnson25@uchicago.edu

Abstract

This study investigates the differential relationships between gesture use during pretend play and subsequent narrative development in children with and without early unilateral brain injury. We compare how representational versus non-representational gestures produced during naturalistic play at three different time points (38, 42, and 50 months) predict narrative structure complexity of de novo stories created at ages 5-6 years across the two populations. Drawing from a longitudinal sample of 20 typically developing children and 11 children with pre- or perinatal brain lesions, we analyze spontaneous parent-child interactions and structured narrative tasks to delineate potential compensatory pathways in language development. Whereas previous research has primarily focused on gesture as a unified construct, we distinguish between different gestural categories to identify specific mechanisms that may support complex language development. Our theoretical framework proposes that representational gestures during pretend play may provide a crucial scaffold for the development of narrative abilities, potentially serving as an alternative route to narrative competence for children with neurological vulnerabilities. By examining populations where typically unified developmental processes may become uncoupled, this research contributes to our understanding of how gestural abilities support complex language development and identifies potential intervention approaches that leverage children's natural compensatory strategies. The findings have implications for both theoretical models of the relationship between play, gesture, and narrative development, and practical approaches to supporting children with developmental vulnerabilities.

Keywords: pretend play, narrative, brain injury, typically developing, children, 3-6 years, representational gesture

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The relationship between play and child development has been extensively studied, with research documenting significant associations between play experiences and developmental outcomes. However, the specific mechanisms through which play supports development remain incompletely understood, particularly regarding how biological and environmental factors may moderate these relationships.

Of the numerous types of play, pretend play—in which children operate simultaneously in real and imagined contexts—emerges as particularly significant for cognitive, linguistic and social development (Lai et al., 2018; Nicolopoulou et al., 2014). Recent theoretical and empirical work suggests that pretend play may serve crucial functions in developing abstract thinking, narrative abilities, and emotion regulation (Gleason & White, 2023; Lillard, 2017). Pretend play involves multiple cognitive demands, including symbolic transformation, perspective-taking, and narrative construction. Each of these components may contribute differently to development, yet researchers have typically examined play as a unified construct rather than exploring its constituent elements (Lillard et al., 2013; Lillard, 2017).

The role of gesture in early language development provides unique insight into how different representational abilities might support complex language skills. Children typically begin using meaningful gestures between 9 and 12 months, before they produce words, and these early gestures predict subsequent language milestones (Goldin-Meadow, 2015a; Iverson & Goldin-Meadow, 2005). For instance, children's use of gesture-plus-word combinations (e.g., pointing to a cup while saying "drink") reliably predicts when they will begin producing two-word utterances. Additionally, recent research demonstrates that children's use of iconic gestures at age 5 predicts their ability to produce well-structured narratives in subsequent years (Demir, Levine, et al., 2015). This predictive relationship suggests that gesture may serve as a transitional device in language development, allowing children to practice expressing complex ideas through one modality before they can do so in another (Iverson & Goldin-Meadow, 2005; So et al., 2010).

Children with early unilateral brain injuries present a particularly informative case for understanding how gesture and play support development: while these children demonstrate remarkable plasticity in basic language functions, they show specific vulnerabilities in complex linguistic and cognitive tasks like narrative production (Demir et al., 2010, 2014; Demir, Rowe, et al., 2015). These children produce narratives that are quantitatively and qualitatively different from those of typically developing peers, characterized by shorter length, less diverse vocabulary, and reduced structural complexity (Demir et al., 2010). However, it remains unclear whether these differences reflect specific deficits in narrative construction, broader challenges in symbolic thinking, or difficulties integrating multiple cognitive processes.

Research on gesture and narrative development provides insight into potential mechanisms. When viewing stories presented with co-speech gestures by a narrator, children with brain injuries show enhanced narrative retelling abilities compared to stories presented without gesture (Demir et al., 2014). Similarly, these children show stronger benefits from gestural support in developing narrative skills compared to typically developing peers (Demir, Rowe, et al., 2015)). These findings suggest that gestural supports may differentially impact developmental mechanisms across populations.

This differential impact becomes particularly relevant when considering different types of gestures. While previous research has focused primarily on iconic gestures that depict actions, objects, or spatial relationships, less attention has been paid to the broad category of representational gestures which includes iconic gestures as well as metaphoric gestures that depict abstract concepts and demonstrative gestures that show how actions are performed (Cooperrider & Goldin-Meadow, 2017; Hostetter, 2011). Children with brain injuries often show particular sensitivity to gestures in narrative contexts, and the presence of gestures can significantly enhance their narrative performance (Demir et al., 2014). Distinguishing between representational gestures (iconic, metaphoric, and demonstrative gestures that depict content) and non-representational gestures (such as beat gestures that emphasize rhythm of speech, or conventional gestures like thumbs up) may provide new insights into the specific gestural

mechanisms that support narrative development.

Current Study

The complex relationship between gesture, play and narrative development is difficult to disentangle when studying typically developing children alone, as these processes often develop in tandem. However, examining populations where these pathways may become uncoupled provides unique insight into how gestural processes support complex language development. Children with early unilateral brain injuries present such an opportunity - their selective pattern of preserved basic language skills but impaired complex narrative abilities allows me to examine how different types of gesture might support narrative development. Pretend play provides an ideal context for this investigation, as it naturally elicits various forms of representational gesture through its decontextualized nature. Research has established that pretend play incorporates both narrative and gestural elements in ways that appear to scaffold the development of abstract thinking and symbolic representation (Gleason & White, 2023). The quality of pretend play, particularly children's ability to engage in elaborate sequences and object substitutions, predicts later semantic and narrative abilities (Stagnitti & Lewis, 2015).

Our research examines two key questions:

1. How do different types of gesture (representational vs. non-representational) manifest during pretend play in children with and without brain injury?
2. How do these early gestural patterns predict later narrative development?

Based on previous research, I hypothesized that the relationship between pretend play gestures and later narrative skill would differ between populations in theoretically meaningful ways. For children with brain injuries, I predicted character viewpoint gesture would play a particularly crucial role in supporting the development of complex narrative skills, potentially serving as a key compensatory mechanism for narrative development in this population. This prediction was supported by evidence that gesture can serve both diagnostic and facilitative functions in language development (Goldin-Meadow, 2015b).

Method

Participants

Participants are 20 typically developing (TD) children (12 girls, 8 boys) and 11 children with pre- or perinatal unilateral brain injury (PL) (8girls, 3 boys) who were part of a larger longitudinal study of language development in the greater Chicago area. All families were monolingual English-speaking. Recruitment for TD children involved advertisements and direct mailings to targeted zip codes, with the sample selected to represent the socioeconomic diversity of the major Midwestern city in which the study took place. The TD children (70% White, 10% Black, and 20% mixed race; 5% Hispanic,) were approximately 38 months at the first time of pretend play assessment and approximately 5 years old at the first time of narrative assessment. Parental education for TD children ranged from 12 to 18 years (M=16.12; SD= 1.76 and median annual household income was $42,000. Recruitment for children with PL involved pediatric neurologists and parent support groups in the same metropolitan area as TD children. Children with PL (100% White) were approximately 38 months at the first time of pretend play assessment and approximately 6 years old at the first time of narrative assessment. Parental education for children with PL ranged from 12 to 18 years (M=15.55; SD=1.75) and median annual household income was $87,500. Children with PL were grouped into two categories: those with cerebrovascular infarcts and those with periventricular lesions.[1] See Table 1 for further information on the neurological profiles of children with pre- or perinatal brain injury.

Procedure

Children were visited in their homes every 4 months between 14-58 months of age. At each home visit, researchers video recorded 90-minute sessions of spontaneous parent-child interactions during typical daily activities. Children were later visited in their schools every year between 5 and 8 years of age. At each school visit, researchers video recorded children

[1] Cerebrovascular infarcts were of the middle cerebral artery territory, and tended to affect the inferior frontal and/or superior temporal regions; whereas,periventricular lesions involve the thalamus, basal ganglia, the medial temporal lobe and/or white matter tracts.

Table 1

Neurological Profiles of Children with Pre- or Perinatal Brain Injury

ID	Hemisphere	Size	Type	Seizure	Areas affected	Premature
30	Left	Large	Cerebrovascular Infarct	No	Frontal, Temporal, Parietal, Occipital, Subcortical	No
35	Left	Medium	Periventricular	No	Subcortical	36.5 wk
46	Right	Large	Cerebrovascular Infarct	Yes	Frontal, Temporal, Parietal, Subcortical	34 wk
93	Right	Small	Periventricular	Yes	Subcortical	No
94	Right	Small	Periventricular	No	Temporal, Parietal, Internal Capsule, Subcortical	No
98	Left	Small	Cerebrovascular Infarct	Yes	Frontal, Temporal, Subcortical	No
99	Left	Large	Cerebrovascular Infarct	Yes	Temporal, Parietal, Occipital, Internal Capsule, Subcortical	No
117	Right	Medium	Cerebrovascular Infarct	Yes	Frontal, Temporal, Parietal, Subcortical	No
132	Left	Small	Periventricular	No	Temporal, Subcortical	No
135	Right	Small	Cerebrovascular Infarct	No*	Frontal, Parietal	No
150	Left	Small	Periventricular	No	White Matter, Subcortical	No

Note:

* Neonatal seizures resolved without medication.

performing a series of literary tests. The current analyses focus on two key time points: ages 30-50 months for analysis of spontaneous pretend play episodes during parent-child interaction, and ages 5-6 years for performance on structured narrative tasks. All home visit interactions were video recorded, transcribed, and coded with high interrater reliability for language (95% agreement on utterance transcription), gesture (88%, $\kappa = .76$), and pretend play (95.6%, $\kappa = 0.73$. All school visit interactions were video recorded, transcribed, and coded with substqntial reliability (ICC=0.76) for narrative structure, consistent with agreement scores in similar narrative studies (Jones & Pellegrini, 1996; McCabe et al., 2008). All discrepancies were resolved through discussion.

Measures

Pretend Play Coding

Children's spontaneous parent-child interactions were coded for pretend play using the Coding Manual for Decontextualized Language, developed by Demir, Rowe, et al. (2015), in which pretend play was defined as discourse during episodes of pretend interaction. Episodes

could include representing an object as something other than it is; attributing speech, actions, thoughts, or feelings to inanimate objects; assuming a role or alternate persona; and enacting novel scripts or telling an original story.

Gesture Coding

Children's gestures during both pretend play and narrative tasks were coded into two main categories: **representational gestures** (including iconic gestures that depict physical properties, metaphoric gestures that represent abstract concepts, and demonstration gestures that show how actions are performed) and **non-representational gestures** (including beat gestures that emphasize rhythm, deictic gestures that point to objects or locations, and conventional gestures that have culturally standardized forms and meanings).

Stein Story Stem Task & Narrative Scoring

Children's narrative abilities were assessed using the Stein narrative task, which presents children with story stems and asks them to create their own stories. Three stems were used: one about a fox living near a forest, another about a girl living near the ocean, and a third about a boy with many toys. The highest narrative score of all story stems was calculated for each annual visit. The highest three scores from the 3 Literacy visits (from ages 5-8) were then averaged to create the final narrative score for each child. Narrative scores refer to the level of narrative organization of a child's original story. Narrative organization at the global level is assessed using the model of story complexity by Stein, N. L. and Glenn, C. G. (1979), which defines a "good" story as one organized around a protagonist' goal-directed action. These narratives are built out of four organizing features: an animate protagonist, temporal structure, causal structure and goal-direction action. The presence of each successive feature in this list is contingent upon the presence of earlier features, and stories with more features are considered to be more complex than stories with fewer features. Based on analyses of these features, each child's story was placed into one of the following ten categories:

1. **No structure (NS) -** includes only one clause with or without a verb.

2. **Descriptive story (DS)** - includes a series of clauses that do not report actions constrained by temporality.
3. **Action story (AC)** - includes actions *with a temporal order*, but story events are not causally organized.
4. **Reactive story (RS)** - includes actions that are causally organized (events in one clause cause the actions in the following clause).
5. **Incomplete goal-based story (IGB)** - contains a goal statement, but no attempt or outcome following the goal.
6. **Incomplete goal-based with attempt (IGBA)** - contains a goal statement and attempt(s), but no outcome following the goal.
7. **Complete goal-based story with one episode implicit goal (GB1-IG)** - includes temporal and causal structure, as well as *implicitly*-stated goal of the protagonist, *one* series of attempts to achieve the goal, and an outcome of these attempts.
8. **Complete goal-based story with one episode explicit goal (GB1-IG)** - includes temporal and causal structure, as well as *explicitly*-stated goal of the protagonist, *one* series of attempts to achieve the goal, and an outcome of these attempts.
9. **Complete goal-based story with multiple episodes implicit goal (GBM-IG)** - includes *multiple* goal-attempt-outcome sequences and frequently more than one *implicitly*-stated goal.
10. **Complete goal-based story with multiple episodes explicit goal (GBM-EG)** - includes *multiple* goal-attempt-outcome sequences and frequently more than one *explicitly*-stated goal.

Plan of Analysis

To understand how pretend play gestures support narrative development in TD children versus children with PL, my analyses proceeded in two phases. the frequency and types of gestures (representational vs. non-representational) during pretend play at 38, 42, and 50 months. Next, I analyzed how early gesture use predicted later narrative skill (averaged between annual

measures from at around 5-6 years, with particular attention to whether these relationships are moderated by group status.

- Narrative ~ group + gest_utt_pp + utt_pp_hr + lg_score + group:fest_utt_pp + (1/subject)
  - for (1) ALL gest_pp, (2) Representational gest_pp
- AND/OR…. 1.classify children into those who use 1+ iconic/representational gesture and those who don't, and then use that as a binary (yes/no) predictor in your analysis rather than a numeric one (0–infinity)

2. consider whether it would be useful to use all gesture instead (e.g., you can look at whether representational gesture frequency and all gesture frequency are correlated, to reason about what you could learn indirectly about iconic gesture from measuring all gestures)

Results

Gesture Use During Pretend Play

Analyses of gesture production during pretend play at 59 months revealed differences between typically developing (TD) children and children with pre- or perinatal unilateral brain injury (PL), though these differences did not reach statistical significance (see Figure 1 . Children with brain injury produced more total gestures during pretend play episodes (M = 6.25, SD = 5.73) compared to TD children (M = 3.53, SD = 3.96), though this difference was not statistically significant, $F(1, 21) = 1.80$, $p = .194$, $\eta^2 = .079$. This medium effect size suggests that approximately 8% of the variance in total gesture production is explained by group status.

In contrast to the pattern observed for total gestures, TD children produced more representational gestures (M = 0.53, SD = 0.83) than children with PL (M = 0.25, SD = 0.71), $F(1, 21) = 0.665$, $p = .424$, $\eta^2 = .031$. Similarly, TD children produced slightly more iconic gestures (M = 0.40, SD = 0.83) than children with PL (M = 0.25, SD = 0.71), $F(1, 21) = 0.188$, p

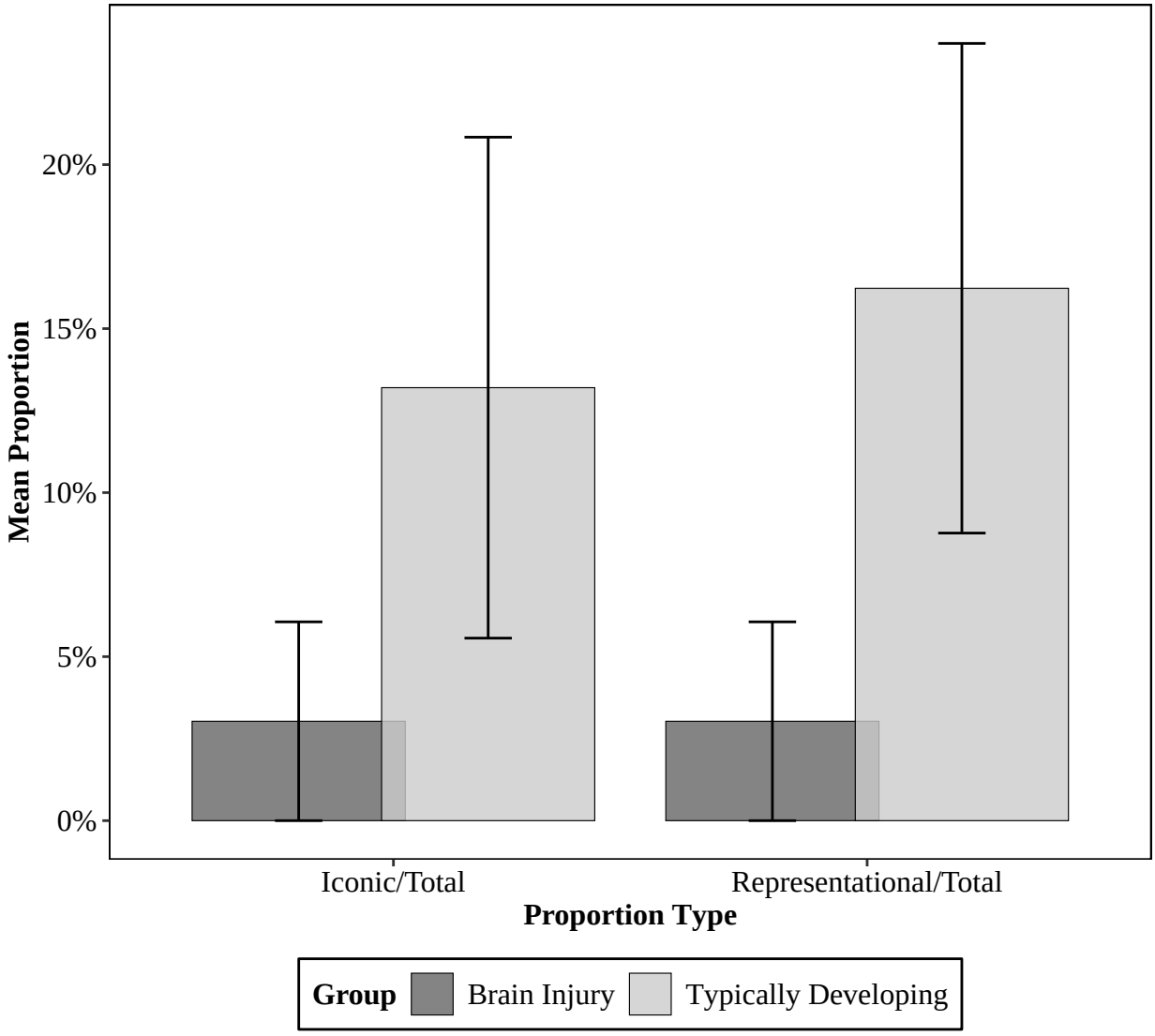
= .669, η^2 = .009. Neither of these differences reached statistical significance, and the effect sizes were small to negligible.

When examining the proportion of gestures that were representational, TD children had a higher proportion (*M* = 16%, *SD* = 25%) compared to children with *PL* (M = 3%, SD = 7%), *F*(1, 15) = 1.585, *p* = .227, η^2 = .096. Similarly, TD children had a higher proportion of iconic gestures (*M* = 13%, *SD* = 25%) compared to children with PL (*M* = 3%, *SD* = 7%), *F*(1, 15) = 0.900, *p* = .358, η^2 = .057. These findings indicate that while children with PL may gesture more overall, a smaller proportion of these gestures serve representational functions.

The lack of statistical significance despite medium effect sizes for total gestures and proportion of representational gestures likely reflects the small sample sizes (PL: *n* = 8; TD: *n* = 15) and substantial within-group variability, particularly in the PL group. The standard deviation for total gestures in the PL group (*SD* = 5.73) approached the magnitude of the mean (*M* = 6.25), indicating considerable individual differences in gesture production among children with early brain injury.

Figure 1

Proportion of Gesture Types During Pretend Play by Group



Fig−cap: Proportion of representational and iconic gestures during pretend play by group (TD or PL).

Pretend Play Behaviors as Predictors of Narrative Development

Discussion

This study examined how different types of gesture during pretend play support narrative development in children with and without early unilateral brain injury. By analyzing representational gestures (iconic, metaphoric, and demonstrative) versus non-representational gestures during naturalistic play at age 59 months, and relating these to narrative abilities at ages 5-6 years, I aim to delineate specific developmental pathways that may be more adaptive for

children with early brain injury. …….. I expect to find that children with brain injuries may demonstrate particularly strong use of representational gestures during pretend play, potentially reflecting early emergence of compensatory mechanisms. Such a finding would suggest that these children may naturally adopt strategies that support their narrative development, even before formal narrative skills emerge. Of particular interest is whether early representational gesture use predicts better narrative outcomes specifically for children with brain injuries. Previous research shows enhanced benefits of gesture for this population in narrative contexts (Demir et al., 2014), but it remains unclear whether this reflects a compensatory developmental pathway or simply greater reliance on preserved abilities. My longitudinal design allows me to examine whether stronger early representational gesture use predicts better narrative outcomes specifically for children with brain injuries, which would support the compensatory pathway hypothesis. These findings will contribute to both theoretical understanding of how gestural abilities support complex language development and practical approaches to supporting children with developmental vulnerabilities. By examining populations where typically unified developmental processes may become uncoupled, we can better understand the mechanisms through which play supports development and potentially identify targeted intervention approaches that leverage children's natural compensatory strategies.

Limitations

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