

RESEARCH INQUIRY - REVISITING CUED LANGUAGE STRUCTURE

Cueing Coordination and Architectural Analysis

Prepared by Cued Language Lab - Cue Cognatio, LLC | Working Discussion Draft

POSITION: Cueing coordination provides a common framework for examining how visible features convey language over time. The established bipartite account of consonant and vowel identification and a proposed tripartite account of the larger segmental event may address different levels of that process. Their comparison must distinguish feature presence, contrastive relevance, production timing, and perception. Tonal adaptations require language-specific features. The value of the broader account depends on testable predictions.

Purpose and scope

As part of Cue Cognatio's ecosystem-wide review of Cued Speech and cued languages, Cued Language Lab (CLL) is taking a direct look at cued language structure and its relationship to language development and literacy. The purpose is to define more clearly what cueing makes available to a child, how cued language is produced and perceived, and what practitioners must understand before claiming competence in its use.

In the Cued American English pattern examined here, handshape, hand placement, and mouth formation are three central visible articulatory resources. In a cued language, those resources convey language-specific distinctions. Fleetwood and Metzger's work is foundational here. They describe consonants through a relevant handshape–mouth formation pairing and vowels through a relevant placement–mouth formation pairing. Their research with deaf native cuers provides evidence that linguistic information can be identified from cued messages visually, without acoustic speech being necessary to the message.

Cue Cognatio proposes examining a tripartite account of the segmental cued event: handshape, placement, and mouth formation are three distinct, coordinated dimensions of a visible linguistic signal. This proposal concerns their organization over time. It does not require all three dimensions to distinguish every phoneme at the same instant, and it is not an exhaustive inventory of features across cued languages. Counting three visible dimensions does not make cued language dependent on the acoustic properties of speech.

The structural question

A bipartite analysis identifies the visible pairing relevant to a consonant or vowel. A tripartite account asks whether describing the larger segmental cued event across three dimensions adds explanatory value. It may help describe transitions, timing, and how information from the hand and mouth becomes available during an unfolding message. Those possibilities require testing.

The distinction between coordinated and simultaneously distinctive features matters. Handshape, placement, and mouth formation participate in a cued sequence, but a consonant and vowel need not be represented as one indivisible phoneme. A useful model must account for their temporal organization and for units outside a simple consonant–vowel pair, including isolated consonants and vowels. Any proposed null or neutral feature value must be defined and tested rather than assumed.

Linguistic theories of distinctive features and nonlinear phonology provide tools for describing how features can be organized and coordinated over time. They do not establish, on their own, how cuers perceive these particular visual features.

Cueing coordination: a comparative thought exercise

Cueing coordination is the primary theme of this inquiry: how visible features are organized over time to convey linguistic distinctions. The bipartite account concerns the pairings that identify consonants and vowels; the proposed tripartite account concerns coordination across a larger event. These levels may be compatible. The following comparison tests whether the broader account adds explanatory value. Challenges and tests are proposed here; they are not attributed to Fleetwood and Metzger as their stated positions.

Bipartite account	Tripartite coordination proposal	Challenge and evidence needed
Unit of analysis: identifies consonants and vowels through their relevant manual–mouth pairing.	Examines handshape, placement, and mouth formation across a larger segmental event.	Define the event and its boundaries. Comparing phonemes with syllables alone does not establish competing explanations.
Feature relevance: the pairing that distinguishes the current segment matters.	Tracks all three visible features, including transitions.	Physical presence does not establish contrastive relevance. Vary one feature while holding the others constant.
Production and perception: symbol description need not specify the receiver's processing architecture.	Proposes studying how coordinated production relates to reception.	Motor coordination does not prove a three-part mental representation. Measure perception separately.

Timing: relevant pairings can occur within an unfolding sequence.	Models three feature trajectories and their relationships over time.	Strict simultaneity is vulnerable to manual anticipation. Test timing windows and avoid a frozen three-coordinate model.
Context: a feature can inform the next segment without distinguishing the current one.	May capture anticipatory information across the event.	Separate current-segment identification from prediction of the next segment. An anticipation effect may fit both accounts.
Isolated units: identify the relevant pairing for a consonant or vowel.	Retains three coordinates, potentially assigning a neutral or null value.	A zero value may preserve the model by definition. Specify what it means and test whether receivers use that coordinate.
Tone: consonant–vowel pairing alone is not a complete cross-language description.	Extends coordination to language-specific tonal features.	Hand inclination, movement, or nonmanual tone features challenge a universal count. Specify the adaptation and tone-bearing unit.
Explanatory value: offers an account of visible symbol identification.	May offer a broader description of cueing coordination.	Require a distinct prediction. If both accounts predict the same outcome, coordination is a useful extension rather than a demonstrated replacement.

Working interpretation: The strongest objection is that three visible features do not, by themselves, establish a three-part linguistic unit or perceptual architecture. “Dimension” must specify an observable feature, a contrastive property, or a processing component. Spoken place, manner, and voicing do not establish a universal three-component requirement for language.

A discriminating test could examine whether varying placement changes consonant identification before vowel information is available. Both accounts must state their predictions in advance and distinguish identification from anticipation. An observed effect would not automatically favor the tripartite proposal. If their predictions coincide, cueing coordination may remain a useful descriptive extension; a claim of replacement would require additional evidence.

Tone and language-specific features

A tonal language tests the limits of treating three features as a universal inventory. Accounts of cued Thai describe hand inclination and movement indicating lexical tone alongside the handshape and placement used for segmental contrasts. A proposed cued Mandarin system uses head movements for tone instead. The visible feature chosen for tone therefore belongs to the design and linguistic structure of a particular adaptation; it cannot be inferred from cued American English alone.

The working model should represent tone on a language-specific tier associated with its tone-bearing unit, such as a syllable, and ask how its visible realization aligns with segmental cueing. Hand angle may be an additional contrastive parameter in one adaptation, while movement or a nonmanual feature may serve in another. Calling every cued language quadripartite would mistake one implementation for a universal structure. The proposed three-feature account remains a bounded analysis of segmental coordination, with additional features specified when a language requires them.

A visual language lived across generations

The case for cued language as a visual language rests on what people communicate and acquire through its visible form, not on whether an analyst counts two or three features. Research with deaf native cuers shows why the visible message must be studied on its own terms. Cued phonology also exists within a wider language: words, grammar, meaning, and interaction matter.

Families are part of that linguistic picture. Deaf and hearing cuers use cued language in everyday relationships, and some families pass cueing practices, communication expectations, and what they regard as their “cue values” to the next generation. Their experiences call for research that includes native and early cuers, family interaction, and expressive as well as receptive language. Individual family accounts are valuable evidence of lived practice; systematic study is needed to determine which patterns extend across families.

Language development and literacy

Cue Cognatio’s broader review asks how sustained access to a cued language supports language development and how that development relates to reading and writing. The structural model is one part of that inquiry. Access to visible phonological distinctions should be studied alongside meaningful conversation, vocabulary, morphology, syntax, and print, with attention to when and how cueing is available across home, education, and community settings.

Evidence that a language can be received visually does not mean every child has consistent access to it. It also does not establish that one literacy approach works equally well for every learner. Research should distinguish the capabilities of the system from the quality, timing, and continuity of the language access a child actually receives.

Perception and conversation: research since the late 1990s

Research on speech and language processing expands the structural inquiry from individual contrasts to continuous recognition, prediction, and interaction. Three levels should be distinguished: the physical signal, the linguistic information recognized by a perceiver, and the meaning constructed during conversation. Evidence about one level does not automatically establish the units or mechanisms of another.

Distributed processing: Hickok and Poeppel (2007) describe a dual-stream architecture supporting sound-to-meaning and sound-to-articulation mappings. Mesgarani et al. (2014) found cortical selectivity for phonetic features during sentence listening. These findings support examining multiple levels of representation; they do not imply that every phoneme has one discrete brain location or that three articulatory dimensions require three perceptual components.

Visual information and prediction: Van Wassenhove et al. (2005) found that visual speech accelerated neural processing of auditory speech. Donhauser and Baillet (2020) identified distinct neural timescales for predictive speech processing. These auditory and audiovisual findings motivate questions about timing and context in cueing, but their mechanisms cannot simply be transferred to visual cued language.

Direct evidence from Deaf cuers: Aparicio et al. (2017) compared visually presented cued words in Deaf early users of cued French with audiovisual words in hearing participants. They found overlapping language-related activation alongside modality-related differences. Manual cues produced greater overlap with full cueing activation than lipreading alone did. The findings support studying cueing as an integrated route to linguistic information and question a universally mouth-primary account of reception.

Sentence-level research: Sarré and Cohen (2025) compared prelingually Deaf cuers, hearing cuers, and hearing noncuers. Their analyses identified mouth–hand integration in a temporal language-related region in Deaf cuers and a movement-related region in hearing cuers. Responses to isolated gestures in Deaf participants also implicated a region associated with the interface between vision and language during reading. These patterns suggest that expertise and language experience matter. They do not establish that cueing is reading or resolve the bipartite–tripartite comparison. Age of exposure, hearing status, proficiency, and receptive versus expressive experience must be considered.

Conversational coordination: Levinson and Torreira (2015) describe rapid turn transitions that require participants to begin planning before the preceding turn ends. Goldstein et al. (2025) modeled neural activity across 100 hours of natural conversation in four patients with intracranial recordings. Contextual computational representations outperformed the symbolic models they tested. This offers methods for studying continuous processing; it does not show that the brain is identical to the computational model or that phonemic categories are dispensable.

Working implication: Cueing coordination should be investigated across unfolding messages, including anticipation, turn completion, clarification, and repair. Isolated-word and sentence-viewing experiments provide important evidence, but do not capture spontaneous interaction between native cuers. Neuroimaging alone cannot determine the minimal contrastive unit, establish a three-part perceptual architecture, or demonstrate effects on literacy. Behavioral and developmental evidence remain necessary.

Leybaert's research: visual phonology, experience, and literacy

Leybaert's work provides behavioral and developmental evidence for this inquiry alongside neuroimaging research. It supports distinguishing the information that identifies a segment from the representations used in memory and literacy. The findings motivate coordination research without establishing a particular bipartite or tripartite architecture.

Silent cueing and memory: Leybaert and Lechat (2001) found reduced serial-order recall in Deaf participants for cued word lists sharing mouth-shape similarity, hand-placement similarity, or both. Hearing cue producers did not show the same hand-placement effect. This supports asking which visual properties affect memory and how linguistic experience shapes their use. A placement effect on

recall does not demonstrate that placement identifies the current consonant. Its implication for CLL is to define relevance by task, time, and perceiver.

Visual phonology and spelling: Leybaert (2000) found that children exposed early and intensively to cueing at home produced more phonologically accurate spellings than children exposed later and only at school. Colin, Magnan, Ecalle, and Leybaert (2007) found that prereading phonological skills predicted written-word recognition the following year in Deaf and hearing participants. These findings support measuring access history and following development longitudinally. They do not isolate cueing from all differences in language experience or prove causation. Home exposure also does not directly establish intergenerational transmission of cue values.

Integration under conflicting signals: Bayard, Colin, and Leybaert (2014) found that manual cues changed perception when auditory and mouth information conflicted, with different response patterns in Deaf and hearing cuers. Their study did not resolve whether integration occurred early or late; auditory status and auditory ability were confounded in the small Deaf sample. Its auditory, labial, and manual sources are different from this inquiry's handshake, placement, and mouth-formation dimensions. Three information sources therefore do not prove our tripartite proposal.

Time-sensitive neural evidence: Jirschik Caron et al. (2023) studied typically hearing participants who were either unfamiliar with cueing or experienced cue producers. Adding manual cues to mouth information increased effects in the early N1 response window, but did not enhance P2 amplitude attenuation. This motivates examining processing over time while keeping the population limitation explicit: the study does not establish processing in Deaf native receivers.

Recent recognition research: Jirschik Caron et al. (2025) compared 31 adults with hearing loss proficient in cue reception with 52 typically hearing adults, including interpreters and noncuers. Combined mouth and manual information produced optimal recognition for participants with hearing loss across auditory-ability groups; patterns differed in typically hearing participants. CLL should measure receptive proficiency, auditory ability, and testing conditions separately rather than assume that production experience establishes equivalent reception.

Developmental synthesis: Leybaert, Aparicio, and Alegria's handbook chapter, published online in 2012 in a volume with a 2011 print edition, connects perception, memory, phonological development, and literacy. It provides a broader foundation for selecting research questions. Its definitions should be reported faithfully, and its synthesis should not be treated as direct evidence resolving this inquiry's structural comparison.

Terminology and public recognition

The linguistic scope of cueing and the public recognition of its name are related but distinct questions. Cue Cognatio's proposed communication approach is to retain Cued Speech as the established name for the "motor function" while using cued language to describe visual linguistic communication in everyday life. This is an editorial recommendation, not a conclusion established by neuroscience. Studies use different definitions, which should be reported faithfully rather than treated as agreement on language status.

A terminology discussion should ask what parents, Deaf cuers, educators, and clinicians understand by each term, whether they can locate resources, and whether the wording accurately communicates visual access and family language use. A comprehension and discoverability study would address the name-recognition problem separately from perceptual experiments.

A research agenda

The following framework is proposed for Cued Language Lab discussions. Its immediate outcome should be a bounded research question and a reviewable pilot concept. A meeting may conclude that the accounts are compatible, that definitions remain unresolved, or that a proposed test cannot distinguish them.

Discussion prompts informed by Leybaert's research

- Does a feature affect immediate recognition, later recall, or both?
- How will receptive expertise be measured independently of cue-production skill?
- Which developmental outcomes require longitudinal evidence beyond adult perception experiments?

Define the unit and the claim

Agree on working definitions of feature, phoneme, syllable, cuem, cueing event, and coordination. Accept cuem as established terminology, using Fleetwood and Metzger's definition as the starting point. Identify events or processes that require additional description, such as transitions, anticipatory movements, tone marking, and conversational coordination. Define any proposed term explicitly and explain its relationship to cuem. Distinguish a feature's physical presence, current-segment identifying value, anticipatory information, and perceptual influence. Output: a shared glossary distinguishing established terms from proposed descriptions, and an explicit statement of what each account explains.

Specify competing predictions

For one selected contrast, have proponents of both accounts state what a receiver should recognize at successive points in the signal. Clarify whether a null value means no current contrastive role or no perceptual influence. Specify an observation that would challenge each account and one that would fit both. Output: a prediction comparison and agreed criteria for interpreting results.

Select a feasible perception pilot

Consider temporal gating, selective masking, or controlled timing shifts of handshape, placement, and mouth information. Measure accuracy, response time, and error patterns; check that manipulated stimuli remain interpretable and do not introduce unintended contrasts. Separate current identification from next-segment prediction. Record language, age and continuity of exposure, receptive proficiency, cue-production skill, and auditory ability separately. Where feasible, compare immediate recognition with delayed or serial-order recall using matched materials; do not infer one task's processing requirements from the other. Include quiet and noise conditions only when the selected question concerns auditory access. Output: a pilot protocol with outcomes, confounds, analysis plan, and a sample rationale.

Connect the pilot to conversation and tone

Discuss how findings could be examined in natural cued interaction through gaze, feature trajectories, turn boundaries, anticipation, and repair. For a tonal adaptation, document the actual tone feature, its tone-bearing unit, and timing; distinguish lexical tone from turn-marking prosody. Output: an annotation proposal and a decision about whether conversational or cross-language work is feasible next.

Build the developmental and family pathway

Define later questions about children's receptive and expressive phonology, vocabulary, grammar, and family transmission of cueing practices and cue values. Specify literacy outcomes separately, such as phonological awareness, decoding, comprehension, or writing. Measure phonological skills before reading instruction and follow literacy outcomes longitudinally. Document home and school exposure, access continuity, instruction, and other language experience before attributing outcomes to structure. Keep family transmission of cue values as a distinct question; the cited home-exposure studies do not establish that transmission. Output: a developmental study concept; adult perception findings alone do not establish child or literacy effects.

Agree on the next action and review point

Close by recording the selected question, unresolved disagreements, responsible lead, needed expertise, next deliverable, and review point. Prioritize a literature and methods review before recruitment. Research involving participants or identifiable family recordings requires an appropriate ethics and privacy review before collection. Share the interpretation with contributors for correction before external release. Output: a decision record distinguishing agreed findings, hypotheses, and communication choices.

Whether the tripartite proposal improves explanation remains empirical. If predictions coincide, retain coordination as a useful descriptive extension. If a pilot produces a distinct, replicable result, refine both accounts before scaling. The broader program should connect production, perception, acquisition, family transmission, and literacy without assuming that one result settles them all.

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About Cued Language Lab

Cued Language Lab (CLL) is the private research arm of Cue Cognatio, LLC. It examines cued language through linguistic inquiry, critical discussion, and the experiences of cuers and families, with particular attention to language development and literacy. CLL develops position papers, research questions, and study concepts to connect foundational theory with applications in education, speech-language pathology, and audiology. Its working papers distinguish established evidence from proposals and invite informed critique. This paper is a CLL discussion product within Cue Cognatio's broader ecosystem-wide review of Cued Speech and cued languages.

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