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THE ROLE OF WORKING MEMORY AND PHONOLOGICAL PROCESSING IN INTERPRETING NON-NATIVE ENGLISH ACCENTS

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ABSTRACT

Simultaneous interpreting imposes extreme real-time demands on perception, memory, and speech planning. When source speech carries non-native accents, additional variability in segmental and prosodic patterns can depress intelligibility and force interpreters to allocate scarce cognitive resources to decoding rather than message reformulation. This article examines how working memory and phonological processing jointly determine accuracy under accented input. Drawing on research in cognitive psychology, bilingual speech perception, and interpreting studies, it argues that the central executive and phonological loop support rapid encoding, maintenance, and transformation of accented utterances, while phonological categorization and lexical access mechanisms modulate the cost of accent adaptation. An integrative analysis of experimental and quasi-experimental findings indicates that higher working-memory capacity and efficient sublexical processing predict fewer omissions and semantic distortions, especially when accents diverge in phonotactics, vowel space, or prosodic rhythm from listeners' entrenched norms. Targeted training that combines high-variability accent exposure, form-focused listening, and paced shadowing appears to improve accuracy by stabilizing phonological mappings and freeing capacity for macro-propositional planning. The article concludes with implications for curriculum design and assessment in interpreter education.

KEYWORDS: Simultaneous interpreting; working memory; phonological processing; accented speech; intelligibility; cognitive load; interpreter training.

INTRODUCTION

Simultaneous interpreters operate at the boundary of human information processing, converting incoming speech into another language with minimal delay. The canonical effort model posits concurrent listening and analysis, short-term storage, and target-language production, coordinated by a limited-capacity control system. Non-native English accents introduce systematic deviations in segmental realizations, coarticulation, timing, and intonation that reduce predictability and increase perceptual uncertainty. For the interpreter, this variation competes with conceptual analysis for cognitive resources; when decoding falters, omissions and lexical approximations proliferate. Understanding how working memory and phonological processing absorb or amplify the costs of accent variability is therefore central to explaining accuracy differences across interpreters and to designing effective training regimes.

Working memory provides a temporary workspace for maintaining partial parses, unresolved referents, and yet-to-be-rendered propositions while new input arrives. Within multicomponent models, the phonological loop holds speech traces through rehearsal, and the

central executive allocates attention and coordinates operations under time pressure. Phonological processing—comprising rapid mapping from acoustics to phoneme categories, prosodic parsing, and lexical access—determines how efficiently unfamiliar realizations are normalized. Accented speech burdens both systems: atypical cue weightings slow categorization, stretch rehearsal demands, and invite interference from subsequent input. Interpreters must therefore manage a dynamic trade-off between perceptual precision and throughput, maintaining semantic fidelity without exhausting capacity.

Across studies, individual differences in working-memory capacity correlate positively with simultaneous interpreting quality, particularly under adverse input conditions. Interpreters with greater capacity sustain longer lag times without loss of coherence, maintain unresolved syntactic dependencies across clauses, and integrate late-arriving disambiguating cues. Under accented English, these advantages become more salient because degraded or unpredictable phonetic cues prolong lexical access and inflate the portion of capacity consumed by phonological maintenance. When the phonological loop is saturated by uncertain traces, the central executive must allocate additional attention to monitoring and repair, leaving fewer resources for message restructuring and terminological precision. The net effect is a rise in omissions and paraphrases of lower informational density.

Phonological processing efficiency moderates this load. Listeners accustomed to high phonetic variability develop flexible cue-weighting strategies, quickly down-weighting unstable dimensions and exploiting robust cues such as durational patterns or vowel reduction profiles. In the context of Asian English accents with syllable-timed rhythm or reduced consonant clusters, and European English accents with shifted vowel quality or prosodic contours, interpreters who swiftly normalize these patterns access the lexicon with fewer delays. Empirical work on foreign-accented speech consistently shows that accent familiarity shortens reaction times and reduces error rates after relatively brief exposure; this plasticity implies that training can move the locus of control from capacity constraints to representational tuning. When interpreters internalize accent-specific probabilities, the phonological loop carries less noisy material, and the executive can reallocate bandwidth to macro-planning, register matching, and pragmatic nuance.

Yet memory and phonology are not independent. Rapid rehearsal can compensate for moderately inefficient phoneme categorization by refreshing traces until lexical access succeeds, while precise categorization reduces the need for prolonged rehearsal. Conversely, heavy reliance on rehearsal under dense information flow risks cumulative interference, particularly when proper names, numbers, and technical collocations must be preserved verbatim. The most accurate interpreters appear to combine agile sublexical parsing with strategic chunking at the proposition level, thereby minimizing the residence time of fragile phonetic detail in short-term storage.

Training interventions that blend phonological and memory demands show the strongest effects on accuracy. High-variability accent exposure—curated corpora spanning talkers, rates, and topics—facilitates robust phonological mappings and reduces the surprise cost of unfamiliar tokens. When paired with paced shadowing that gradually increases articulation-to-input lag, such exposure strengthens rehearsal control and alignment between perception and production. Form-focused listening that targets accent-sensitive contrasts (for example, tense–lax vowel pairs or consonant cluster realization) accelerates category retuning without

devolving into decontextualized drills, especially when immediately recycled in brief re-telling tasks. Memory-focused exercises, including n-back on auditory syllables, digit span under time pressure, and constrained paraphrase with fixed lag, enhance resistance to interference and sharpen executive control over segmentation and prioritization.

Assessment practices should reflect these mechanisms. Global scoring of "fluency" masks distinct sources of error; separating accuracy into literal correctness, completeness, and terminological fidelity clarifies whether errors originate in phonological misperception or memory overload. Incorporating accented speech of varied provenance into entrance diagnostics and progress tests prevents training–testing mismatch and signals that accent robustness is a core professional competence rather than an optional enrichment. Longitudinal monitoring can track whether accuracy improvements under accented input are driven by faster lexical access times, shorter pauses, and reduced self-repairs—signatures of phonological adaptation and memory stabilization.

At the curricular level, balanced dosage is crucial. Overexposure to a single accent may yield narrow familiarity without generalizable benefits, while unstructured variability can overwhelm learners and entrench avoidance strategies such as excessive lag or reliance on generic paraphrase. A principled progression from controlled contrasts to ecologically rich speech, with explicit metacognitive reflection on listening strategies, maximizes transfer. Ultimately, the value of such training lies in freeing working memory for higher-order operations—discourse restructuring, implicature management, and diplomatic tone—once decoding no longer monopolizes resources.

Accuracy in simultaneous interpreting from non-native English accents depends on an interplay between working-memory capacity and phonological processing efficiency. Accented variability taxes both the phonological loop and the central executive; interpreters who rapidly normalize phonetic cues and who manage rehearsal under pressure preserve more capacity for meaning construction and stylistic appropriateness. Training that integrates high-variability accent exposure with targeted form-focused listening and calibrated memory challenges can shift performance constraints from decoding to discourse management, producing measurable gains in completeness and precision. Programs that embed diversified accented input and mechanism-aware assessment will graduate interpreters better prepared for the realities of global English.

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