

Purpose-Designed Musical Interventions: A Pedagogical Model for Supporting Adult Foreign Language Acquisition

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ABSTRACT

This conceptual article introduces Purpose-Designed Musical Interventions (PDMIs) as a pedagogical model for supporting adult foreign language learning. Situated at the intersection of applied linguistics, cognitive neuroscience, music cognition, educational theory, and neurologic music therapy, the article examines how specifically tailored musical structures may support grammatical internalisation, phonological awareness, pronunciation development, memory retention, and learner engagement. Unlike conventional classroom practices that use commercially available songs mainly for motivational purposes, the PDMI framework proposes that rhythm, melody, harmony, and prosody can be deliberately shaped in relation to specific linguistic aims. The framework is developed through interdisciplinary literature and long-standing experience at the intersection of foreign language pedagogy and clinical music therapy. Rather than presenting empirical validation, it synthesises theoretical perspectives and practice-based observations to outline an integrated approach. Particular attention is given to rhythmic entrainment, predictive auditory processing, structured repetition, and musical expectancy as possible mechanisms supporting language-related cognitive processes. Illustrative examples are discussed to show how grammatical and phonological structures may be embedded within musical form. The article also considers possible implications for adult education, lifelong learning, communicative engagement, and language-support contexts, while emphasising the need for systematic empirical investigation. PDMIs are therefore positioned as a promising interdisciplinary approach to music-mediated language learning, with potential relevance for future pedagogical innovation and research in adult foreign language acquisition.

Keywords: Purpose-Designed Musical Interventions, music-mediated language learning, adult foreign language acquisition, rhythmic entrainment, grammar acquisition, cognitive neuroscience, applied linguistics, music therapy, pronunciation learning, pedagogical design

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1. Introduction

Adult foreign language acquisition is widely recognised as a cognitively demanding and complex process, particularly in relation to grammatical internalisation, pronunciation accuracy, working memory demands, and long-term retention. Adult learners frequently encounter challenges related to increased cognitive load, affective inhibition, reduced learning confidence, and the automatising of unfamiliar linguistic structures. In contrast to early childhood acquisition, adult language learning often depends more heavily on conscious processing, sustained attention, and repeated rehearsal, which may affect learner motivation and persistence over time (Cores-Bilbao et al., 2019; Sihvonen et al., 2022).

Within this context, music has increasingly been considered as more than a motivational classroom supplement. Research in cognitive neuroscience and music cognition suggests that rhythmically and melodically organised auditory input may support verbal encoding, temporal sequencing, attention regulation, and memory consolidation (Särkämö & Huotilainen, 2013; Thaut & Hoemberg, 2015). Studies on rhythmic entrainment and auditory-motor synchronisation further indicate that structured musical engagement may influence phonological processing, speech timing, and auditory prediction mechanisms relevant to language learning (Cason & Schön, 2012; Tierney & Kraus, 2013).

The relationship between music and language has also been examined through theories of shared neural processing and hierarchical structure building. Previous research suggests that music and language may involve partially overlapping cognitive systems associated with syntactic integration, expectancy formation, and predictive processing (Asano & Boeckx, 2015; Kunert et al., 2015; Patel, 2003). Harmonic progression, rhythmic organisation, and melodic anticipation have therefore been discussed as theoretically compatible with mechanisms involved in linguistic sequencing and grammatical prediction, although these correspondences remain under active academic debate (Cecchetti et al., 2023; Herff et al., 2024).

Research in applied linguistics and music-mediated pedagogy has likewise suggested that structured musical exposure may contribute positively to vocabulary retention, pronunciation awareness, learner engagement, and affective support in second-language learning environments (Chen, 2020; Huang, 2023; Pérez Carmona et al., 2021; Zhang et al., 2024). Music-based instructional activities have also been associated with reduced language anxiety, stronger classroom participation, and improved tolerance for repetition,

particularly among adult learners (Cores-Bilbao et al., 2019; Kim et al., 2024).

Despite this growing body of interdisciplinary research, music in language education is still frequently used in incidental or unsystematic ways. In many instructional contexts, commercially available songs are introduced primarily for entertainment, exposure, or motivational purposes, without deliberate alignment between musical structure and specific linguistic objectives. As a result, the rhythmic, grammatical, prosodic, and phonological characteristics of these materials may not correspond closely to pedagogical targets (Chen et al., 2020; Pérez Carmona et al., 2021). Furthermore, a substantial proportion of the literature has focused on children, general musical exposure, or broad cognitive effects rather than on purpose-designed musical interventions for adult beginner learners.

This conceptual and pedagogical gap is addressed here by proposing the framework of Purpose-Designed Musical Interventions (PDMIs). Within this model, musical structures are tailored to reflect the grammatical, rhythmic, phonological, and prosodic features of the target language content. Rhythm is understood as a potential carrier of linguistic sequencing and segmentation, while melody and harmonic movement may support expectancy formation, tolerance for repetition, and mnemonic organisation. Importantly, the article does not claim direct causal equivalence between musical cognition and language acquisition. Rather, it proposes that structured musical design may offer theoretically compatible and pedagogically meaningful support for adult language learning processes. This conceptual pedagogical framework combines interdisciplinary literature with long-term experience in adult language education, intercultural pedagogy, and clinical music therapy, bringing together theoretical perspectives and practice-based observations in order to formulate a coherent interdisciplinary model.

The objectives of this article are therefore fourfold:

1. To examine interdisciplinary theoretical foundations linking music, cognition, and language learning;
2. To propose the framework of Purpose-Designed Musical Interventions as a structured pedagogical model for adult foreign language acquisition;
3. To illustrate how linguistic structures may be intentionally embedded within musical design through practice-informed examples; and
4. To identify implications, limitations, and future research directions for music-mediated language learning.

By positioning music not merely as an auxiliary classroom resource but as a potentially structured pedagogical medium, the article seeks to contribute to ongoing discussions at the intersection of applied linguistics, cognitive neuroscience, educational innovation, and music-based intervention research.

2. Methodology and Conceptual Framework

2.1 Methodological Positioning

This article adopts a conceptual methodological orientation based on interdisciplinary literature, long-term pedagogical observation, and reflective educational experience. The paper does not present empirical findings derived from formal experimentation, participant sampling, statistical analysis, or controlled intervention studies. Instead, it brings together theoretical literature, educational experience, and observational insights in order to formulate the framework of Purpose-Designed Musical Interventions (PDMIs) as a structured pedagogical approach to adult foreign language learning.

The conceptual orientation of the study emerged gradually through sustained engagement across different intercultural, educational, and therapeutic contexts. This included adult foreign language instruction, community educational initiatives, music-therapeutic interventions, and observations involving music-supported communicative engagement. Across these experiences, it became increasingly apparent that carefully structured musical material appeared capable of supporting tolerance for repetition, pronunciation awareness, grammatical sequencing, and learner participation in ways not always achieved through conventional textbook-centred instruction alone. These observations are further contextualised in the following section, which outlines the gradual development of the PDMI framework across adult education, intercultural practice, singing language learning, and clinical music therapy contexts. The article does not claim clinical efficacy or experimentally validated causation between music and language acquisition outcomes. Consequently, the arguments advanced throughout the paper should be understood as theoretically grounded pedagogical propositions that require systematic future investigation.

The methodological orientation adopted is aligned with conceptual inquiry as used in educational and pedagogical research. In this type of work, theoretical synthesis does not function only as a review of existing literature, but also as a way of building a coherent model through the integration of related perspectives. For the present study, literature has been examined from applied linguistics, music cognition, cognitive neuroscience, educational psychology, second-language acquisition,

neurologic music therapy, and socio-cultural learning theory.

Particular attention was given to research on rhythmic entrainment, predictive auditory processing, hierarchical cognition, syntax-related processing, memory consolidation, auditory-motor coordination, and music-mediated learning environments (Asano & Boeckx, 2015; Cason & Schön, 2012; Herff et al., 2024; Patel, 2003, 2011; Rohrmeier & Koelsch, 2012; Thaut & Hoemberg, 2015). These areas of literature do not establish direct equivalence between music and language acquisition. However, they suggest that partially overlapping cognitive mechanisms may contribute to temporal prediction, sequencing, expectancy formation, and structured auditory processing relevant to both domains.

The article is also based on educational theories associated with constructivism and socio-cultural learning. Constructivist perspectives propose that learners actively internalise knowledge through meaningful engagement and progressively structured input rather than through passive reception alone. Repetition, pattern recognition, and scaffolded progression therefore become important components of adult learning environments. Similarly, socio-cultural approaches influenced by Vygotskian traditions emphasise guided participation, mediated learning, imitation, and collaborative interaction as mechanisms supporting movement toward greater learner autonomy. Within this methodological framing, musical organisation is treated as a pedagogical resource that can be deliberately related to grammatical sequencing, phonological awareness, lexical repetition, and communicative pacing.

The development of the framework was also shaped by reflective work with musical compositions created specifically for educational purposes. Unlike commercially produced songs adapted secondarily for classroom use, the pedagogical materials discussed in this article were designed to foreground particular linguistic structures. This distinction constitutes one of the principal conceptual contributions of the paper. Illustrative examples referenced throughout the article include *Suéñame* and *El niño feliz*, pedagogically oriented compositions developed for advanced and beginner learners of Spanish. These materials integrate repetitive sentence structures, phonological reinforcement, grammatical sequencing, and rhythmic predictability in order to support structured exposure and learner participation. Their inclusion within the article serves an illustrative and conceptual function rather than providing formal experimental validation.

At the same time, the present model recognises several limitations and areas of uncertainty. Music-based learning cannot be assumed to benefit all learners

equally. Individual differences relating to musical background, cognitive profile, learning preferences, linguistic experience, and affective disposition may significantly influence engagement and effectiveness. It is also acknowledged that current research on music and language interaction remains theoretically diverse and, in some areas, methodologically contested. While several studies report positive relationships between rhythmic processing, phonological awareness, auditory prediction, and language learning outcomes (Delogu et al., 2010; Gordon et al., 2015; Huang, 2023), questions regarding transferability, long-term retention, and causal mechanisms remain insufficiently resolved.

2.2 Genesis of the PDMI Framework

The PDMI framework did not emerge from a single theoretical premise, but from a gradual development across intercultural, pedagogical, and therapeutic contexts. An early stage was shaped in 2001 at the Centro Cultural Ricardo Rojas of the Universidad de Buenos Aires, within language education programmes for adults over the age of sixty who were returning to university learning. As a language teacher in this context, the methodological challenge was to work with learners whose needs differed from those of younger adult students, particularly in relation to memory, attention, confidence, oral participation, and tolerance for repetition. Rhythm-based activities were therefore introduced as part of a modified pedagogical approach. Coordinated clapping, patterned repetition, paced oral production, and group synchronisation were used to support basic sentence patterns, verb forms, lexical items, and formulaic expressions. These experiences suggested that rhythm could provide an organising structure for attention, repetition, oral participation, and the internalisation of introductory linguistic patterns in later-life language learning.

A subsequent stage developed between 2002 and 2006 at Centro Cultural La Movida in Vienna, through activities organised in connection with the Tiempo bookshops. Literary readings, concerts, tango workshops, and other participatory cultural events allowed Spanish to be experienced through poetry, music, movement, and social interaction. Although these were not formal language courses, they showed how vocabulary, rhythm, pronunciation, and communicative confidence could be reinforced through culturally meaningful participation.

Between October 2007 and March 2011, this work was further developed at the Foreign Language Centre of the University of Greifswald through the course *Singing Spanish Learning*, which used group singing as a pedagogical medium for Spanish language learning.

Literary and musical materials, including songs such as *Te quiero*, with text by Mario Benedetti set to music by Alberto Favero, were adapted for classroom use (Benedetti & Favero, 1975). Through these materials, learners engaged with authentic linguistic and cultural content by means of repetition, phrase segmentation, melodic contouring, and coordinated group vocal production. These experiences helped clarify the pedagogical value of musical phrasing for vocabulary recall, syntactic awareness, pronunciation practice, and learner willingness to repeat complex material in ways that differed from conventional drill-based instruction.

From 2011 onwards, further observations emerged from clinical music therapy work in institutional medical contexts at Universitätsmedizin Greifswald, particularly within palliative medicine and the Parkinson Complex Treatment programme of the Department of Neurology. In these settings, principles related to Neurologic Music Therapy, as developed in the work of Michael Thaut, offered an important clinical reference point for observing how rhythm, melody, vocal engagement, and structured repetition could support speech initiation, communicative activation, memory access, and verbal participation in patients with neurological or cognitive difficulties. Although these experiences did not constitute formal clinical research for the present article and are not presented as evidence of therapeutic efficacy, they were conceptually important. These observations suggested that, when rhythmically and melodically organised interventions appear to support communicative access in populations with impaired or vulnerable language pathways, similar musical principles may also hold pedagogical potential for supporting language learning in healthy adult learners.

Taken together, these stages show the gradual movement from intercultural music-language practice, to rhythm-based adult instruction, singing-based language learning, therapeutic observation, and finally to the creation of purpose-designed pedagogical materials such as *Suéñame* and *El niño feliz*. This developmental trajectory is central to the present article because it explains why PDMLs are proposed not merely as a theoretical construct, but as a pedagogical model emerging from long-term educational and music-therapeutic experience.

2.3 Conceptual Foundations of Purpose-Designed Musical Interventions

The theoretical basis of the PDMI framework is situated within a broader field of research that examines the relationship between music and language as interconnected, though distinct, human capacities. Rather

than treating music and language as entirely separate cognitive domains, comparative research has increasingly explored how both may involve shared processes related to auditory perception, sequencing, hierarchical organisation, memory, prediction, and neural integration (Patel, 2008). This perspective is especially relevant for the present article, since it allows musical structure to be considered not as an external addition to language learning, but as a possible pedagogical medium through which linguistic patterns may be organised, repeated, and internalised.

Purpose-Designed Musical Interventions are based on the idea that musical organisation may provide a structured medium through which linguistic forms are experienced in temporal, rhythmic, emotional, and cognitive ways. From this perspective, language learning is not understood only as the memorisation of isolated vocabulary or grammatical rules, but also as engagement with patterned systems of auditory expectation, repetition, and communicative sequencing.

One important theoretical influence on the framework comes from research on predictive processing in music cognition. Studies in this area suggest that listeners continuously form expectations about likely continuations in rhythm, melody, and harmonic movement (Rohrmeier & Koelsch, 2012; Tillmann et al., 2014). Similar forms of expectancy have also been discussed in relation to linguistic processing, particularly in grammar recognition, sentence completion, and discourse anticipation (Patel, 2003). In the proposed framework, these parallels are not taken as evidence that music and language operate through identical cognitive systems. Rather, they are understood as theoretically compatible mechanisms that may support structured learning environments.

Rhythmic organisation is another central element of the PDMI model. Research on auditory motor entrainment suggests that rhythm may influence timing, coordination, segmentation, and attentional regulation (Thaut, 2015; Tierney & Kraus, 2013). In language learning contexts, rhythmic repetition may therefore help learners perceive syllable timing, stress patterns, connected speech, and pronunciation contours that are often difficult to acquire through written exposure alone.

The theory of hierarchical cognition and grouping theory, as developed by Lerdahl and Jackendoff (1983), proposes that musical understanding is organised through nested grouping structures and hierarchical relationships. Comparable forms of hierarchical organisation are also central to language, where words combine into phrases, clauses, and larger discourse structures. The PDMI framework therefore proposes that carefully structured musical grouping may support chunking processes

involved in vocabulary learning, phrase acquisition, and grammatical sequencing.

Taken together, these elements converge with the OPERA hypothesis, which proposes that musical training may strengthen neural encoding relevant to speech processing when overlap, precision, emotion, repetition, and attention are present (Patel, 2011). In this sense, the hypothesis provides an integrative theoretical basis for understanding how structured musical engagement may support attention and auditory discrimination in language learning contexts, without implying direct neurological transfer.

The PDMI framework also addresses the socio-emotional dimensions of adult learning. Adult learners often experience anxiety, self-consciousness, motivational fluctuation, and fear of oral error during foreign language acquisition. Music-mediated environments may provide emotionally supportive contexts that encourage participation, repetition, and collaborative interaction (Cores-Bilbao et al., 2019; Kim et al., 2024). From this perspective, musical repetition is not understood merely as mechanical rehearsal, but as a meaningful and socially mediated communicative activity.

Importantly, the framework does not assume that every use of music is pedagogically effective. Purpose-Designed Musical Interventions differ from incidental music use because they are constructed around specific linguistic objectives. These elements are therefore organised according to pedagogical priorities rather than commercial musical conventions. Figure 1 illustrates the interdisciplinary structure of the PDMI framework, while Table 1 summarises the main theoretical foundations informing the model.

Figure 1 presents PDIMs as emerging from the convergence of applied linguistics, music cognition, cognitive neuroscience, constructivist and socio-cultural learning theories, neurologic music therapy, and adult language pedagogy. Together, these areas provide a basis for understanding how musical and linguistic structures may be deliberately aligned to support pronunciation awareness, grammatical reinforcement, rhythmic sequencing, learner engagement, and memory retention. The figure is intended as a conceptual synthesis, not as evidence of empirically verified causation.

3. Discussion and Framework Development

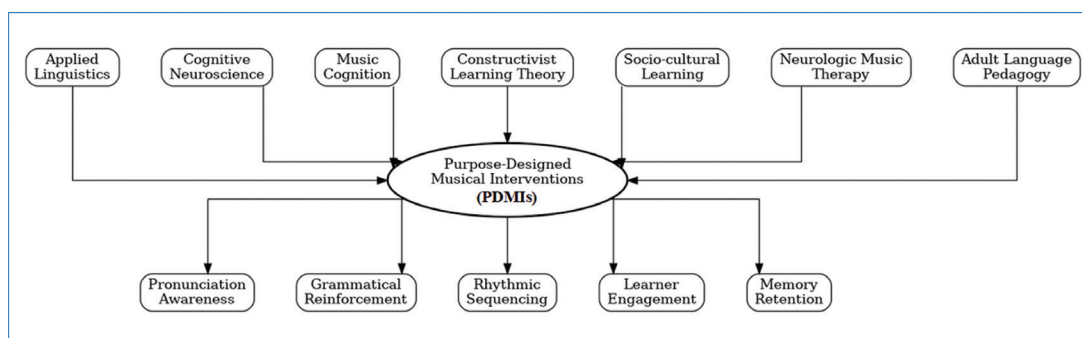
3.1 Music, Cognition, and Adult Language Processing

One of the central ideas of the Purpose-Designed Musical Interventions framework is that music may serve as a structured pedagogical medium for supporting processes involved in adult foreign language acquisition.

Table 1. *Integrated Harmonic, Cognitive, and Linguistic Correspondences Supporting the PDMI Framework*

Harmonic Function / Structural Principle	Core Description in Music Cognition Literature	Pedagogical and Linguistic Application in the Present Study	Key Sources
Tonic	Central point of tonal stability. Harmonic movement tends to resolve toward it, creating repose, closure, and completion.	Functions as a pedagogical equivalent of sentence completion, semantic closure, and full stop punctuation. Useful for reinforcing completed grammatical forms, declarative statements, and syntactic finality.	Lerdahl & Jackendoff (1983); Bigand et al. (2005)
Dominant	Generates instability, forward motion, and expectancy, producing a strong tendency toward resolution to the tonic.	Represents suspense, open meaning, verbal drive, interrogative force, or structures requiring continuation. Useful for modelling action verbs, questions, and anticipatory clauses.	Bigand & Pineau (1997); Rohrmeier & Koelsch (2012)
Subdominant	Broadens tonal space and frequently prepares movement toward the dominant before cadential closure.	Functions as a transitional device comparable to connectors, subordinate clauses, or preparatory discourse movement. Useful for introducing new linguistic material or preparing syntactic progression.	Lerdahl & Jackendoff (1983)
Deceptive Cadence	Expected cadential resolution is redirected toward an alternative harmony, creating surprise, revision, and reanalysis.	Mirrors contrastive discourse markers such as <i>however</i> , <i>but</i> , or unexpected semantic turns. Useful for teaching contrast, exception, irregular forms, and altered expectation in language.	Cecchetti et al. (2023); Margulis (2005)
Modulation	Change of tonal centre reorganises hierarchical relations around a new reference point.	Functions as topic shift, contextual change, new section, or altered communicative frame. Useful for signalling transitions in dialogue, tense, register, or thematic focus.	Margulis (2005); Lerdahl & Jackendoff (1983)
Hierarchical Structure	Musical cognition is organised through nested levels including grouping, metric organisation, and prolongational relations.	Parallels linguistic hierarchy from words to phrases, clauses, and larger discourse units. Supports sequencing of vocabulary, grammar, and sentence construction.	Lerdahl & Jackendoff (1983); Patel (2003); Rohrmeier (2011)
Grouping Structure	Listeners perceive musical events as coherent units rather than isolated sounds.	Supports chunking of lexical items, formulaic expressions, and sentence segments, thereby reducing cognitive load and aiding retention in adult learners.	Lerdahl & Jackendoff (1983); Margulis (2005)
Metric Structure	Regular pulse and accent patterns guide temporal expectation, coordination, and attentional focus.	Assists pronunciation, syllable timing, stress placement, speech rhythm, and fluency in foreign language learning.	Lerdahl & Jackendoff (1983); Thaut & Hoemberg (2015)
Tension and Resolution	Musical meaning often emerges through cycles of expectancy, delay, instability, and fulfilment.	Can sustain learner attention, motivate anticipation of grammatical outcomes, and reinforce memory through patterned closure.	Bigand et al. (2005); Tillmann et al. (2014); Margulis (2005)
Predictive Processing	Listeners continuously anticipate likely continuations based on learned tonal regularities and contextual probabilities.	Supports grammar prediction, sentence completion, faster recognition of recurring language patterns, and expectancy-based learning within PDMIs.	Tillmann et al. (2014); Patel (2008); Herff et al. (2024)
Syntax Parallels	Structural relations in music and language involve partially overlapping mechanisms of hierarchical integration and expectancy management.	Supports the intentional alignment of harmonic movement with grammatical sequencing and clause organisation in pedagogical composition.	Patel (2003); Asano & Boeckx (2015); Rohrmeier (2011)

Note. Table 1 integrates tonal hierarchy theory, expectancy research, harmonic cognition, and language processing literature to illustrate how musical structure may be pedagogically aligned with grammatical and communicative functions within Purpose-Designed Musical Interventions.

**Figure 1.** *Theoretical Architecture of the Purpose-Designed Musical Interventions (PDMI) Framework*

Note. Conceptual representation of the main fields informing the PDMI model and their convergence in structured music-mediated language learning.

Although the relationship between music and language remains theoretically complex, research suggests that both domains involve temporal organisation, sequencing, auditory discrimination, predictive processing, and hierarchical pattern recognition (Asano & Boeckx, 2015; Patel, 2003; Sammler & Elmer, 2020).

Adult learners often experience difficulty internalising grammatical structures, pronunciation patterns, and prosodic features because foreign language instruction frequently separates linguistic form from embodied communicative rhythm. In many classroom contexts, grammar is taught through explanation, memorisation, and written drills. These methods remain pedagogically valuable, but they may not always provide sufficient auditory, rhythmic, and procedural reinforcement.

Research in music cognition helps to explain this possibility. Studies suggest that listeners anticipate rhythmic continuation, melodic movement, and harmonic resolution while engaging with music (Rohrmeier & Koelsch, 2012; Tillmann et al., 2014). Comparable forms of expectancy also operate in language processing, where listeners anticipate syntactic continuation, lexical probability, and sentence completion (Patel, 2003). These parallels should not be interpreted as evidence that music and language function through identical mechanisms. Rather, they suggest that structured musical environments may support attention, sequencing, and anticipation during language learning.

Rhythm is especially important within this model. Rhythmic organisation may help learners perceive syllable timing, stress distribution, speech pacing, and phrase segmentation, all of which are central to communicative competence. Research on auditory motor synchronisation indicates that rhythmic engagement may support temporal coordination and phonological discrimination (Cason & Schön, 2012; Tierney & Kraus, 2013). In adult foreign language learning, repeated rhythmic exposure may therefore offer learners an additional pathway for practising pronunciation patterns through embodied and vocal repetition, rather than relying only on explicit correction.

The relationship between rhythm and grammar is also relevant. Empirical and theoretical studies have associated rhythmic discrimination, grammatical skills, musical syntax, and hierarchical processing with broader mechanisms of auditory and linguistic organisation (Gordon et al., 2015; Herff et al., 2024; Kunert et al., 2015). Within the PDMI framework, these findings are used cautiously. The article does not claim that music directly teaches grammar. Rather, it proposes that carefully organised rhythm, melody, and repetition may create favourable conditions for repeated exposure

to grammatical patterns and for the reinforcement of linguistic sequencing.

Melody may also contribute to memory organisation and recall. Musically organised material may support verbal retention through repetition, segmentation, and emotional salience (Chen, 2020; Fernández de Cañete García et al., 2022). Adult learners may remember phrases more effectively when they are embedded in melodic and rhythmic contexts than when they are presented only as isolated vocabulary or grammatical items. In this sense, music may support not only cognitive processing, but also motivation and persistence during learning tasks that require repetition.

Pronunciation and phonological awareness are another important part of the framework. Adult learners often find it difficult to perceive and reproduce unfamiliar phonetic distinctions, stress patterns, and prosodic contours. Rhythmically guided vocal engagement may support aspects of pronunciation learning, speech imitation, and auditory discrimination (Delogu et al., 2010; Zhang et al., 2024). Within the PDMI model, repetitive melodic phrasing and rhythmic pacing are therefore carefully organised to foreground phonological contrast, stress positioning, and articulatory repetition.

At the same time, music-mediated learning cannot be assumed to benefit all learners in the same way. Musical complexity, genre preference, prior musical experience, cultural familiarity, and individual learning profiles may influence learner response. For some learners, excessive musical density or rapid pacing may increase cognitive load rather than facilitate comprehension. The PDMI framework therefore emphasises pedagogical flexibility and careful design rather than universal prescription.

The affective dimension is also central. Adult language learners frequently experience anxiety, self-monitoring, and reluctance to participate orally. Music-mediated repetition may reduce some of this pressure by embedding oral practice within collective, rhythmically guided activity. Studies examining music and language learning have suggested that musical engagement may support learner confidence, socio-emotional participation, and motivation (Cores-Bilbao et al., 2019; Kim et al., 2024). Thus, the PDMI framework understands music not as an isolated cognitive tool, but as a pedagogical medium that may bring together rhythm, pronunciation, memory, engagement, and social participation.

3.2 Purpose-Designed Musical Interventions as Pedagogical Design

A defining feature of the PDMI framework is the distinction between the incidental classroom use of

songs and the deliberate design of pedagogical music. In many language learning environments, commercially available songs are incorporated to increase motivation, introduce cultural material, or diversify classroom activity. Such practices may be valuable, but the linguistic structure of commercial songs is not necessarily aligned with pedagogical sequencing, grammatical progression, pronunciation practice, or beginner-level comprehension.

Purpose-Designed Musical Interventions differ in both intention and construction. Within the PDMI framework, musical material is composed or organised specifically to support targeted linguistic objectives. Musical and linguistic elements are designed in relation to learner needs and instructional aims. The pedagogical focus therefore lies not only in using music, but in aligning musical form with linguistic purpose.

This distinction emerged through reflective pedagogical practice across language teaching, intercultural education, and music-supported communicative contexts. This earlier trajectory helped clarify the need to move from adapted literary and musical repertoire towards pedagogical compositions designed specifically around linguistic objectives. Repeated observations suggested that learners showed greater tolerance for repetition when grammatical structures were embedded within musically organised material, especially when oral practice occurred within a shared rhythmic and vocal context.

Within the PDMI model, repetition is therefore not treated as mechanical rehearsal alone. It functions as patterned communicative exposure shaped by musical expectancy, temporal organisation, and meaningful

Table 2. *Core Theoretical Foundations Supporting Purpose-Designed Musical Interventions*

Framework	Core idea	Relevance to PDMI	Key authors
Shared Syntactic Integration Resource Hypothesis	Music and language share neural resources for processing hierarchical structures, especially syntax.	Supports the alignment of musical syntax with grammatical syntax in order to reinforce structural processing.	Patel (2003); Kunert et al. (2015)
Statistical Learning in Music and Language	The brain extracts regularities, transitional probabilities, and hierarchical patterns from structured auditory input.	Supports repeated exposure to rhythmically and melodically organised linguistic material.	Daikoku (2018)
Auditory Processing Theory	Musical experience may enhance auditory discrimination, phonological awareness, and segmentation.	Supports pronunciation, syllable perception, stress placement, and phonological encoding in language learning.	Gordon et al. (2015)
Neuroplasticity and Cross Modal Transfer	Musical activity may induce functional and structural changes relevant to speech and language processing.	Supports the use of structured musical input with adult learners despite age-related learning challenges.	Hyde et al. (2009); Habib et al. (2016)
OPERA Hypothesis	Music may enhance speech processing when overlap, precision, emotion, repetition, and attention co-occur.	Provides a central neurocognitive rationale for designing PDIMs as precise, repeated, emotionally engaging, and attention-sustaining learning materials.	Patel (2011); Tierney et al. (2013)
Constructivism	Knowledge is actively constructed through interaction, repetition, and progressive structuring.	Supports the use of guided musical activities through which learners build grammatical understanding step by step.	Piaget (1972)
Zone of Proximal Development	Learning develops through mediated support within the learner's potential range.	Supports the movement from guided listening and repetition towards increasingly independent language production.	Vygotsky (1978)
Neurologic Music Therapy and Rhythmic Entrainment	Rhythm and melody may support timing, speech coordination, attention, and communicative activation.	Supports the use of rhythm and melody as organising mechanisms for pronunciation, fluency, and memory.	Thaut & Hoemberg (2015)
Music Cognition and Auditory Neuroplasticity	Musical engagement activates auditory, motor, memory, and emotional systems involved in learning.	Supports the interdisciplinary link between musical processing, language learning, memory, and affective engagement.	Särkämö & Huottilainen (2013); Sihvonen et al. (2022)
Musical Expectation and Predictive Processing	Listeners anticipate musical continuations through melodic, rhythmic, and harmonic patterns.	Supports the PDMI principle that harmonic and melodic expectation can parallel grammatical anticipation and sentence closure.	Margulis (2005); Tillmann et al. (2014); Bigand et al. (2005)

Note. This table synthesises the principal theoretical foundations supporting the PDMI framework. The model draws on music and language syntax, auditory processing, neuroplasticity, statistical learning, constructivist pedagogy, and music therapy to justify the intentional alignment of musical structure with linguistic content.

participation. Recurrent melodic phrasing may help learners anticipate sentence structure, stress placement, and lexical recurrence. Rhythmic predictability may also support pacing and articulatory coordination during oral production.

The instructional article *Aprender español con la canción “Suéñame”: Den bejahten Imperativ üben*, published by the German pedagogical publisher RAABE Verlag (Alio-Warr, 2022), provides an early example of this transition from adapted musical material to purpose-designed pedagogical composition. Based on the song *Suéñame*, originally conceived as an instructional composition integrating imperative constructions, subjunctive forms, and selected past tense structures within a coherent rhythmic and melodic framework (Amonada Zeon, 2021), the publication demonstrates how grammatical targets can be embedded within memorable musical phrases. Rather than functioning only as a motivational classroom song, the material allows repeated exposure to morphosyntactic patterns through performance, listening, guided recall, and pedagogically structured classroom activities.

This material was implemented with pre-university learners in German secondary education contexts. Students engaged not only in receptive activities, such as listening, repetition, and singing, but also in productive tasks involving guided songwriting, lyric transformation, controlled substitution, and oral reconstruction. By using the original composition as a structural template, learners were able to create their own linguistic output while maintaining greater grammatical control. In this respect, the design supported a movement from controlled repetition towards semi-guided production, linking memorisation with active language use rather than treating them as separate processes.

A further illustration is *El niño feliz*, a purpose-designed composition developed for beginner learners of Spanish and aligned with foundational A1.1 content. The song encodes basic structures including present tense forms of verb *ser*, expressions of origin such as *ser de*, affirmative and negative sentence patterns, gender and number agreement, singular and plural forms, noun adjective combinations, and introductory future constructions such as *ir a*. Its lexical and phonological design is also intentional: the word *niño* introduces the phoneme /n/, while high-frequency vocabulary, repeated phrases, and recurring agreement patterns support early phonological awareness and exposure to core morphological features.

Within this model, *Suéñame* and *El niño feliz* show how pedagogical music can move beyond general exposure or classroom motivation. In both cases, musical

structure functions as a scaffold for grammatical encoding, phonological reinforcement, and learner production. The examples are not presented as empirical proof of effectiveness, but as practice-based illustrations of how the PDMI framework may be translated into concrete instructional design.

Musical expectancy and harmonic movement may also contribute to learner attention and emotional engagement. Research on musical expectation suggests that anticipation and resolution play an important role in listener engagement (Tillmann et al., 2014). In educational settings, such expectancy may help sustain participation during repeated learning sequences. The framework does not claim that harmonic progression directly encodes grammatical knowledge in a one-to-one manner. Rather, it assumes that harmonic, melodic, and rhythmic organization may create musically structured conditions of anticipation, repetition, salience, and closure, which can support the processing and retention of linguistic patterns. This position is consistent with research on musical syntax and shared syntactic integration resources, as well as with Neurologic Music Therapy approaches in which musical structure is used to scaffold speech, language, memory, and cognitive functions.

The socio-emotional dimension of the framework is equally important. Adult learners may bring prior experiences of linguistic insecurity, fear of error, or communicative self-consciousness. Group-based musical engagement may create a more collaborative and less evaluative environment in which vocal participation becomes shared rather than individually exposed. This perspective is consistent with research suggesting that music-mediated learning environments may support socio-emotional engagement and learner confidence (Cores-Bilbao et al., 2019; Kim et al., 2024).

For this reason, PDMIs should be understood as pedagogical tools rather than as replacements for established language teaching methods. Grammar explanation, communicative interaction, reading development, writing practice, and corrective feedback remain essential components of adult foreign language education. The contribution of PDMIs lies in their capacity to enrich these processes through structured auditory exposure, rhythmic reinforcement, learner engagement, and emotionally supportive repetition.

Figure 2 illustrates the proposed pedagogical sequencing of a Purpose-Designed Musical Intervention within adult foreign language learning contexts. The process begins with the identification of specific linguistic objectives, followed by their translation into musical and pedagogical design choices. Learners are subsequently engaged through guided listening, repetition, vocal

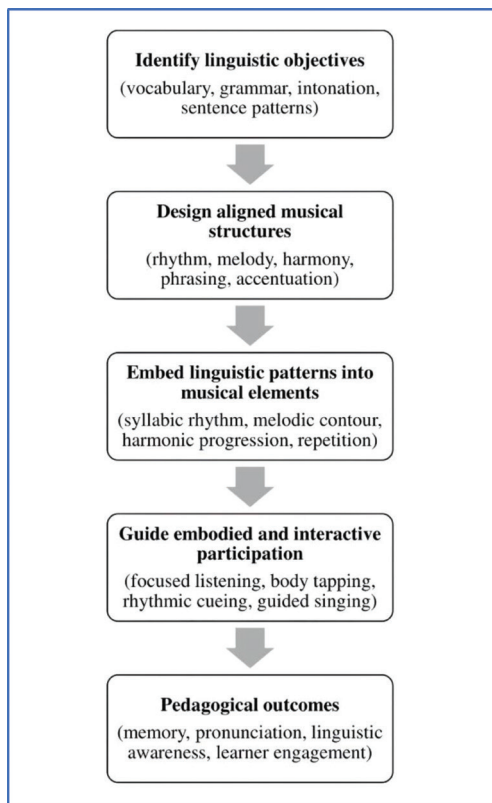


Figure 2. Pedagogical Flow of a Purpose-Designed Musical Intervention (PDMI)

Note. This figure presents the proposed pedagogical sequence of a Purpose-Designed Musical Intervention within adult foreign language learning.

participation, rhythmic reinforcement, and contextual communicative practice. The framework proposes that repeated exposure to intentionally structured musical patterns may contribute to pronunciation awareness, grammatical familiarity, memory consolidation, and learner confidence. The process-oriented structure represented in the figure is conceptual and pedagogical in nature and should not be interpreted as evidence of experimentally validated learning outcomes.

3.3 Educational Interpretation, Benefits, and Limitations of PDMIs

The educational relevance of Purpose-Designed Musical Interventions lies in their capacity to organise language learning through rhythm, repetition, melody, and shared participation. These elements may contribute to several dimensions of adult foreign language learning, including rhythmic anticipation, pronunciation awareness, grammatical sequencing, memory-related recall, and learner confidence. Carefully designed musical experience may create supportive conditions for language practice when aligned with specific pedagogical objectives.

Rhythmic entrainment is one of the central concepts informing this interpretation. Human learning is

responsive to patterned temporal regularities, particularly when rhythm, pulse, and repetition are organised coherently (Thaut & Hoemberg, 2015; Tierney & Kraus, 2013). In language learning contexts, rhythmic regularity may support syllable segmentation, stress recognition, pronunciation pacing, and auditory attention. Adult learners often struggle with prosodic timing and connected speech because these features are difficult to internalise through written instruction alone. Structured rhythmic repetition may therefore provide an additional temporal frame through which linguistic patterns can be experienced and rehearsed.

Predictive auditory processing also contributes to the model, although it should be understood in educational rather than medical terms. Listeners form expectations regarding melodic continuation, harmonic progression, and rhythmic resolution (Rohrmeier & Koelsch, 2012; Tillmann et al., 2014). Comparable forms of prediction are involved in language comprehension and grammatical anticipation (Patel, 2003). Within the PDMI model, repeated musical sequencing may help learners become increasingly familiar with grammatical order and sentence pattern regularity. The claim is not that harmony teaches grammar, but that musical expectation may support attention, repetition, and linguistic familiarity.

Memory-related processes are another important aspect of the proposal. Musical repetition has been associated with mnemonic retention, especially in relation to sequential verbal material and patterned recall (Särkämö & Huotilainen, 2013). In adult foreign language learning, repeated exposure to rhythmically organised linguistic structures may contribute to familiarity, automatised, and recall efficiency. The repetitive nature of music may also increase tolerance for rehearsal, which is particularly relevant because repeated practice is often necessary for pronunciation development and grammatical consolidation. Although the model is also shaped by experience with music-supported work involving neurologic patients, particularly in relation to rhythm, repetition, communicative activation, and vocal engagement, the present article does not present PDMIs as a clinical treatment or medical intervention. These experiences are used instead as part of a broader educational reflection on how structured musical activity may encourage attention, participation, and communicative practice in adult learning contexts. This distinction is important because the focus of the present proposal is pedagogical, not clinical.

The socio-emotional dimension of PDMIs is especially relevant for adult learners. Anxiety, embarrassment, and fear of oral error may inhibit pronunciation practice and spontaneous communication. Group musical participation, guided vocal repetition, and rhythm-based

interaction may contribute to a more collaborative and less evaluative learning atmosphere (Cores-Bilbao et al., 2019; Kim et al., 2024). The structured and repetitive nature of musical activities may also reduce perceived performance pressure by shifting attention towards collective participation rather than individual accuracy alone.

At the same time, important limitations must be recognised. Music-mediated learning should not be assumed to benefit all learners equally. Individual differences in musical background, personality, cultural familiarity, learning preferences, and affective disposition may influence learner response. Some adult learners may feel uncomfortable with singing or group participation.

Furthermore, while interdisciplinary research suggests meaningful relationships between music and language-related processing, several proposed mechanisms remain theoretically suggestive rather than empirically established. Current research does not yet provide definitive consensus regarding the extent to which musical engagement directly enhances grammatical acquisition, long-term retention, or communicative fluency across diverse adult learner populations.

The value of PDMIs lies in enriching language learning environments through structured auditory engagement, rhythmic reinforcement, pronunciation practice, emotional support, and repeated communicative exposure. Their effectiveness will depend on careful instructional design, learner context, appropriate musical complexity, and integration within broader language pedagogy.

Table 3 summarises several pedagogical possibilities together with corresponding limitations associated with the PDMI framework. While structured musical engagement may contribute positively to learner participation, rhythmic awareness, pronunciation practice, and repetition tolerance, these potential benefits should be interpreted cautiously and contextually. Individual learner differences, cultural familiarity with musical participation, cognitive preferences, and instructional

design quality may significantly influence outcomes. The present framework therefore advocates Purpose-Designed Musical Interventions as a complementary pedagogical approach rather than a universal instructional solution.

4. Conclusion

This article proposes the framework of Purpose-Designed Musical Interventions (PDMIs) as a conceptual and practice-informed pedagogical approach to adult foreign language acquisition. Drawing upon interdisciplinary scholarship in applied linguistics, music cognition, cognitive neuroscience, educational theory, and neurologic music therapy, the framework explores how intentionally structured musical composition may support pronunciation awareness, grammatical sequencing, rhythmic processing, learner engagement, and memory-related learning processes. A central contribution lies in distinguishing purpose-designed pedagogical music from the incidental classroom use of commercially available songs. Within the PDMI framework, rhythm, melody, repetition, harmonic expectancy, and prosodic organisation are intentionally aligned with specific linguistic objectives. The framework therefore proposes that music may function not merely as motivational accompaniment, but as a structured pedagogical medium within adult language learning environments.

The article has additionally emphasised that the relationship between music and language should be approached cautiously and critically. While interdisciplinary scholarship increasingly suggests meaningful interactions between rhythmic processing, auditory prediction, attention, and language-related cognition, many proposed mechanisms remain theoretically suggestive rather than empirically conclusive. Accordingly, the PDMI framework is presented as an exploratory interdisciplinary proposal for pedagogical innovation.

By integrating theoretical synthesis with practice-based pedagogical reflection, the article contributes to growing discussions concerning music-mediated

Table 3. *Potential Benefits and Pedagogical Limitations of Purpose-Designed Musical Interventions (PDMIs)*

Potential Benefits	Potential Limitations
Increased repetition tolerance	Learner discomfort with singing or musical participation
Improved rhythmic and prosodic awareness	Cultural variability in musical preference and familiarity
Pronunciation reinforcement through structured repetition	Potential cognitive overload if musical complexity is excessive
Enhanced learner engagement and participation	Requires specialised pedagogical and compositional design
Reduced language anxiety in supportive learning contexts	Limited empirical validation across diverse learner populations
Support for grammatical sequencing and chunking	Effectiveness may vary according to learner background and aptitude

Note. This table outlines selected pedagogical benefits and limitations of Purpose-Designed Musical Interventions.

learning, adult education, cognitive engagement, and interdisciplinary approaches to language pedagogy. At the same time, it recognises the importance of methodological caution, learner variability, and empirical verification in evaluating the broader applicability of music-based instructional design.

4.1 Implications for Language Learning and Communicative Support

The PDMI framework carries several potential implications for adult foreign language pedagogy and related interdisciplinary learning environments. In language education contexts, specifically tailored musical materials may provide alternative pathways for engaging learners who experience difficulty with conventional grammar-centred or textbook-dominated instructional approaches. Rhythmically organised repetition, melodic reinforcement, and prosodic patterning may assist some learners in sustaining attention, increasing repetition tolerance, and developing familiarity with pronunciation and grammatical sequencing.

The framework may be particularly relevant in adult beginner contexts where affective barriers, language anxiety, and fear of oral participation frequently inhibit communicative engagement. Group musical participation and rhythm-based repetition may contribute to more collaborative and emotionally supportive learning environments in which learners feel more comfortable experimenting with pronunciation and oral production. In this sense, music-mediated pedagogical design may support not only linguistic exposure but also learner confidence and classroom participation.

The interdisciplinary nature of the framework also suggests possible relevance beyond conventional language classrooms. Scholarship in neurologic music therapy and music-supported rehabilitation has increasingly explored relationships between rhythm, speech timing, memory engagement, and communicative participation (Särkämö & Huotilainen, 2013; Thaut & Hoemberg, 2015). Although the present article does not make clinical claims, the framework may hold exploratory value for future research concerning communicative support in ageing populations, rehabilitation-oriented language engagement, and cognitively supportive learning environments.

Similarly, the framework may offer useful perspectives for intercultural education, community-based learning initiatives, and lifelong learning programmes involving adult learners from diverse linguistic and educational backgrounds. Because music frequently operates as a socially shared and emotionally mediated experience, carefully designed pedagogical compositions may contribute to increased motivation, participation, and

collaborative interaction across multicultural educational settings.

Purpose-Designed Musical Interventions are not presented as therapeutic treatment or as universally effective pedagogical practice. Rather, the framework highlights possible interdisciplinary directions through which music-mediated learning environments may contribute to future educational innovation and research.

4.2 Limitations of the Present Framework

Several important limitations should be acknowledged in relation to the present framework. First, the article is conceptual and practice-informed rather than empirically validated. The arguments advanced throughout the paper are derived from interdisciplinary theoretical synthesis together with long-term pedagogical observation and reflective educational practice. No formal experimental design, participant analysis, longitudinal measurement, or statistical evaluation was conducted within the scope of the present study.

Second, many of the neurocognitive relationships discussed in the article remain theoretically compatible rather than conclusively established. While existing scholarship suggests potential connections between rhythmic processing, predictive auditory mechanisms, memory-related functions, and language learning, the precise nature and extent of these relationships continue to be debated within the literature. Consequently, the framework should not be interpreted as evidence of direct neurological transfer between music cognition and grammatical acquisition.

Third, the pedagogical effectiveness of music-mediated learning is likely to vary substantially across learner populations. Individual differences relating to musical background, cognitive style, cultural familiarity, personality, motivation, and language proficiency may significantly influence learner engagement and instructional outcomes. Some adult learners may respond positively to rhythm-based pedagogical environments, while others may experience discomfort, distraction, or increased cognitive load.

The framework is additionally limited by its reliance upon illustrative pedagogical examples rather than systematically evaluated instructional interventions. The compositions *Suéñame* and *El niño feliz* are discussed as practice-informed examples of intentionally structured musical design, but they have not yet been subjected to controlled comparative investigation across diverse educational contexts.

Although the article briefly considers possible implications for rehabilitation-oriented communication support, these discussions remain exploratory and

non-clinical in nature. No therapeutic efficacy claims are being made, and formal clinical research would be required before any rehabilitation-related applications could be meaningfully evaluated.

4.3 Future Research Directions

The PDMI framework opens several promising directions for future interdisciplinary research. Most importantly, systematic empirical investigation is required in order to evaluate the pedagogical effectiveness of Purpose-Designed Musical Interventions across diverse adult learner populations and instructional contexts. Future studies may benefit from mixed-methods approaches combining quantitative assessment with qualitative learner experience analysis.

Experimental and quasi-experimental research designs could examine whether intentionally structured musical interventions contribute to measurable differences in pronunciation accuracy, grammatical retention, listening comprehension, learner motivation, repetition tolerance, or communicative confidence when compared with conventional instructional approaches. Longitudinal studies would be particularly valuable in assessing retention effects and sustained learner engagement over time.

Further investigation is also needed concerning learner variability. Future research should examine how factors such as age, musical background, language proficiency, cognitive profile, cultural familiarity with music, and affective disposition influence responsiveness to music-mediated pedagogical design. Such work would help clarify whether specific learner groups benefit more substantially from structured musical interventions than others.

Additional interdisciplinary research involving cognitive neuroscience and music cognition may likewise contribute to deeper understanding of the mechanisms potentially underlying music-language interaction. Studies exploring auditory prediction, rhythmic synchronisation, speech timing, attentional regulation, and memory-related processing may help refine theoretical interpretations of how structured musical engagement relates to adult language learning processes.

Pedagogical design research represents another important area for future inquiry. Further studies may explore how tempo, melodic complexity, repetition density, prosodic alignment, harmonic expectancy, and lyrical structure influence learner engagement and linguistic processing. Comparative analysis between commercially available songs and purpose-designed pedagogical compositions may also provide valuable insight into instructional effectiveness.

Exploratory research concerning rehabilitation-oriented communicative engagement, healthy ageing, and community-based adult learning may further extend the interdisciplinary relevance of the framework. However, such investigations should proceed cautiously and ethically, particularly in contexts involving clinical or vulnerable populations. These future directions suggest that Purpose-Designed Musical Interventions represent a potentially productive area for continued dialogue between applied linguistics, music cognition, educational theory, and interdisciplinary pedagogical research.

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During the preparation of this manuscript, the authors used Generative AI and AI-assisted technologies solely for editorial purposes, including language refinement, grammar correction, stylistic improvement, and the enhancement of clarity and coherence. These tools were not used to generate the research ideas, theoretical framework, analysis, interpretation, arguments, or conclusions presented in the manuscript. All intellectual content, conceptual development, methodological decisions, and scholarly interpretations remain the sole responsibility of the author.

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