International Journal of Linguistics and Translation Studies
Volume 4, Issue 2, 2023
Homepage: http://ijlts.org/index.php/ijlts/index
DOI: https://doi.org/10.36892/ijlts.v4i2.748

Schema Activation and Listening Comprehension in EFL Secondary Students: Evidence from a Quasi-Experimental Study in Morocco

Dr. Mohamed Ouhejjou
Faculty of Languages, Letters and Arts, Ibn Tofail University, Kénitra, Morocco
**Email:* mohamed.ouhejjou@uit.ac.ma

How to cite:
Ouhejjou, M. . (2023). Schema Activation and Listening Comprehension in EFL Secondary Students: Evidence from a Quasi-Experimental Study in Morocco. International Journal of Linguistics and Translation Studies, 4(2), 98–115. https://doi.org/10.36892/ijlts.v4i2.748

ARTICLE HISTORY
Received: *15/01/2023*
Accepted: *10/03/2023*

Keywords:
schema theory; listening comprehension; schema activation; pre-listening instruction; background knowledge; EFL; Moroccan secondary education

Abstract

This study investigates the extent to which schema-based pre-listening instruction improves the listening comprehension of Moroccan EFL secondary students. A quasi-experimental pretest–posttest design was employed with 68 third-year baccalaureate students from a secondary school in Kénitra, Morocco, assigned to experimental (n = 35) and control (n = 33) groups. Over a five-week intervention, the experimental group received pre-listening instruction incorporating brainstorming, vocabulary pre-teaching, graphic organizers, and KWL chart activities, whereas the control group received conventional instruction. Data were collected through a listening comprehension test battery, a background knowledge probe, and a 20-item attitude questionnaire. Results showed that the experimental group significantly outperformed the control group on post-intervention listening measures, with large effect sizes observed after ANCOVA adjustment (partial η^2 = .71). Prior knowledge varied systematically across thematic units and was moderately to strongly associated with comprehension performance (r = .44–.61). Learners with lower prior knowledge registered the largest gains from instruction. Attitudinal findings revealed strongly positive perceptions of schema-based instruction, particularly regarding vocabulary pre-teaching and anxiety reduction. The study extends schema theory research to the Moroccan EFL context and supports the pedagogical value of schema activation in listening instruction.

1. Introduction

Listening comprehension occupies a central yet persistently underemphasized position in both second language acquisition research and classroom practice. It is not only the first skill to emerge in naturalistic acquisition contexts but also a primary gateway to the development of speaking, reading, and writing, insofar as meaningful production is largely contingent on prior comprehension (Rost, 2011; Rubin, 1995; Vandergrift, 2007). From a cognitive standpoint, listening is best understood not as a passive reception of acoustic signals but as an active and interactive process in which bottom-up decoding mechanisms operate alongside top-

down inferential strategies (Buck, 1994). Within this framework, schema theory offers a theoretically grounded account of how prior knowledge structures enable listeners to interpret incoming information meaningfully by mapping it onto pre-existing cognitive frameworks — a reconstructive process conditioned by what the listener already knows rather than a straightforward retrieval of encoded meaning (Bartlett, 1932; Rumelhart, 1980; Anderson, 1984). The activation of relevant schemata prior to a listening task has accordingly been theorized as a mechanism for reducing the cognitive load associated with top-down processing, thereby liberating attentional resources for the more demanding operations of phonological and lexical decoding at the bottom-up level (Buck, 1994; Peterson, 2001).

Notwithstanding this well-established theoretical grounding, schema theory has been more extensively applied to the reading modality than to listening, and the empirical research base on schema activation in listening instruction remains comparatively limited — particularly in EFL secondary education contexts and in non-East-Asian settings (Vandergrift, 2003). This geographic lacuna is consequential in the Moroccan EFL context, where listening materials frequently deal with topics that are culturally or disciplinarily distant from learners' background knowledge, and where teachers have limited access to professional development on listening pedagogy (Ouhejjou, 2019). The present study does not advance a theoretically novel hypothesis — the beneficial role of schema activation in listening comprehension has been established in the literature. Rather, its contribution is twofold: it provides an empirical test of schema activation effects within a Moroccan EFL secondary context, thereby extending the geographic and sociocultural scope of the existing evidence base; and it operationalizes the theoretically important but empirically underexplored distinction between schema availability and schema activation through the use of a purpose-built background knowledge probe.

Three research questions guide the investigation. The first asks whether schema-based pre-listening instruction yields measurable improvements in listening comprehension performance relative to conventional instruction. The second examines how learners' background knowledge profiles interact with listening comprehension across topics of varying cultural and disciplinary familiarity. The third explores learners' attitudinal responses to schema-based pre-listening strategies. The scope of the study is delimited to third-year baccalaureate learners at an intermediate level of EFL proficiency, using curriculum-mandated listening materials over a five-week intervention period. The paper proceeds as follows: Section 2 reviews the relevant theoretical and empirical literature; Section 3 describes the methodology; Sections 4 and 5 present and discuss the results respectively; Section 6 draws conclusions and outlines directions for further research.

2. Literature Review

2.1 Schema Theory: Foundations and Typology

Schema theory traces its origins to Bartlett's (1932) experimental work on reconstructive memory, which demonstrated that human recall is an active reconstruction shaped by prior knowledge and cultural conventions rather than a passive retrieval process. This foundational insight was formalized by Rumelhart (1980), who modelled schemata as hierarchically organized knowledge units guiding both perception and inference, and extended to language education by Anderson (1984), who argued that reading and listening comprehension are schema-driven processes in which textual or acoustic input functions as a set of cues triggering relevant prior knowledge structures.

Within applied linguistics, three principal schema types bear on L2 comprehension. Content schemata encode background knowledge about topics and situations, enabling

listeners to draw inferences beyond what is explicitly stated. Formal schemata represent knowledge of discourse structures and genre conventions, helping listeners anticipate the flow of information. Cultural schemata encode culturally specific scripts and norms, the absence of which can impede comprehension even when content and formal schemata are otherwise adequate (Alptekin, 2006; Carrell, 1984). These types interact dynamically during comprehension, and their relative salience varies as a function of the topic and context of the listening task.

A theoretically consequential distinction — one not always observed with sufficient care in empirical research — is that between schema availability and schema activation. The former refers to the presence of relevant knowledge structures in long-term memory; the latter refers to their active mobilization during online processing. Instructional intervention may accordingly need to address not only gaps in students' knowledge but also the failure to deploy knowledge already available — a distinction operationalized empirically in the present study through the use of a background knowledge probe administered prior to each listening unit.

2.2 Schema Theory, Listening Comprehension, and Pedagogical Techniques

Although schema theory was initially applied primarily to reading, its extension to listening is both theoretically justified and empirically supported. Unlike reading, which allows for re-processing and self-pacing, listening involves real-time decoding of transient acoustic input under temporal pressure, with limited opportunity for regression or repair. This places particularly heavy demands on working memory and requires listeners to coordinate bottom-up phonological, lexical, and syntactic parsing with top-down schema-driven inference simultaneously (Buck, 1994; Peterson, 2001). Schema activation functions as a compensatory mechanism within this architecture: by making relevant conceptual frameworks available prior to input, it reduces the cognitive cost of top-down processing and liberates attentional capacity for more demanding bottom-up operations. This theoretical position is further enriched by Vandergrift and Goh's (2012) metacognitive model of L2 listening, which foregrounds self-monitoring, planning, and evaluation as central to effective comprehension — processes that pre-listening schema activation directly facilitates by enabling learners to form expectations against which incoming input can be monitored. Field's (2008) process-based account similarly emphasizes targeting specific cognitive processes rather than merely assessing comprehension outcomes, an orientation that schema activation instruction serves by preparing the cognitive terrain before auditory input is encountered.

Empirical studies have provided broadly convergent, though not fully consistent, evidence for this view. Chung (1999, 2002) demonstrated that advance organizer conditions significantly improved listening comprehension in Chinese EFL learners. Vandergrift (2003) showed that prediction-based pre-listening strategies enhanced both comprehension and metacognitive awareness. Long (1990) similarly reported positive effects of background knowledge activation on listening performance. Variability across studies — attributable to differences in proficiency levels, task types, and operationalization of schema activation — nonetheless precludes overly confident generalizations, and the underrepresentation of North African and Arabophone contexts remains a consequential gap that the present study is designed to address.

Several pedagogical techniques have been proposed and empirically tested for activating prior knowledge before listening:

Brainstorming — the elicitation of learners' existing associations with a topic before exposure to the input — not only activates topically relevant schemata but renders implicit

knowledge explicit and shareable, creating a collective schema-building process in the classroom (Vandergrift, 1999, 2003).

Graphic organizers — including semantic maps, Venn diagrams, KWL charts, and flow charts, serve a dual function: activating and organizing prior knowledge in the pre-listening phase while providing a structural scaffold for note-taking and retention during and after listening (Moore & Readence, 1984; Nesbit & Adesope, 2006; Jiang, 2012).

Vocabulary pre-teaching — targeting lexical schema activation specifically. Beck et al. (1982) established that pre-taught items must be key terms in the target passage, introduced in semantically coherent sets and limited in number, so as to function effectively as schema-activating cues that enable listeners to form content expectations and reduce the disruption caused by unknown words during online processing.

These techniques are most effective when deployed in combination rather than in isolation, as each targets a distinct facet of the schema activation process.

3. Methodology

3.1 Research Design

A quasi-experimental pretest–posttest control group design was adopted. Random assignment of individual students to conditions was not feasible within the institutional constraints of a public secondary school in Morocco, where class timetables and administrative structures require the use of intact classroom groups. The consequent non-equivalence of groups prior to assignment necessitated the administration of a pretest to assess baseline comparability, in accordance with the established conventions of non-equivalent group designs (Campbell & Stanley, 1963). This design necessarily limits the strength of causal inference that can be drawn from the findings, and this limitation is revisited in Section 5.6.

3.2 Participants

The participants comprised 68 third-year baccalaureate students from the scientific stream at Abdelmalik Saadi High School in Kénitra, Morocco, enrolled during the first academic term of 2023. The experimental group (EG) comprised 35 students and the control group (CG) comprised 33 students. Both groups were taught by the same experienced EFL teacher throughout the study period, a procedural decision taken with a view to controlling for teacher effect as a potential confounding variable. All participants were Arabic-speaking Moroccan nationals with broadly comparable formal English instruction histories of approximately eight years, assessed as intermediate proficiency on the basis of in-school placement data. Informed consent was obtained from the participating teacher, and student data were fully anonymized prior to analysis. The study was conducted within the regular school curriculum, ensuring that no participant was placed at any disadvantage as a result of involvement in the research.

3.3 Instruments and Materials

Three instruments were employed, each designed to address a specific research question, and their combined use is intended to ensure full investigative coverage without redundancy.

- **Listening comprehension test battery (RQ1).** A pretest and posttest were administered to both groups before and after the intervention respectively, with a view to establishing baseline

equivalence and measuring subsequent gains. Each test combined multiple question types — wh-questions, completion items, multiple-choice questions, and true/false items — targeting three levels of comprehension: literal items requiring identification of explicitly stated information; inferential items requiring schema-driven reasoning beyond the explicit content; and global comprehension items assessing identification of main ideas and discourse organization. This layered design reflects the theoretical expectation that schema activation benefits higher-order inferential processing more than verbatim recall. All materials were drawn from the official third-year EFL curriculum mandated by the Moroccan Ministry of Education (Units 1–5), ensuring both content validity and ecological validity. Construct validity was addressed procedurally by administering tests immediately after each listening segment without note access. Internal consistency reliability was not independently calculated, as item-level response data were not retained separately from total scores during data collection. The instruments were, however, drawn directly from curriculum materials validated and standardized by the Ministry for use at this proficiency level, and their content validity is consequently supported by the institutional calibration process through which they were developed. This represents an acknowledged limitation of the study's psychometric documentation, and future research should incorporate independently validated instruments with reported reliability indices.

- **Background knowledge probe (RQ2).** A purpose-built probe was administered prior to each of the five listening units, comprising six to eight items assessing learners' familiarity with the unit topic, relevant vocabulary, and cultural or disciplinary context. This instrument operationalizes background knowledge as a directly measurable variable — the Background Knowledge Index (BKI, maximum = 14) — rather than as an inference drawn from stream membership or demographic characteristics, a methodological refinement that addresses a gap commonly noted in schema-theory listening research. Probe items were developed on the basis of the thematic and lexical content of each unit, drawing on objectives specified in the official curriculum guidelines, and were reviewed by the participating teacher for content relevance and proficiency-level appropriateness. The probe was subsequently piloted with 12 students from the same school not participating in the main study, to check item clarity and administration time; ambiguous items were revised or removed on the basis of pilot feedback. Internal consistency was satisfactory across all five units, with Cronbach's alpha coefficients ranging from .76 to .84 (Unit 1: $\alpha = .78$; Unit 2: $\alpha = .81$; Unit 3: $\alpha = .76$; Unit 4: $\alpha = .84$; Unit 5: $\alpha = .82$).
- **Attitude questionnaire (RQ3).** A twenty-item Likert-scale questionnaire (1 = strongly disagree, 5 = strongly agree) was administered to experimental group students following the intervention. It was organized around three analytically distinct dimensions: perceived usefulness, assessed separately for each strategy type; affective engagement, capturing students' emotional experience of schema-activated relative to conventional lessons; and perceived comprehension support, addressing whether students felt the strategies facilitated their understanding and prediction of content. Reliability was confirmed via Cronbach's alpha, as reported in Section 4.3.

The table below summarizes how each instrument maps onto the research questions:

Table 1. *Instrument–Research Question Mapping*

Instrument	RQ1	RQ2	RQ3
Pretest/posttest listening battery	Primary	Secondary	—
Background knowledge probes (×5)	—	Primary	—
Attitude questionnaire (20-item Likert)	—	—	Primary

3.4 Procedure and Data Analysis

The intervention lasted five weeks. Prior to instruction, the participating teacher received a briefing session on schema theory and its pedagogical implications from the researcher, so as to ensure consistency in implementation. The EG received pre-listening instruction incorporating brainstorming, vocabulary pre-teaching, visual prompts and contextual cues, graphic organizers, and completion of the K and W columns of a KWL chart. During listening, students engaged in guided note-taking. Post-listening activities included L column completion

followed by a short paragraph-writing task on the unit topic. The CG received conventional instruction without systematic schema activation. Both groups completed listening tasks based on the same curriculum-mandated materials throughout the intervention period.

Quantitative data were analyzed using SPSS. Within-group pre–post differences were examined using paired-samples t-tests; between-group comparisons were conducted using independent-samples t-tests; and an ANCOVA was performed with pretest scores as the covariate to control for potential baseline differences. For RQ2, Pearson correlation analyses examined the relationship between the BKI and listening comprehension performance, and one-way ANOVA compared listening scores across BKI profiles categorized as high, moderate, or low. For RQ3, questionnaire responses were analyzed using descriptive statistics, Cronbach's α, and Pearson correlations to explore relationships among attitudinal dimensions. Effect sizes are reported using Cohen's d for t-tests and η^2 for ANOVA throughout.

A post-hoc power analysis was conducted using G*Power (Faul et al., 2007) to evaluate sample size adequacy for the primary between-group comparison. With the observed effect size ($d = 3.48$), an alpha level of .05, and the present sample sizes ($n_1 = 35$, $n_2 = 33$), the achieved statistical power was .99, indicating adequate power for the primary treatment effect. The exploratory subgroup analyses — particularly for the low-BKI subgroup ($n = 8$) — were, however, substantially underpowered, and the corresponding findings should accordingly be interpreted as preliminary and hypothesis-generating rather than confirmatory.

4. Results

4.1 Listening Comprehension Performance (RQ1)

Descriptive statistics for pretest and posttest scores are presented in Table 2.

Table 2. *Descriptive Statistics for Pretest and Posttest Scores*

Group	N	Test	M	SD
EG	35	Pretest	4.93	0.94
EG	35	Posttest	8.33	0.69
CG	33	Pretest	4.94	0.89
CG	33	Posttest	5.86	0.74

The two groups were virtually identical at pretest (EG: $M = 4.93$; CG: $M = 4.94$), confirming baseline equivalence prior to the intervention. Following treatment, a pronounced divergence emerged: the EG achieved substantially higher posttest scores ($M = 8.33$) than the CG ($M = 5.86$), pointing to a strong positive effect associated with schema-based instruction.

Within-Group Comparisons. Paired-samples t-tests were conducted to examine changes over time within each group (Table 3).

Table 3. *Paired-Samples t-Tests for Within-Group Comparisons*

Group	Mean Difference	t	df	p	Cohen's d	95% CI
Experimental	3.40	22.15	34	< .001	3.74	[3.09, 3.71]
Control	0.92	9.48	32	< .001	1.65	[0.72, 1.12]

Both groups demonstrated statistically significant improvement over the intervention period; however, the magnitude of change differed markedly. The EG exhibited a substantial gain (Mdiff = 3.40, d = 3.74), whereas the CG showed a comparatively modest increase (Mdiff = 0.92, d = 1.65). The CG's improvement is consistent with a practice effect — gains attributable to repeated exposure rather than to any specific instructional treatment (DeKeyser, 2007) — while the substantially larger EG gains indicate that schema activation confers measurable added value beyond practice alone.

Between-Group Comparison. An independent-samples t-test was conducted to compare posttest performance across groups (Table 4).

Table 4. *Independent-Samples t-Test for Posttest Scores*

Group	M	SD	t	df	p	Cohen's d	95% CI
EG	8.33	0.69	14.37	66	< .001	3.48	[2.13, 2.81]
CG	5.86	0.74					

The results confirm a statistically significant difference in posttest scores favoring the EG. The effect size (d = 3.48) reflects a substantial practical advantage, though it remains subject to the design and sampling caveats discussed fully in Section 5.1.

ANCOVA Results. An ANCOVA was conducted with posttest scores as the dependent variable and pretest scores as the covariate (Table 5).

Table 5. *ANCOVA Summary for Posttest Scores*

Source	SS	df	MS	F	p	Partial η^2
Pretest (Covariate)	18.52	1	18.52	36.41	< .001	.36
Group	78.64	1	78.64	154.67	< .001	.71
Error	32.92	65	0.51			

The covariate significantly predicted posttest performance, confirming the influence of prior ability. Crucially, the group effect remained highly significant after controlling for pretest scores, indicating that the observed differences are attributable to the instructional treatment rather than to baseline variation. The large effect size (partial $\eta^2 = .71$) indicates that instructional condition accounted for a substantial proportion of variance in posttest outcomes. Adjusted means (Table 6) further corroborate this pattern.

Table 6. *Adjusted Means for Posttest Scores*

Group	Adjusted M	SE
EG	8.28	0.12
CG	5.91	0.12

Even after statistical adjustment for pretest performance, the EG maintained a clear advantage, reinforcing the robustness of the treatment effect within the constraints of the present design.

4.2 Background Knowledge and Listening Comprehension (RQ2)

The background knowledge probe was administered prior to each listening unit to assess learners' schema availability across five thematic domains. Table 7 presents mean BKI scores for the full sample (N = 68).

Table 7. *Mean Background Knowledge Index (BKI) Scores by Unit*

Unit	Topic	M (SD)
1	Formal, Informal, Non-formal Education	9.2 (2.4)
2	Cultural Issues and Values	10.1 (2.1)
3	Gifts of Youth	9.8 (2.3)
4	Women and Power	8.4 (2.7)
5	Advances in Science & Technology	7.9 (2.9)

The results reveal systematic variation in schema availability across thematic domains. Higher BKI scores were observed in Units 2 and 3, which are closely aligned with learners' sociocultural experience, while Units 4 and 5 yielded lower scores, confirming that background knowledge is topic-dependent rather than uniformly distributed. To examine individual differences, learners were classified into three profiles based on their overall BKI (M = 9.08, SD = 2.56): high (BKI ≥ 11.0, 22%), moderate (BKI 7.5–10.9, 53%), and low (BKI ≤ 7.4, 25%). While most learners possess moderate background knowledge, a substantial proportion exhibit limited schema availability — a profile that may constrain comprehension and that the instructional intervention is specifically designed to address.

Relationship Between Background Knowledge and Listening Performance. Pearson correlation analyses were conducted between unit-specific BKI scores and corresponding pretest comprehension scores (Table 8), examined prior to the intervention so as to isolate the natural relationship between schema availability and comprehension in the absence of instructional manipulation.

Table 8. *Correlations Between BKI and Listening Comprehension (Pretest)*

Unit	r	p
1	.52	< .01
2	.48	< .01
3	.44	< .01
4	.61	< .001
5	.58	< .001

Moderate to strong positive correlations were found across all units, indicating that higher schema availability is consistently associated with better listening performance at baseline. The strongest associations emerged in Units 4 and 5 — precisely the topics with the lowest BKI scores — suggesting that prior knowledge becomes increasingly consequential as topics become less familiar or more cognitively demanding.

Interaction Between Schema Availability and Listening Performance. To address RQ2 more directly, listening comprehension scores were compared across BKI profiles using one-way ANOVA for each unit (Table 9).

Table 9. *Listening Comprehension Scores by BKI Profile and ANOVA Results (Pretest, N = 68)*

Unit	High BKI	Moderate BKI	Low BKI	F	p	η^2
1	6.8	5.9	4.2	8.31	< .001	.20
2	7.2	6.1	4.5	9.04	< .001	.22
3	7.0	6.0	4.3	7.92	< .001	.19
4	6.5	5.2	3.8	12.45	< .001	.27
5	6.3	4.9	3.5	14.27	< .001	.30

***Note**: Scores are out of 10. All η² values exceed the .14 threshold for large effects (Cohen, 1988).*

Learners with higher BKI scores consistently outperformed those with lower scores across all units, and the performance disparity was particularly pronounced in Units 4 and 5, where differences between high- and low-schema groups exceeded 2.5 score points, attesting to the fact that schema availability interacts with topic familiarity and exerts its most powerful effect where background knowledge is most limited.

Exploratory Analysis: Interaction with Instruction. To examine whether schema activation instruction differentially benefited learners with varying levels of prior knowledge, comprehension gains were compared across BKI profiles within the experimental group (n = 35). Given the small subgroup sizes involved, these analyses are exploratory and the findings should accordingly be interpreted with caution (Table 10).

Table 10. *Listening Comprehension Gains by BKI Profile (Experimental Group)*

BKI Profile	n	Pretest M (SD)	Posttest M (SD)	Gain	t	df	p	Cohen's d
Low (≤ 7.4)	8	3.9 (0.8)	6.9 (0.9)	+3.0	6.82	7	< .001	2.41
Moderate (7.5–10.9)	18	5.1 (0.7)	8.4 (0.7)	+3.3	11.45	17	< .001	3.04
High (≥ 11.0)	9	6.5 (0.6)	8.2 (0.8)	+1.7	4.52	8	.002	1.51

Three patterns emerge. First, all BKI subgroups demonstrated statistically significant gains, reflecting the broad effectiveness of the intervention irrespective of prior knowledge level. Second, low- and moderate-BKI learners registered comparable absolute gains (+3.0 and +3.3 points respectively), substantially exceeding those of high-BKI learners (+1.7 points), indicating that schema activation instruction was most consequential where prior knowledge was most limited. Third, despite this substantial improvement, low-BKI learners did not fully reach the posttest levels of their high-BKI peers (6.9 vs. 8.2), suggesting that schema activation can partially compensate for limited prior knowledge but cannot entirely substitute for its absence — a finding directly relevant to the theoretical distinction between schema availability and schema activation outlined in Section 2.1.

4.3 Student Attitudes Toward Schema-Based Instruction (RQ3)

The attitude questionnaire was administered to 33 of the 35 experimental group students following the intervention, two students being absent on the day of administration. Given the modest sample size, the findings are best regarded as preliminary and interpreted in conjunction with the effect sizes. Table 11 presents descriptive statistics and internal consistency indices for the overall scale and its three sub-dimensions.

Table 11. *Descriptive Statistics and Reliability for the Attitude Questionnaire*

Scale	Items	Possible Range	M	SD	Skewness	Cronbach's α
Total Questionnaire	20	20–100	81.2	8.7	−0.48	.89
Perceived Usefulness	8	8–40	33.4	4.2	−0.35	.86
Affective Engagement	6	6–30	23.9	3.8	−0.52	.83
Comprehension Support	6	6–30	23.9	4.0	−0.41	.84

Learners reported highly positive attitudes toward schema-based instruction ($M \approx 4.06$ per item). The negative skewness across all scales indicates a concentration of responses toward the agreement end, attesting to a consistently favorable evaluation. All subscales exceeded the accepted reliability threshold ($\alpha \geq .70$).

Perceived Usefulness by Strategy Type. Table 12 summarizes mean usefulness ratings for each instructional technique.

Table 12. *Perceived Usefulness by Strategy Type*

Strategy Type	M (out of 5)	SD
Vocabulary pre-teaching	4.40	0.60
Activating prior knowledge (general)	4.20	0.70
Brainstorming	4.10	0.70
Prediction-focused activities	4.00	0.80
Graphic organizers	3.90	0.90
KWL charts	3.70	1.00

All strategies were rated positively ($M > 3.5$), with vocabulary pre-teaching emerging as the most valued technique. KWL charts received comparatively lower ratings, though still above neutral — a result that likely reflects the greater cognitive demands and metalinguistic awareness this strategy requires rather than any inherent ineffectiveness. A repeated-measures comparison confirmed that vocabulary pre-teaching was rated significantly higher than both KWL charts ($p < .001$, $d = 0.73$) and graphic organizers ($p = .004$, $d = 0.54$).

Affective Engagement. Table 13 summarizes key affective indicators.

Table 13. *Affective Engagement Indicators*

Dimension	M (out of 5)	SD
Reduced anxiety	4.10	0.70
Increased motivation	4.10	0.80
Increased confidence	4.00	0.80
Enjoyment/interest	3.75	0.90

A retrospective comparison based on students' recall of prior listening lessons revealed significantly lower perceived anxiety during schema-activated lessons compared to conventional instruction ($p < .001$, $d = 0.89$). It should not be missed, however, that retrospective comparisons are subject to recall bias, demand characteristics, and social desirability effects — all of which may have inflated the perceived difference between conditions — and this finding should accordingly be interpreted with considerable caution. Future research should employ concurrent validated anxiety measures, such as adapted versions of the Foreign Language Classroom Anxiety Scale (Horwitz et al., 1986), administered during both conventional and schema-activated lessons to enable a more methodologically robust comparison. Gains in enjoyment, while statistically significant ($p = .009$, $d = 0.49$), were comparatively more moderate, suggesting that schema activation primarily enhances affective readiness by reducing cognitive and emotional barriers to comprehension rather than by substantially elevating intrinsic motivation.

Perceived Comprehension Support. Table 14 presents mean ratings across core comprehension functions.

Table 14. *Perceived Comprehension Support*

Function	M (out of 5)	SD
Main idea comprehension	4.20	0.70
Following the listening	4.10	0.80
Inferencing (guessing meaning)	4.00	0.80
Tolerance of ambiguity	3.90	1.00
Knowledge integration	3.90	0.80
Information retention	3.80	0.90

The highest ratings were associated with global comprehension and processing fluency, suggesting that schema activation primarily supports top-down processing mechanisms during real-time listening. Somewhat lower ratings for information retention indicate that its benefits are more pronounced during comprehension itself than in subsequent memory consolidation — a distinction bearing on post-listening activity design.

Relationships Among Attitudinal Dimensions. Pearson correlations revealed moderate-to-strong positive relationships among the three subscales: perceived usefulness and comprehension support ($r = .64$, $p < .01$); perceived usefulness and affective engagement ($r = .58$, $p < .01$); and affective engagement and comprehension support ($r = .61$, $p < .01$). Learners who perceived the strategies as useful were correspondingly more inclined to report improved comprehension and more positive affective experiences, reinforcing the view that cognitive and affective dimensions of listening are deeply interconnected.

5. Discussion

5.1 Schema Activation and Listening Comprehension Performance (RQ1)

The results provide clear empirical support for the view that structured schema-based pre-listening instruction improves the listening comprehension of Moroccan EFL secondary students relative to conventional instruction, a finding consistent with the interactive model of listening (Buck, 1994). Within this model, schema activation functions as a compensatory mechanism: by making relevant conceptual frameworks available before listening, it reduces the cognitive cost of top-down processing and liberates attentional resources for the more demanding bottom-up operations of phonological and lexical decoding (Peterson, 2001). The ANCOVA results — which sustained a large group effect (partial $\eta^2 = .71$) after controlling for pretest performance — indicate that the observed differences are attributable to the instructional treatment rather than to pre-existing group differences, thus strengthening the case for a treatment effect within the constraints of the quasi-experimental design. The CG's more modest but significant improvement ($d = 1.65$) attests to the contribution of practice effects (DeKeyser, 2007), while the substantially larger EG gains demonstrate that schema activation provides added value that practice alone cannot account for.

It remains incumbent, however, to engage critically with the magnitude of the effect sizes yielded by the present study, as values of $d = 3.74$ and $d = 3.48$ substantially exceed what the classroom intervention literature in applied linguistics typically reports — contexts in which d values above 1.0 are already considered large by conventional standards (Cohen, 1988). It would be misleading to interpret these figures as straightforward indicators of the intervention's absolute efficacy without accounting for the specific study conditions that, in combination, produced such inflation. Four contributing factors warrant identification. First, the low pretest baseline — both groups performing at approximately 4.93 out of 10 prior to the intervention — created considerable room for improvement, amplifying mean differences and inflating the numerators of effect size calculations in what the methodological literature terms

a floor proximity effect (Slavin & Smith, 2009). Second, the sample's homogeneity — all participants being third-year baccalaureate students from a single institution's scientific stream with comparable English instruction histories — produced small pooled standard deviations that compress the denominator of the Cohen's d formula and mathematically inflate the resulting values irrespective of the actual instructional effect. Third, the five-week intervention duration favors larger short-term effect estimates than longitudinal designs sustain, insofar as the benefits of novelty, heightened attention, and concentrated instructional focus dissipate as interventions extend over time (Slavin & Smith, 2009). Fourth, the possibility of novelty effects cannot be discounted: students in the EG were exposed to an instructional approach that differed markedly from their prior classroom experience, and their motivational and attentional response to that novelty may have contributed to performance gains independently of the schema activation content per se. Taken together, these four conditions produce effect size estimates that, while mathematically accurate and honestly reported, are best interpreted as local and context-specific. The 95% confidence intervals around these estimates — approximately [2.71, 4.25] for $d = 3.48$ and [2.89, 4.59] for $d = 3.74$ — further attest to the statistical uncertainty that attaches to point estimates derived from a sample of this size, and serve as a quantitative reminder that replication under more heterogeneous conditions is a necessary precondition for more generalizable claims about effect magnitude.

5.2 Topic Familiarity and Background Knowledge (RQ2)

The background knowledge probe revealed that schema availability is topic-dependent rather than uniformly distributed, a finding that aligns with the theoretical position outlined in Section 2.1. Culturally proximate topics — Units 2 and 3 (cultural values and youth experience) — yielded higher BKI scores ($M = 9.8–10.1$), while disciplinarily specialized topics — Units 4 and 5 (gender and science/technology) — produced lower scores ($M = 7.9–8.4$). This pattern is a direct corollary of the fact that Moroccan students' sociocultural experience affords more extensive prior knowledge of topics embedded in everyday social life than of those belonging to academic or politically charged discourses.

The correlations between BKI and pretest comprehension scores — ranging from $r = .44$ to $r = .61$ and strongest precisely where BKI scores were lowest — confirm that prior knowledge is most consequential when topics are most unfamiliar, consistent with Carrell's (1984) observation that cultural schemata exert their strongest effects in conditions of greatest content distance. The ANOVA results corroborate this pattern: performance gaps between high- and low-BKI learners were widest in Units 4 and 5, where the distance between curriculum content and learner experience was greatest.

The exploratory analysis within the EG adds a further dimension. Low-BKI learners registered substantial absolute gains (+3.0 points), comparable to those of their moderate-BKI peers (+3.3 points) and substantially exceeding those of high-BKI learners (+1.7 points), indicating that schema activation instruction functions as an equity mechanism — most consequential for learners who enter the classroom with the least prior knowledge. That said, low-BKI learners did not fully reach the posttest levels of their high-BKI peers (6.9 vs. 8.2), attesting to the fact that schema activation can partially compensate for, but not entirely substitute, absent background knowledge. The theoretical distinction between schema availability and schema activation is thus empirically sustained.

5.3 Learner Attitudes (RQ3)

The strongly positive attitudinal profile ($M = 4.06$ per item) attests to the perceived value of schema-based instruction across cognitive and affective dimensions. Vocabulary pre-

teaching emerged as the most favorably rated strategy (M = 4.40), a finding coherent with Field's (2008) identification of unfamiliar vocabulary as the most immediate and disruptive barrier to listening comprehension. When key vocabulary is pre-taught, the disruption caused by unknown words during online processing is reduced in a way that learners can perceive directly — hence the tangibility of its benefit relative to strategies whose value is more diffuse or delayed. KWL charts were rated lowest (M = 3.70), not because they are inherently less effective, but because they demand a level of metacognitive awareness and strategic orientation unlikely to be developed in a five-week period without more explicit scaffolding. This distinction carries direct implications for instructional practice, as discussed in Section 5.5.

The large effect associated with anxiety reduction (d = 0.89) is consistent with Krashen's (1982) affective filter hypothesis, which holds that a lowered affective state creates more favorable conditions for language comprehension and acquisition. While this hypothesis has been subject to theoretical critique regarding its falsifiability and empirical grounding (Gregg, 1984; White, 1987), its core intuition — that affective states mediate cognitive engagement with language input — retains explanatory utility in instructional contexts and finds broader support in the SLA anxiety literature (Horwitz, Horwitz & Cope, 1986; MacIntyre & Gardner, 1994). Graham's (2011) suggestion that schema activation primarily reduces negative emotional states rather than generating positive ones finds support in the more modest enjoyment gains (d = 0.49) — a distinction between anxiety reduction and intrinsic motivation that deserves more attention in future research.

The perceived comprehension support ratings — highest for main idea comprehension (M = 4.20) and following the listening (M = 4.10), somewhat lower for retention (M = 3.80) — indicate that schema activation benefits real-time top-down processing more than post-listening memory consolidation, consistent with Field's (2008) process-based account, and suggest that supplementary post-listening activities may be needed to extend these benefits to the retention phase. The moderate-to-strong correlations among attitudinal dimensions (r = .58–.64) reinforce the view that cognitive and affective dimensions of listening are deeply interconnected rather than operating independently.

5.4 Integration Across Findings

Taken together, the three sets of findings converge on a coherent and theoretically consistent picture. Schema activation improves listening comprehension by reducing cognitive load during top-down processing, and this benefit is modulated by topic familiarity: learners with limited prior knowledge gain most from instruction but do not fully close the performance gap with their higher-knowledge peers, underscoring the complementary and non-substitutable roles of schema availability and schema activation. From the learner's perspective, vocabulary pre-teaching is valued for its immediate tangibility, while anxiety reduction constitutes the most salient affective benefit. The study extends the schema theory literature to a North African EFL context that has hitherto been underrepresented, operationalizes the availability/activation distinction in an empirically tractable way, and provides a differentiated attitudinal profile of learner perceptions that goes beyond single-dimension global measures.

5.5 Pedagogical Implications

The findings carry actionable implications for EFL teachers and curriculum designers operating within the Moroccan secondary education system, though it remains incumbent to frame these as professional recommendations rather than established prescriptions, given the design constraints acknowledged below.

Teachers are urged to incorporate systematic pre-listening schema activation into regular classroom practice rather than treating listening as a product-oriented testing activity. The effect sizes reported, even under cautious interpretation, indicate that a modest investment of class time in pre-listening preparation yields substantial comprehension dividends. Vocabulary pre-teaching should be a routine component, with teachers selecting key items judiciously — focusing on terms central to the passage theme that are unlikely to be inferred from context — in accordance with the criteria established by Beck et al. (1982). Teachers should also remain cognizant that topic familiarity strongly moderates comprehension: when curriculum-mandated materials deal with topics culturally or disciplinarily distant from learners' experience, additional schema activation and scaffolding are not optional enhancements but necessary preconditions for effective listening instruction.

The finding that low-BKI learners benefit most from schema activation suggests that pre-listening instruction functions as an equity mechanism and should be prioritized in classes with heterogeneous background knowledge profiles. KWL charts should not be abandoned on the basis of their comparatively lower ratings but introduced with more explicit modelling, a clearer explanation of their metacognitive rationale, and a gradual release of responsibility to students so that the strategy's cognitive demands become assets rather than obstacles. Finally, teachers should communicate to students that pre-listening activities are designed not as additional burdens but as supportive scaffolding that reduces anxiety and builds the predictive confidence that effective listening requires.

5.6 Limitations

Several limitations warrant candid discussion. The sample size is modest (N = 68 for the main experiment; n = 33 for the questionnaire), and the subgroup analyses for low-BKI learners (n = 8) are particularly underpowered; those findings should accordingly be regarded as hypothesis-generating rather than confirmatory. The quasi-experimental design, with its use of intact groups and absence of random assignment, limits the strength of causal inference that can be drawn, although the pretest equivalence and ANCOVA results strengthen the case for a treatment effect. No delayed posttest was administered, leaving open the question of whether observed gains persist over time.

A limitation that warrants substantive acknowledgment concerns the magnitude of the effect sizes. As discussed in Section 5.1, Cohen's d values ranging from 3.04 to 3.74 considerably exceed what the intervention research literature in applied linguistics customarily reports, and their interpretation demands critical circumspection that a straightforward reading of the figures would not afford. The mechanism is rooted in the mathematical properties of the statistic itself: as a ratio of mean difference to pooled standard deviation, d is exquisitely sensitive to sample homogeneity. When participants are drawn from a single institution, a single academic stream, and a narrow proficiency band, the resulting pooled standard deviation is inevitably small, and a small denominator produces a large quotient irrespective of the absolute magnitude of the instructional effect — a condition compounded by the floor proximity of pretest scores and the short intervention duration. The wide 95% confidence intervals around the key estimates — approximately [2.71, 4.25] for d = 3.48 and [2.89, 4.59] for d = 3.74 — reflect the real statistical uncertainty attaching to point estimates derived from a modest and homogeneous sample. Future research should address this limitation by recruiting participants from multiple schools across different regions and streams, extending the intervention period to a full academic semester, administering a delayed posttest to assess the durability of gains, and adopting a fully randomized design where institutional constraints permit.

A further limitation concerns the possibility of a Hawthorne effect. Students in the EG were exposed to an instructional approach that differed markedly from their prior classroom experience, and it cannot be ruled out that the heightened novelty, increased teacher preparation, and additional instruments contributed to improved performance independently of the schema activation content per se. Future research employing active control conditions — in which the CG receives an equally novel but schema-unrelated treatment — would help isolate the specific contribution of schema activation from more general motivational and novelty effects.

5.7 Directions for Further Research

Future research should address the present study's limitations by replicating the design with larger and more diverse samples across multiple Moroccan secondary schools and educational streams. Longitudinal designs incorporating delayed posttests are needed to assess the durability of schema activation gains. The development and validation of a listening test battery with established psychometric properties for the Moroccan EFL context would strengthen the measurement base of future studies. Online rather than retrospective measures of anxiety would reduce the recall bias inherent in the present attitudinal instrument. It would also be instructive to examine whether strategy-specific training — particularly explicit instruction in KWL chart use — improves learners' perceived usefulness of cognitively demanding strategies, and whether schema activation instruction transfers to untaught listening materials beyond the curriculum. Qualitative investigations into learners' subjective experiences of schema activation strategies would complement the quantitative findings reported here and yield insights into the cognitive and affective mechanisms that aggregate statistics cannot capture.

5.8 Theoretical Contributions

The present study makes several contributions to the theoretical literature. First, it provides empirical support for the interactive model of listening (Buck, 1994) by demonstrating that schema activation — a top-down support mechanism — improves comprehension in a modality that places heavy demands on bottom-up decoding, confirming the complementary and mutually facilitating relationship between the two processing modes. Second, it operationalizes and empirically distinguishes between schema availability, measured via the BKI, and schema activation, implemented through pre-listening instruction, showing that both are consequential but that instructional intervention can partially compensate for limited availability — a distinction the literature has theorized but rarely tested directly. Third, it extends the schema theory evidence base to a North African EFL context, demonstrating that patterns documented in Western and East Asian settings generalize to the Moroccan secondary education environment. Fourth, it complements the metacognitive model of listening advanced by Vandergrift and Goh (2012) by showing that pre-listening preparation creates the conditions under which the monitoring and evaluative processes central to that model can operate more effectively.

6. Conclusion

The present study set out to investigate the effects of schema-based pre-listening instruction on the listening comprehension of Moroccan EFL secondary students, while examining the moderating role of background knowledge and learners' attitudinal responses to such instruction. The findings provide convergent evidence across cognitive, performance, and affective dimensions, and it is hoped that they constitute a useful contribution to a literature

that has hitherto underrepresented both the listening modality and the North African EFL context.

The EG significantly outperformed the CG on post-intervention listening comprehension measures, demonstrating that schema activation confers gains that go beyond practice effects alone — though the magnitude of these gains warrants cautious interpretation in light of the study's design constraints. Background knowledge emerged as a consequential moderating variable: schema availability varied systematically across thematic units, with culturally proximate topics yielding higher familiarity scores and disciplinarily specialized topics producing more limited prior knowledge profiles. Learners with the lowest prior knowledge registered the largest absolute gains, suggesting that schema activation functions as an equity mechanism, though they did not fully converge with their higher-knowledge peers — a finding that empirically sustains the theoretical distinction between schema availability and schema activation. Learners reported strongly positive attitudes toward the instructional approach, valuing vocabulary pre-teaching for its immediate tangibility and identifying anxiety reduction as the most salient affective benefit.

Theoretically, the study supports the interactive model of listening by demonstrating how top-down schema activation facilitates bottom-up processing in a real classroom context, and extends the applicability of schema theory to a North African EFL setting that has received scant empirical attention. Practically, it underscores the importance of systematic pre-listening preparation, particularly in contexts where curriculum-mandated materials are culturally or disciplinarily distant from learners' lived experience. The limitations related to sample size, design, and intervention duration preclude definitive generalizations, and further research along the lines outlined in Section 5.7 is needed to establish more robust and transferable conclusions. That said, the starting point is clear enough: listening instruction in Moroccan secondary schools, and in comparable EFL contexts, stands to benefit substantially from a more deliberate and theoretically informed integration of schema activation into everyday pedagogical practice.

7. References

Alptekin, C. (2006). Cultural familiarity in inferential and literal comprehension in L2 reading. System, 34(4), 494–508. https://doi.org/10.1016/j.system.2006.05.003

Anderson, R. C. (1984). Role of the reader's schema in comprehension, learning, and memory. In R. C. Anderson, J. Osborn, & R. J. Tierney (Eds.), Learning to read in American schools: Basal readers and content texts (pp. 243–257). Lawrence Erlbaum Associates.

Bartlett, F. C. (1932). Remembering: A study in experimental and social psychology. Cambridge University Press.

Beck, I. L., McKeown, M. G., & Omanson, R. C. (1982). The effects of long-term vocabulary instruction on lexical access and reading comprehension. Journal of Educational Psychology, 74(4), 506–521. https://doi.org/10.1037/0022-0663.74.4.506

Buck, G. (1994). The appropriacy of psychometric measurement models for testing second language listening comprehension. Language Testing, 11(2), 145–170. https://doi.org/10.1177/026553229401100203

Campbell, D. T., & Stanley, J. C. (1963). Experimental and quasi-experimental designs for research. Rand McNally.

Carrell, P. L. (1984). Schema theory and ESL reading: Classroom implications and applications. The Modern Language Journal, 68(4), 332–343. https://doi.org/10.1111/j.1540-4781.1984.tb04675.x

Chung, J. M. (1999). The effects of using video texts supported with advance organizers and captions on Chinese college students' listening comprehension. Foreign Language Annals, 32(3), 295–308. https://doi.org/10.1111/j.1944-9720.1999.tb01342.x

Chung, J. M. (2002). The effects of using two advance organizers with video texts for the teaching of listening in English. Foreign Language Annals, 35(2), 231–241. https://doi.org/10.1111/j.1944-9720.2002.tb03156.x

Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Lawrence Erlbaum Associates.

DeKeyser, R. M. (Ed.). (2007). Practice in a second language: Perspectives from applied linguistics and cognitive psychology. Cambridge University Press.

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. Behavior Research Methods, 39(2), 175–191. https://doi.org/10.3758/BF03193146

Field, J. (2008). Listening in the language classroom. Cambridge University Press.

Graham, S. (2011). Self-efficacy and academic listening. Journal of English for Academic Purposes, 10(2), 113–117. https://doi.org/10.1016/j.jeap.2011.04.001

Gregg, K. R. (1984). Krashen's monitor and Occam's razor. Applied Linguistics, 5(2), 79–100. https://doi.org/10.1093/applin/5.2.79

Horwitz, E. K., Horwitz, M. B., & Cope, J. (1986). Foreign language classroom anxiety. The Modern Language Journal, 70(2), 125–132. https://doi.org/10.1111/j.1540-4781.1986.tb05256.x

Jiang, X. (2012). Effects of discourse structure graphic organizers on EFL readers' comprehension of expository texts. Asian EFL Journal, 14(1), 94–139. https://doi.org/10.64152/10125/66669

Krashen, S. D. (1982). Principles and practice in second language acquisition. Pergamon Press.

Long, D. R. (1990). What you don't know can't help you: An exploratory study of background knowledge and second language listening comprehension. Studies in Second Language Acquisition, 12(1), 65–80. https://doi.org/10.1017/S0272263100008743

MacIntyre, P. D., & Gardner, R. C. (1994). The subtle effects of language anxiety on cognitive processing in the second language. Language Learning, 44(2), 283–305. https://doi.org/10.1111/j.1467-1770.1994.tb01103.x

Moore, D. W., & Readence, J. F. (1984). A quantitative and qualitative review of graphic organizer research. The Journal of Educational Research, 78(1), 11–17. https://doi.org/10.1080/00220671.1984.10885564

Nesbit, J. C., & Adesope, O. O. (2006). Learning with concept and knowledge maps: A meta-analysis. Review of Educational Research, 76(3), 413–448. https://doi.org/10.3102/00346543076003413

Ouhejjou, M. (2019). Investigating listening comprehension problems in Moroccan high schools [Unpublished master's thesis]. Ibn Tofail University.

Peterson, P. W. (2001). Skills and strategies for proficient listening. In M. Celce-Murcia (Ed.), Teaching English as a second or foreign language (3rd ed., pp. 87–100). Heinle & Heinle.

Rost, M. (2011). Teaching and researching listening (2nd ed.). Longman.

Rubin, J. (1995). The contribution of video to the development of competence in listening. In D. J. Mendelsohn & J. Rubin (Eds.), A guide for the teaching of second language listening (pp. 151–165). Dominie Press.

Rumelhart, D. E. (1980). Schemata: The building blocks of cognition. In R. J. Spiro, B. C. Bruce, & W. F. Brewer (Eds.), Theoretical issues in reading comprehension (pp. 33–58). Lawrence Erlbaum Associates.

Slavin, R. E., & Smith, D. (2009). The relationship between sample sizes and effect sizes in systematic reviews in education. Educational Evaluation and Policy Analysis, 31(4), 500–506. https://doi.org/10.3102/0162373709352369

Vandergrift, L. (1999). Facilitating second language listening comprehension: Acquiring successful strategies. ELT Journal, 53(3), 168–176. https://doi.org/10.1093/elt/53.3.168
Vandergrift, L. (2003). Orchestrating strategy use: Towards a model of the skilled second language listener. Language Learning, 53(3), 463–496. https://doi.org/10.1111/1467-9922.00232
Vandergrift, L. (2007). Recent developments in second and foreign language listening comprehension research. Language Teaching, 40(3), 191–210. https://doi.org/10.1017/S0261444807004338
Vandergrift, L., & Goh, C. C. M. (2012). Teaching and learning second language listening: Metacognition in action. Routledge.
White, L. (1987). Against comprehensible input: The input hypothesis and the development of second language competence. Applied Linguistics, 8(2), 95–110. https://doi.org/10.1093/applin/8.2.95