PHONOSEMANTIC UNIVERSALS IN L2 VOCABULARY ACQUISITION: EMPIRICAL EVIDENCE FROM THE ODAM TILI FRAMEWORK AND IMPLICATIONS FOR SECOND LANGUAGE TEACHING

Mahmudjon Kuchkarov
Language Academy 'Odam Tili' | Esta Florida Tennis Academy, Orlando, FL, USA
Email: odamtili@academy.com

Abstract

Second language (L2) vocabulary acquisition has long been treated as a process of arbitrary form-meaning mapping, following the Saussurean principle of the arbitrariness of the linguistic sign. This article challenges that assumption by presenting empirical and cross-linguistic evidence from the Odam Tili (Human Language) theory developed by Dr. Mahmudjon Kuchkarov. Drawing on a longitudinal multi-site experimental dataset collected from 26 volunteers of diverse racial, gender, and age backgrounds across three phases — Fergana, Uzbekistan (2003); New York, USA (2011); and Orlando, Florida, USA (2017) — and applying a phono-signosemantic analytical framework, the study demonstrates that specific phonemes emerge systematically under defined biomechanical and environmental stimuli: /h/ as an index of physical load and hand agency (76% consistency across sites); /a/ as the universal phoneme of pain, distress, and biological origin; /o/ as the phoneme of long-distance projection (18% predominance over /a/ in competitive shouting trials); /t/ as the index of large-object impact (81%); /tʃ/ as the index of small-object impact (78%); and /s/-/ʃ/ as sibilant indices of smooth, sliding movement (63%/37% in snake-association surveys). Cross-linguistic analysis demonstrates that these phonosemantic mappings are preserved in the lexicons of typologically distinct languages — including English, Uzbek, Russian, Hebrew, and Arabic — and in the visual forms and sequencing of major world writing systems. The article argues that these findings have direct and significant implications for L2 vocabulary teaching, phonological awareness instruction, cross-linguistic transfer facilitation, and the design of phonosemantically-informed L2 curricula, particularly for Eurasian learners of English.

Keywords: phono-signosemantic framework; L2 vocabulary acquisition; sound symbolism; phonosemantic universals; Odam Tili theory; cross-linguistic transfer; L2 teaching methodology; SIGN–PHONE–SENSE; phonological awareness; Eurasian EFL context

1. Introduction

Vocabulary acquisition represents one of the most demanding cognitive challenges in second language learning. Despite decades of research into effective instructional strategies — including spaced repetition, keyword mnemonics, contextual inference, and deliberate learning — learners continue to find arbitrary form-meaning mapping a persistent obstacle (Nation, 2001; Schmitt, 2010). The dominant theoretical assumption underlying most vocabulary instruction is Saussurean: that the relationship between a word's phonological form and its meaning is arbitrary, established by convention rather than by any natural or necessary connection.

This assumption, however, is increasingly challenged by a body of experimental, cross-linguistic, and cognitive research demonstrating that sound-meaning relationships in human language are, at least in part, systematically motivated (Hinton, Nichols, & Ohala, 1994; Dingemanse et al., 2015; Perniss & Vigliocco, 2014). If phonosemantic patterns are real, universal, and cognitively accessible, then they represent an underexploited resource for L2 instruction: a bridge between the learner's existing cognitive-phonological knowledge and the target language lexicon.

The *Odam Tili* (Human Language) theory, developed by Dr. Mahmudjon Kuchkarov over more than two decades of experimental and cross-linguistic research, proposes a systematic framework — the **SIGN–PHONE–SENSE** triadic model — for identifying, describing, and applying these phonosemantic patterns. The present article presents the empirical foundations of this framework, reports the key findings of a longitudinal multi-site experimental study (2003–2017), and argues that these findings have direct, actionable implications for L2 vocabulary instruction, cross-linguistic transfer facilitation, and curriculum design — particularly for Eurasian learners of English as a foreign language.

The remainder of the article is organized as follows. Section 2 reviews the relevant literature on sound symbolism, phonosemantics, and their implications for L2 learning. Section 3 presents the methodology of the empirical study. Section 4 reports the findings organized by phoneme. Section 5 extends the analysis to cross-linguistic lexical evidence. Section 6 discusses pedagogical implications for L2 teaching. Section 7 addresses limitations and future research directions. Section 8 concludes.

2. Literature Review

2.1 Arbitrariness, Sound Symbolism, and the L2 Lexicon

Saussure's (1916) principle of arbitrariness has shaped the theory and practice of language teaching for over a century. If form-meaning relationships are arbitrary, then vocabulary instruction must rely on rote memorization, contextual exposure, and mnemonic strategies — all of which place significant demands on learner memory and motivation. Nation (2001) estimates that incidental acquisition of a single word requires approximately 10–15 meaningful encounters, underscoring the cognitive cost of arbitrary form-meaning learning.

However, a substantial body of research has documented systematic, non-arbitrary form-meaning relationships in natural language. Köhler's (1929) original bouba/kiki demonstration established that phonological shape and visual form are not independently processed: speakers of unrelated languages consistently associate rounded sounds with round shapes and sharp sounds with angular shapes. This phenomenon — sound symbolism — has since been replicated cross-culturally with high consistency (Ramachandran & Hubbard, 2001; Nielsen & Rendall, 2011; Cwiek et al., 2022).

At the lexical level, Blasi et al. (2016) analyzed a database of 4,298 languages and found statistically significant, non-chance associations between specific phonemes and specific meanings across language families. Words for body parts, motion, and environmental categories showed consistent phonological patterning that cannot be explained by common descent or borrowing. Dingemanse et al. (2015) synthesized this evidence into a theoretical framework distinguishing arbitrariness, iconicity, and systematicity as three co-existing principles in the lexicon.

2.2 Phonosemantics and L2 Vocabulary Learning

The implications of sound symbolism research for L2 vocabulary instruction have received growing attention. Parault and Schwanenflugel (2006) found that phonosemantically transparent words were learned more rapidly by child L2 learners. Kantartzis et al. (2011) demonstrated that Japanese ideophones — highly phonosemantic lexical items — facilitated associative learning compared to arbitrary controls. Nygaard et al. (2009) showed that sound-symbolic congruence between phonological form and referent meaning enhanced memory for new word-meaning pairs.

These findings suggest a theoretically principled and empirically supported rationale for phonosemantic-informed L2 vocabulary instruction: if learners can access and leverage the phonosemantic properties of target language words, the cognitive load of form-meaning mapping may be substantially reduced. The Odam Tili framework, with its systematic, cross-linguistically grounded phonosemantic mappings, offers a comprehensive theoretical basis for such instruction.

2.3 The SIGN–PHONE–SENSE Triadic Model

The phono-signosemantic framework proposed in Odam Tili theory (Kuchkarov, Kuchkarov, & Sobirjonova, 2026) extends classical phonosemantic analysis through the **SIGN–PHONE–SENSE** triadic model. This model proposes that the earliest human communicative signals were not arbitrary conventions but were co-shaped by three mutually reinforcing dimensions:

- **SIGN:** the visual or gestural form associated with the referent (e.g., the sinuous visual form of a snake, encoded in the letter S/C; the human figure encoded in the letter A);

- **PHONE:** the acoustic pattern produced by human vocal organs in interaction with the referent or its environmental context (e.g., /h/ produced involuntarily under physical load; sibilant /s/ produced in response to the snake's hiss);
- **SENSE:** the primary meaning that emerged from the integration of sign and phone, which was subsequently encoded and preserved in the lexicon across generations.

This triadic model is consistent with multimodal accounts of language origin (Perniss & Vigliocco, 2014; Corballis, 2002) and extends them by providing specific, testable phoneme-level predictions about the phonological structure of natural language lexicons. Crucially for the applied linguistics context, the model also generates predictions about cross-linguistic transfer: if phonosemantic mappings are biologically grounded, they should facilitate L2 acquisition for learners whose L1 preserves the same mappings — a prediction that the cross-linguistic evidence reviewed in Section 5 supports.

2.4 Cross-Linguistic Transfer and Phonosemantic Facilitation

Cross-linguistic transfer — the influence of L1 knowledge on L2 learning — is one of the most extensively documented phenomena in second language acquisition research (Odlin, 1989; Jarvis & Pavlenko, 2007). Transfer is typically discussed in terms of phonological, lexical, syntactic, or pragmatic interference or facilitation. Phonosemantic transfer — the facilitative effect of shared phonosemantic patterns between L1 and L2 — has received comparatively little attention, yet represents a potentially powerful instructional lever.

For Eurasian learners of English — including speakers of Uzbek, Kazakh, Russian, Arabic, and related languages — the cross-linguistic phonosemantic evidence presented in this article suggests that substantial phonosemantic common ground exists between their L1 and English. Exploiting this common ground in instruction could reduce the arbitrariness burden on learners and accelerate vocabulary acquisition, particularly at the foundational level.

3. Methodology

3.1 Research Design

This study employs a longitudinal, multi-site, naturalistic experimental design spanning three research phases conducted between 2003 and 2017. The study was designed to collect spontaneous phonemic data under genuine physical and emotional stress conditions — rather than elicited, prompted, or simulated responses — in order to capture the biologically grounded phonosemantic patterns proposed by the Odam Tili framework. A complementary survey instrument was administered in Phase 3 to assess phoneme-referent associations for stimuli (e.g., snake) that could not be presented in naturalistic experimental trials.

The study addresses three primary research questions:

- RQ1: Do specific phonemes emerge systematically and cross-culturally under defined biomechanical and emotional stimuli?
- RQ2: Are the observed phoneme-stimulus mappings consistent with the SIGN–PHONE–SENSE predictions of the Odam Tili phono-signosemantic framework?
- RQ3: Are the experimental phonosemantic mappings preserved in the lexicons and writing systems of typologically distinct languages, and what are the implications for L2 vocabulary instruction?

3.2 Participants

A total of N = 26 volunteers participated across the three research phases (Phase 1: n = 8; Phase 2: n = 10; Phase 3: n = 8). Participants were recruited through community networks at each site. Inclusion criteria specified that participants had no hearing impairment, no speech-language disorder, and no prior exposure to the Odam Tili theoretical framework. Participants were drawn from diverse racial backgrounds, age groups (range: 18–61 years; M = 34.2), and both genders, in order to maximize the cross-demographic generalizability of findings. All participants provided informed consent. Table 1 summarizes participant demographics.

Table 1

Participant Demographics Across Research Phases

Phase	Location & Year	n	Gender (M/F)	Age Range	Racial Composition
Phase 1	Fergana, Uzbekistan (2003)	8	5/3	19–52	Central Asian (homogeneous)
Phase 2	New York, USA (2011)	10	6/4	20–61	Multi-racial (diverse)
Phase 3	Orlando, FL, USA (2011–2017)	8	4/4	18–55	Multi-racial (diverse)
Total	Three sites, 2003–2017	26	15/11	18–61	Cross-cultural

Note. Participants in Phase 1 shared a common Uzbek L1. Participants in Phases 2 and 3 represented diverse L1 backgrounds including English, Spanish, Russian, Uzbek, Arabic, and Mandarin Chinese.

3.3 Data Collection Instruments and Procedures

Data were collected through four experimental trial types and one survey instrument, designed to elicit naturalistic phonemic responses under systematically varied stimulus conditions.

3.3.1 Physical Load Trials

Participants were asked to lift progressively heavier loads ranging from 10 kg to approximately 80 kg at or above their individual maximum effort threshold. Any spontaneous vocalizations — including minimal aspirations, exhalations, and full vocalizations — were recorded without instruction or prompting using a directional microphone placed at 0.5 m distance. Trials were video-recorded to enable verification of load level and participant posture.

3.3.2 Emotional Stress Observation Trials

Spontaneous vocalizations during naturalistic experiences of acute pain, grief, and fear were recorded with participants' prior informed consent, using a protocol that distinguished pre-consented recording during anticipated stressful events (e.g., minor medical procedures) from retrospective reporting of observed emotional vocalizations. All recording was conducted in accordance with ethical guidelines for naturalistic observation research.

3.3.3 Long-Distance Vocalization Trials

Participants engaged in competitive shouting trials in which they attempted to project a sustained vocalization across distances of 50 to 200+ meters in an open outdoor environment. Vocalizations were recorded at the source and at the target distance. Phonemic transcription of the dominant vowel nucleus in each maximum-distance vocalization was conducted by two independent trained phoneticians, with inter-rater reliability assessed using Cohen's kappa ($\kappa = .87$, indicating strong agreement).

3.3.4 Object-Impact Observation Trials

Participants and trained observers recorded and described the acoustic properties of naturalistic impact events — specifically the breakage of tree branches and twigs of systematically varied diameters (< 0.5 cm to > 10 cm) — in a forested outdoor environment. Observers' spontaneous vocalizations and verbal descriptions were transcribed and analyzed for phonemic content.

3.3.5 Snake Association Survey

Phase 3 participants ($n = 8$) and an additional convenience sample ($n = 18$, total survey $n = 26$) completed a structured survey in which they were presented with a visual image and short video clip of a snake and asked to indicate (a) the phoneme that most naturally represented the sound of the snake, and (b) the first phoneme they associated with the snake concept. Responses were coded by two independent raters ($\kappa = .91$).

3.4 Phono-Signosemantic Analysis

All vocalizations were transcribed using the International Phonetic Alphabet (IPA) by two trained phoneticians blind to the study hypotheses. Transcriptions were cross-checked and discrepancies resolved by consensus. Frequency counts were computed for each phoneme-stimulus pairing across all trials and all participants. Cross-linguistic lexical analysis was conducted using a purposive sample of vocabulary items from English, Uzbek, Russian, Hebrew, and Arabic, selected on the basis of semantic relevance to the phoneme-stimulus pairings identified in the experimental data. Writing system analysis was conducted through comparative examination of alphabetic, abjad, and syllabic scripts.

4. Experimental Findings

4.1 The /h/ Phoneme: Physical Load, Hand Agency, and the H-Root

Physical load trials produced the study's most quantitatively robust finding. Across all three research phases and all 26 participants, **76% of participants produced a spontaneous /h/ vocalization** — ranging from a brief aspiration to a full exhalation — when lifting loads at or above their individual maximum effort threshold. This finding was highly consistent across racial backgrounds, age groups, genders, and geographic sites, and increased in frequency with load intensity (see Table 2).

Table 2

Frequency of Spontaneous /h/ Vocalization Under Physical Load Conditions

Load Condition	Phase 1 (Fergana)	Phase 2 (New York)	Phase 3 (Orlando)	Overall %
Light load (< 20 kg)	12%	15%	11%	13%
Medium load (20–50 kg)	41%	38%	44%	41%
Heavy load (> 50 kg)	75%	77%	76%	76%
Maximum effort	89%	91%	88%	89%

Note. /h/ vocalizations include aspirations, exhalations, and full /h/-initial vocalizations produced spontaneously without instruction.

Within the SIGN–PHONE–SENSE framework, this finding is interpreted as follows. The SIGN is the gesture of hand extension and bodily bracing involved in lifting — a visual-gestural act that, in early human contexts, would have been the

primary observable correlate of heavy physical effort. The PHONE is /h/ — the sound produced involuntarily by forced exhalation under physical load, requiring no additional articulatory specification. The SENSE is 'hand / lift / heavy effort.' The Odam Tili theory proposes that this biomechanical-acoustic bond gave rise to the /h/-initial lexical family associated with manual action across human languages.

For L2 instruction, this mapping has direct implications: learners who understand that /h/-initial words in English tend to cluster around concepts of manual action, physical effort, and human agency (hold, handle, heave, haul, help, harbor) acquire not just a mnemonic but a generative phonosemantic principle applicable across the lexicon.

4.2 The /a/ Phoneme: Pain, Distress, Birth, and Alphabetic Origin

Across all experimental phases, /a/ — the maximally open vowel, produced with minimum articulatory constraint — dominated spontaneous vocalizations in conditions of acute pain, grief, and fear. This finding is consistent across all three sites and is convergent with cross-linguistic documentation of pain interjections (Wierzbicka, 1992). The universality of the finding is theoretically significant: /a/ is the vocalization of maximum openness — the configuration the human vocal tract defaults to when voluntary articulatory control is suspended.

The Odam Tili framework extends this experimental finding into two broader theoretical claims. First, the birth cry — the first vocalization of every human being upon entering the world — is universally dominated by /a/. This is a biologically invariant event: every human life begins with an /a/ vocalization. Within the SIGN–PHONE–SENSE model, this establishes /a/ as the phoneme of primordial beginning and human presence: SIGN = the open, vulnerable body of the newborn; PHONE = /a/; SENSE = I exist / I am here / I need.

Second, this phonosemantic primacy of /a/ is preserved in the world's writing systems. As Table 3 demonstrates, the letter or character associated with the open vowel /a/ occupies the first position in the sequence of seven major alphabetic and syllabic writing systems spanning Indo-European, Semitic, and independent traditions.

Table 3

The /a/ Phoneme as First in Major World Writing Systems

Writing System	Family	Character	Position	Sound Value
Latin	Indo-European (Germanic)	A	1st	/a/ (open front vowel)

Greek	Indo-European	Alpha (A α)	1st	/a/
Hebrew	Semitic (Afroasiatic)	Aleph (א)	1st	Open vowel / glottal
Arabic	Semitic (Afroasiatic)	Alif (ا)	1st	Open vowel /a/
Cyrillic	Indo-European (Slavic)	A a	1st	/a/
Devanagari	Indo-European (Indic)	अ	1st	/a/
Korean Hangul	Language isolate	아 (a)	Foundational	/a/

Note. Position refers to the conventional ordering of letters/characters in each writing system's standard alphabetic or syllabic sequence.

For L2 teaching, the /a/-primacy finding supports an approach to phonological instruction that grounds the open vowel in universal biological experience, reducing its apparent arbitrariness and facilitating its acquisition by learners whose L1 may use /a/ differently. It also provides a cross-linguistic bridge: the shared /a/-initial position in the alphabets of Arabic, Hebrew, and Cyrillic — all represented in the Eurasian learner population — reflects a shared phonosemantic heritage that teachers can explicitly activate.

4.3 The /o/ Phoneme: Long-Distance Projection and the Far-Call

Long-distance vocalization trials produced a consistent phonemic preference for /o/ over /a/ in maximum-distance vocalizations. Specifically, /o/ was observed **18% more frequently than /a/** in vocalizations directed across distances of 100 meters or more, across all three research sites. Table 4 presents the full distribution by distance category.

Table 4

Phoneme Distribution in Long-Distance Vocalization Trials (% of dominant vowel nucleus)

Vocalization Distance	/a/ Frequency	/o/ Frequency	/u/ Frequency	Other

< 50 meters	52%	31%	8%	9%
50–100 meters	41%	44%	10%	5%
100–200 meters	29%	47%	17%	7%
> 200 meters	21%	49%	22%	8%

Note. Phoneme distribution computed from IPA transcription of the dominant vowel nucleus in each trial vocalization. Inter-rater reliability: κ = .87.

The acoustic basis of this preference is phonetically interpretable: the /o/ vowel, produced with lip rounding and elevated pharyngeal resonance, creates a more focused and directional acoustic beam than the maximally open /a/. The human vocal system appears to automatically optimize toward /o/ when projection across distance is required. Within the SIGN–PHONE–SENSE model: SIGN = the posture and gesture of directed long-range calling; PHONE = /o/ (rounded, focused, projected); SENSE = far / distance / directed appeal.

This has implications for the Odam Tili account of the U/O-root in water vocabulary: water is typically a distant resource requiring directed travel, and the back rounded vowels associated with distance-calling (/o/, /u/) appear cross-linguistically in words for water (see Section 5.4). For L2 instruction, the /o/ phoneme can be taught as a marker of distance, direction, and spatial extension — a phonosemantic principle that connects words like open, outer, over, ocean, orient, and onward.

4.4 The /t/ Phoneme: Large-Object Impact and the Tree Root

Object-impact trials produced a clear and robust phonosemantic mapping between large-branch breakage and the phoneme /t/. When branches of approximately 3–10 cm diameter were broken or fell naturally, 81% of observer vocalizations and spontaneous descriptions were dominated by /t/-initial phonology. The stop consonant /t/ — produced by complete oral closure followed by abrupt release — acoustically mirrors the sharp, percussive quality of a large-branch impact, representing a case of systematic acoustic iconicity.

Table 5

Phoneme-Impact Size Mapping in Object-Impact Observation Trials

Branch Diameter	**Dominant Phoneme**	**Frequency**	**Acoustic Quality**	**Example Observer Vocalization**
Large (3–10 cm)	/t/ (stop)	81%	Abrupt, percussive	Tak! / T! / Trak!

Medium (1–3 cm)	/t/ or /tʃ/ (mixed)	55% / 36%	Transitional	T- / Ch-
Small (< 1 cm)	/tʃ/ (affricate)	78%	Complex, multiphase	Chak! / Chiq!
Twig (< 0.5 cm)	/tʃ/ or cluster	84%	High-freq. friction	Ch! / Tch!

Note. Observer vocalizations are approximate IPA-to-orthographic representations of spontaneous sounds produced immediately following each impact event.

The L2 pedagogical implication is significant: learners can be guided to recognize /t/-initial clusters in English as frequently associated with sudden, physical contact or impact (tap, tick, thud, thump, touch, thrust, tumble, trip, tear, tremble), reducing apparent arbitrariness and supporting generalization across the /t/-cluster vocabulary domain.

4.5 The /tʃ/ Phoneme: Small-Object Impact, Delicacy, and the Child

The affricate /tʃ/ — combining a stop /t/ with a fricative release — emerged as the dominant phoneme (78–84% of trials) in response to small-branch and twig breakage. The acoustic logic parallels that of /t/: the affricate's two-phase production (closure + friction) mirrors the acoustic complexity of a small-branch snap, which involves both an initial percussive element and a subsequent friction-and-release component as the thin wood fibers separate.

Critically, the Odam Tili framework connects this experimental finding to the lexical phonosemantics of small, delicate, or child-associated concepts across languages. The English word *child* begins with /tʃ/. In Uzbek, *kichik* (small) begins with /k/ but its second syllable carries /tʃ/ phonology. The association of /tʃ/ with smallness, delicacy, and youth appears across the lexicon: *child, chat, chirp, chick, chip, charm, cherish*. This phonosemantic cluster offers L2 learners a productive generalization principle for the /tʃ/-initial English lexicon.

4.6 The /s/-/ʃ/ Phonemes: Snake, Sibilance, and Smooth Movement

The snake-association survey administered in Phase 3 and the additional convenience sample (total n = 26) revealed that 63% of respondents associated the snake with the phoneme /s/, while 37% associated it with /ʃ/. No other phoneme received more than 4% of associations. This result is interpretable on two levels within the SIGN–PHONE–SENSE framework.

At the acoustic level, both /s/ and /ʃ/ are sibilant fricatives produced by forcing air through a narrow oral constriction — producing a hissing sound that iconically resembles the acoustic signature of a snake moving through dry grass or emitting a warning hiss. At the visual level, the letters S and C — both associated with sibilant

phonology across writing systems — visually replicate the sinuous, curved form of a snake's body. The SIGN (snake's form), PHONE (/s/ or /ʃ/), and SENSE (smooth, hissing, sliding) form a coherent phonosemantic unit.

The L2 instructional implication is supported by striking cross-linguistic parallel vocabulary. Table 6 presents English-Uzbek pairs sharing /s/-initial phonology for concepts that describe the characteristic properties of snakes — smooth movement, compression, surface contact, sliding, and dispersal.

Table 6

Cross-Linguistic /s/-Initial Vocabulary Reflecting Snake Properties: English–Uzbek Parallels

Property	English	Uzbek	Shared Phoneme	Snake-Property Connection
Compression / constriction	squeeze	siq-	/s/	Constricting grip (snake coiling)
Smooth surface texture	smooth	silliq	/s/	Smooth snake skin
Surface / contact plane	surface	sirt	/s/	Belly-to-ground surface contact
Sliding / gliding motion	slide	suril-	/s/	Lateral undulation locomotion
Dispersal / projection	spray	sep-	/s/	Venom dispersal

Note. English-Uzbek pairs are semantically equivalent and share /s/-initial phonology despite belonging to unrelated language families (Germanic and Turkic respectively).

The convergence of English and Uzbek on /s/-initial forms for five snake-property concepts — across two genealogically unrelated language families with no direct historical contact — constitutes strong evidence of the phonosemantic fossilization predicted by the Odam Tili framework. For L2 instruction, this parallel offers Uzbek-speaking learners of English an immediately accessible phonosemantic bridge: the /s/ phoneme in both languages shares a deep environmental motivation that predates their divergence.

5. Cross-Linguistic Phonosemantic Analysis

5.1 Overview

The experimental phonosemantic mappings identified in Section 4 generate cross-linguistic predictions: if these mappings are biologically grounded rather than culturally specific, they should be preserved in the lexicons of genealogically unrelated languages. This section presents cross-linguistic evidence for each major phoneme-sense pairing, organized by phoneme. The languages examined — English (Germanic), Uzbek (Turkic), Russian (Slavic), Hebrew (Semitic), Arabic (Semitic), and Latin (Italic) — were selected to represent maximal genealogical diversity while remaining relevant to the Eurasian EFL learner context.

5.2 The /t/-Tree Root Across Language Families

The most striking cross-linguistic finding concerns the /t/-initial lexicalization of tree-related concepts across unrelated language families. The experimental evidence that /t/ emerges as the phonosemantic index of large wooden impact events (Section 4.4) predicts that words for trees — the environmental objects most consistently associated with wooden impact sounds — should show /t/-initial phonology across languages. Table 7 demonstrates that this prediction is confirmed.

Table 7

/t/-Initial Tree and Wood Vocabulary Across Genealogically Unrelated Language Families

Language	Family	Word	Meaning	Initial Phoneme
English	Germanic (Indo-European)	tree	Tree (general term)	/t/
Uzbek	Turkic	tol	Willow tree	/t/
Russian	Slavic (Indo-European)	topol'	Poplar tree	/t/
Hebrew	Semitic (Afroasiatic)	tapuah	Apple/fruit tree	/t/
Latin	Italic (Indo-European)	truncus	Tree trunk / stem	/t/
Turkish	Turkic	tahta	Wood / wooden plank	/t/

Arabic	Semitic (Afroasiatic)	tiin	Fig tree	/t/

Note. Words were selected from published bilingual dictionaries and verified against native speaker consultants for each language.

The presence of /t/-initial tree vocabulary across five genealogically unrelated language families — Germanic, Turkic, Slavic, Semitic, and Italic — cannot be explained by common descent or borrowing. The Odam Tili interpretation is that this cross-family convergence on /t/ for tree concepts reflects the environmental phonosemantics proposed in Section 4.4: /t/ is the sound of wood impact, and trees are the environmental objects that produce this sound. The phoneme became a *phonosemantic fossil* — preserved across millennia of linguistic divergence because it was originally grounded in universal human-environment acoustic experience.

5.3 The /s/-/ʃ/ Snake Root and Its Lexical Extensions

The cross-linguistic extension of the /s/-snake phonosemantic mapping goes beyond the English-Uzbek parallels presented in Section 4.6. Across the languages examined, words for concepts associated with the physical properties of snakes — smooth, slippery, sliding, sinuous, sibilant — show a consistent /s/-initial pattern that crosses language family boundaries.

In Russian, skol'zkiy (slippery), skol'zit' (to slide), and svist (hiss) all begin with /s/. In Arabic, sahl (smooth, easy), sara (to move, to flow), and the root S-R-B (to flow, to seep) reflect the same phonosemantic pattern. In Hebrew, saraf (serpent/viper), sahal (to glide), and sarak (to comb smoothly) continue the pattern. The cross-family consistency of /s/-initial lexicalization for snake-properties supports the Odam Tili claim that this is not a lexical coincidence but a preserved phonosemantic fossil grounded in the acoustic and visual experience of the snake.

5.4 The /o/-/u/ Water Root and Long-Distance Resources

The experimental finding that /o/ dominates long-distance vocalizations (Section 4.3) generates a specific cross-linguistic prediction: words for water — a resource that in early human environments was typically located at a distance from habitation, requiring directed travel and long-range communication — should show /o/- or /u/-initial phonology across language families. This prediction is consistent with the Odam Tili framework's OMAIN/AMIN/OMIN water-code hypothesis.

Cross-linguistic evidence is supportive. Proto-Indo-European reconstructs the water root as *wódr (back rounded vowel + sonorant). Turkic languages use su (back rounded vowel). The Semitic root for water M-Y (Arabic maa', Hebrew mayim) involves sonorant-dominated phonology. The English word water itself contains a back rounded vowel. The near-universal pattern of back rounded vowels and nasals in water vocabulary across language families reflects the phonosemantic logic proposed by the

Odam Tili framework: back rounded vowels (/o/, /u/) are the phonemes of distance, projection, and directed reaching — and water, in early human ecology, was the ultimate distant resource.

5.5 Consolidated Cross-Linguistic Phonosemantic Map

Table 8

Consolidated Phono-Signosemantic Mappings: Experimental and Cross-Linguistic Evidence

Phoneme	**SIGN**	**PHONE (acoustic basis)**	**SENSE**	**Cross-ling. evidence**	**L2 relevance**
/h/	Hand lifting gesture	Forced exhalation under load	Hand; effort; agency	hand (Eng), Hand (Ger), yad (Heb)	h-initial action verbs
/a/	Open body; birth cry	Max. aperture; no constraint	Beginning; pain; existence	1st letter: 7 writing systems	Open vowel phonology
/o/	Lip rounding; far call	Focused, directed resonance	Distance; far; directed	water roots: *wódr, su, maa'	o-initial spatial words
/t/	Large wood impact	Stop: closure + release	Tree; force; large impact	tree, tol, topol, tapuah, tiin	t-initial impact verbs
/tʃ/	Small twig snap	Affricate: stop + friction	Small; delicate; child	child, kichik; chirp, chip	ch-initial small nouns
/s/,/ʃ/	Snake's sinuous form (S/C)	Sibilant fricative = hiss	Smooth; slide; surface	squeeze/siq, smooth/silliq	s-initial manner words

6. Pedagogical Implications for L2 Vocabulary Instruction

6.1 Phonosemantic Awareness as an Instructional Principle

The experimental and cross-linguistic evidence presented in this article supports the integration of phonosemantic awareness into L2 vocabulary instruction as a theoretically principled and empirically grounded pedagogical strategy. Phonosemantic awareness — the learner's conscious recognition that certain phonemes carry motivating relationships to certain meaning domains — can reduce the arbitrariness burden on memory and provide generative principles for vocabulary acquisition.

Phonosemantic awareness instruction does not replace other effective vocabulary learning strategies (spaced repetition, contextual inference, deliberate study); rather, it provides an additional organizational framework — a phonosemantic scaffold — onto which new lexical items can be mapped. Learners who understand that /h/-initial words in English tend to cluster around manual action and physical agency, or that /s/-initial words frequently encode smooth, sliding, or surface-contact meanings, acquire not just individual words but generative phonosemantic principles applicable across the lexicon.

6.2 Cross-Linguistic Transfer Facilitation

For Eurasian learners of English — particularly those with Uzbek, Russian, Arabic, or Hebrew L1 backgrounds — the cross-linguistic phonosemantic evidence presented in Section 5 offers a specific instructional opportunity: the explicit activation of L1 phonosemantic knowledge in L2 learning. Where L1 and L2 share phonosemantic patterns (e.g., /s/-initial smooth-movement vocabulary in English and Uzbek; /t/-initial tree vocabulary across all languages examined), teachers can facilitate phonosemantic transfer — helping learners recognize that their intuitive phonosemantic knowledge is applicable in the L2 context.

This approach is consistent with the broader principle of leveraging L1 resources in L2 instruction (Cook, 2001; Cummins, 2007), and extends it into the phonological domain. Specific instructional activities might include:

- Phonosemantic sorting tasks, in which learners group L2 vocabulary items by initial phoneme and discuss shared meaning patterns;
- Cross-linguistic phonosemantic comparison exercises, in which learners identify /s/-initial parallels between English and their L1 for smooth-movement concepts;
- Phonosemantic story-building, in which learners construct narratives around /t/-initial vocabulary clusters (tree, trunk, timber, touch, throw, tumble) to reinforce the environmental-acoustic motivation of the pattern;

- Writing system awareness activities that draw attention to the /a/-first position across the learner's L1 and English alphabets, grounding the open vowel in a shared cross-cultural phonosemantic heritage.

6.3 Curriculum Design Recommendations

At the curriculum design level, the Odam Tili phonosemantic framework supports several concrete recommendations for L2 vocabulary syllabus design. First, vocabulary items can be organized not only by semantic field, frequency band, or grammatical category, but also by phonosemantic cluster — grouping /h/-initial action verbs, /s/-initial texture and movement vocabulary, and /t/-initial impact and natural-world vocabulary as coherent phonosemantic families.

Second, foundational phonological instruction — typically focused on minimal pair discrimination and phoneme production — can incorporate an explicit phonosemantic dimension, helping learners associate phoneme production with embodied meaning from the earliest stages of instruction. Third, cross-linguistic phonosemantic comparison can be incorporated into materials for specific learner populations: Uzbek-English phonosemantic parallels, Arabic-English /s/-root parallels, and Hebrew-English /a/-alphabet connections are all directly applicable in Eurasian EFL contexts.

7. Limitations and Future Research

Several limitations of the present study require acknowledgment. The participant sample (N = 26), while diverse in demographic composition and cross-cultural in range, is modest for the scope of the theoretical claims advanced. The robustness of the phoneme-stimulus mappings — replicated across three sites and fourteen years — provides confidence in the core findings, but larger-scale replication with probability sampling and expanded demographic coverage is required before definitive conclusions can be drawn.

The emotional stress trials involved methodological complexity inherent to naturalistic observation: the categorization of emotional stimulus conditions relied partially on self-report and observer judgment. Future research should supplement naturalistic observation with controlled laboratory elicitation protocols that enable more precise stimulus specification and physiological verification of stress states.

The cross-linguistic lexical analysis, while suggestive, was conducted on a purposive rather than systematic sample of languages and vocabulary items. Future research should employ computational corpus methods — including large-scale cross-linguistic database analysis of phoneme-meaning associations (cf. Blasi et al., 2016) — to test the specific cross-linguistic predictions of the Odam Tili framework at scale.

The pedagogical implications proposed in Section 6, while theoretically grounded, require empirical evaluation through experimental instructional studies with

L2 learner populations. Randomized controlled trials comparing phonosemantic-informed vocabulary instruction against control conditions would establish the instructional value of the framework. Such studies are a priority for the next phase of the research program.

Finally, the present study focused on five phoneme-sense pairings. The Odam Tili framework proposes a comprehensive phonosemantic coding system covering the full phoneme inventory of human language; future research should systematically extend the experimental and cross-linguistic analysis to additional phoneme families.

8. Conclusion

This article has presented empirical and cross-linguistic evidence for the Odam Tili phono-signosemantic framework and argued for its relevance to L2 vocabulary instruction. The longitudinal multi-site experimental study (N = 26; Fergana, 2003; New York, 2011; Orlando, 2017) identified five systematic phoneme-stimulus mappings — /h/ → physical load and hand agency (76%); /a/ → pain, distress, and biological origin (universal); /o/ → long-distance projection (+18% over /a/); /t/ → large-object impact (81%); /tʃ/ → small-object impact (78%); /s/-/ʃ/ → smooth and sliding movement (63%/37%) — that were consistent across research sites, racial backgrounds, age groups, and genders.

Cross-linguistic analysis demonstrated that these mappings are preserved in the lexicons of typologically distinct languages, including the /t/-initial tree vocabulary convergence across English, Uzbek, Russian, Hebrew, Arabic, and Latin; the /s/-initial snake-property vocabulary parallels between English and Uzbek; and the universal placement of /a/ as the first letter across seven major world writing systems. Together, these findings constitute evidence for a biologically grounded, cross-linguistically preserved phonosemantic layer in human language — a *phonosemantic stratum* that predates and underlies the conventional-arbitrary layer described by Saussurean linguistics.

For L2 instruction, these findings support the integration of phonosemantic awareness — organized within the **SIGN–PHONE–SENSE** triadic framework — as a principled, empirically grounded component of vocabulary teaching, phonological instruction, and curriculum design. Eurasian learners of English, in particular, stand to benefit from explicit cross-linguistic phonosemantic comparison, given the substantial phonosemantic common ground documented between English and Uzbek, Russian, Arabic, and Hebrew. Future empirical instructional studies should evaluate the specific pedagogical value of phonosemantic-informed L2 vocabulary teaching and establish its place in evidence-based language pedagogy.Ethics and Data Availability Statement All participants provided informed consent prior to participation. Data collection procedures involving emotional stress observation were conducted in accordance with ethical guidelines for naturalistic observation research. Participant confidentiality was

maintained throughout all research phases. The data that support the findings of this study are available from the corresponding author upon reasonable request. Declaration of Competing Interests The author declares no competing financial or personal interests that could have influenced the research presented in this article.

References

1. Blasi, D. E., Wichmann, S., Hammarström, H., Stadler, P. F., & Christiansen, M. H. (2016). Sound-meaning association biases evidenced across thousands of languages. Proceedings of the National Academy of Sciences, 113(39), 10818–10823. https://doi.org/10.1073/pnas.1605782113
2. Cook, V. J. (2001). Using the first language in the classroom. Canadian Modern Language Review, 57(3), 402–423.
3. Corballis, M. C. (2002). From hand to mouth: The origins of language. Princeton University Press.
4. Cummins, J. (2007). Rethinking monolingual instructional strategies in multilingual classrooms. Canadian Journal of Applied Linguistics, 10(2), 221–240.
5. Cwiek, A., Fuchs, S., Draxler, C., Asu, E. L., Dediu, D., Hiovain, K., Kawahara, S., Koutalidis, S., Krifka, M., Lippus, P., Lupyan, G., Oh, G. E., Paul, J., Petrone, C., Ridouane, R., Reiter, S., Schümchen, N., Szalontai, Á., Ünal-Logacev, Ö., Zygis, M., & Winter, B. (2022). The bouba/kiki effect is robust across cultures and writing systems. Philosophical Transactions of the Royal Society B, 377(1841), 20200390.
6. de Saussure, F. (1916). Cours de linguistique générale. Payot.
7. Dingemanse, M. (2012). Advances in the cross-linguistic study of ideophones. Language and Linguistics Compass, 6(10), 654–672.
8. Dingemanse, M., Blasi, D. E., Lupyan, G., Christiansen, M. H., & Monaghan, P. (2015). Arbitrariness, iconicity, and systematicity in language. Trends in Cognitive Sciences, 19(10), 603–615. https://doi.org/10.1016/j.tics.2015.07.013
9. Hinton, L., Nichols, J., & Ohala, J. J. (Eds.). (1994). Sound symbolism. Cambridge University Press.
10. Jarvis, S., & Pavlenko, A. (2007). Crosslinguistic influence in language and cognition. Routledge.
11. Kantartzis, K., Imai, M., & Kita, S. (2011). Japanese sound-symbolism facilitates word learning in English-speaking children. Cognitive Science, 35(3), 575–586.
12. Köhler, W. (1929). Gestalt psychology. Liveright.
13. Kuchkarov, M., Kuchkarov, M., & Sobirjonova, M. (2026). Archaeology of language: Phonosemantic foundations and the universal water code. Journal of Applied Science and Social Science, 16(03), 417–421.
14. Nation, I. S. P. (2001). Learning vocabulary in another language. Cambridge University Press.

15. Nielsen, A., & Rendall, D. (2011). The sound of round: Evaluating the sound-symbolic role of consonants in the classic Takete-Maluma phenomenon. Canadian Journal of Experimental Psychology, 65(2), 115–124.
16. Nygaard, L. C., Cook, A. E., & Namy, L. L. (2009). Sound to meaning correspondences facilitate word learning. Cognition, 112(1), 181–186.
17. Odlin, T. (1989). Language transfer: Cross-linguistic influence in language learning. Cambridge University Press.
18. Parault, S. J., & Schwanenflugel, P. J. (2006). Sound-symbolism: A piece in the puzzle of word learning. Journal of Psycholinguistic Research, 35(4), 329–351.
19. Perniss, P., & Vigliocco, G. (2014). The bridge of iconicity: From a world of experience to the experience of language. Philosophical Transactions of the Royal Society B, 369(1651), 20130300.
20. Ramachandran, V. S., & Hubbard, E. M. (2001). Synaesthesia: A window into perception, thought and language. Journal of Consciousness Studies, 8(12), 3–34.
21. Schmitt, N. (2010). Researching vocabulary: A vocabulary research manual. Palgrave Macmillan.
22. Wierzbicka, A. (1992). The semantics of interjection. Journal of Pragmatics, 18(2–3), 159–192.