

Anti-Locality in L2 Syntax: Universal Constraints vs. L1 Transfer: Evidence from Japanese Learners of English

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1. Introduction

This study investigates whether second language (L2) learners can acquire anti-locality, an abstract syntactic constraint that is not instantiated in their first language (L1), by focusing on English *tough* constructions (TCs). Anti-locality prohibits “too short” movement and provides a sharp contrast between English TCs and degree constructions (DegCs), which differ minimally in surface form but diverge structurally because of the presence of an intervening Degree Phrase in DegP (Erlewine, 2016, 2020; Brillman & Hirsch, 2016; Tomioka, 2022).

From a Second Language Acquisition (SLA) perspective, this contrast provides a strong test for Universal Grammar (UG)-based accounts. Japanese is a particularly informative L1, as Japanese *tough*-like constructions such as *-yasui/-nikui* allow similar interpretations without A'-movement, potentially obscuring sensitivity to anti-locality in English. In addition, recent work emphasizes that grammatical knowledge and its online manifestations may dissociate, thus abstract constraints are not always reliably reflected in real-time processing (Slabakova, 2016).

We test the prediction that anti-locality yields a robust TC-DegC asymmetry in English and ask whether Japanese learners acquire this contrast despite the availability of an L1-based non-movement strategy. Using a two-experiment design with matched materials, we examine both offline acceptability and online processing costs, and their alignment across individuals. The findings support a view of “UG without uniformity,” whereby sensitivity to abstract constraints such as anti-locality is in principle available to learners, but its behavioral realization varies systematically with individual processing profiles across offline judgments and online comprehension.

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2. Previous Studies

2.1. Anti-locality and English TCs

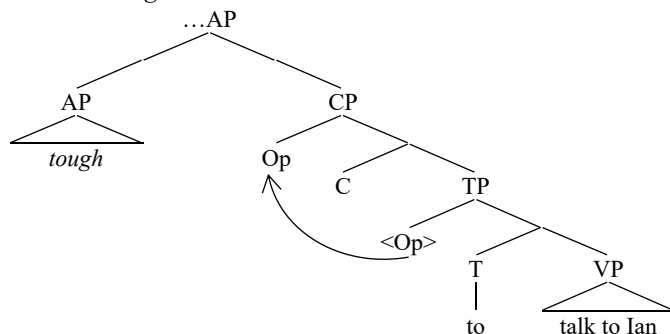
Locality constraints in generative grammar have traditionally focused on the impossibility of overly long dependencies (Ross, 1967; Chomsky, 1973, 1986), leaving unexplained why movement that is “too short” should be illicit. This gap motivated the Anti-locality Constraint, which is the idea that movement that fails to cross a sufficient structural domain is universally prohibited. The core intuition, traceable to the Vacuous Movement Hypothesis (Chomsky, 1986), was formalized in domain-based approaches, including phase-theoretic accounts (Abels, 2003; Grohmann, 2003) and most explicitly in Erlewine’s (2016, 2020) Spec-to-Spec Anti-locality Condition, which requires movement from a specifier to cross at least one maximal projection.

Under this approach, English TCs and DegCs form a minimal pair: DegCs contain an intervening Degree Phrase (e.g., *too*, *enough*) that licenses movement, whereas TCs lack such a projection, yielding an illicit Spec-to-Spec dependency. This structural contrast, rather than construction-specific semantics, underlies the grammatical asymmetry between the two constructions (Brillman & Hirsch, 2016; Tomioka, 2022; Nakamura, 2025).

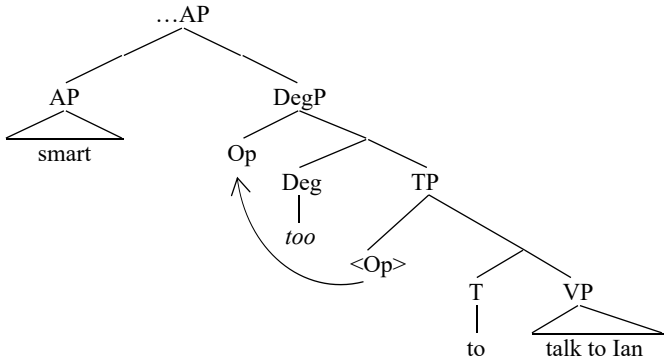
Crucially, anti-locality applies uniformly across construction types. As shown by Brillman and Hirsch (2016) and extended by Tomioka (2022), English TCs and DegCs differ minimally in surface form, but sharply in grammaticality in (1) and (2) below. In TCs, the subject gap is illicit as shown in (1). Under standard analysis, the relevant operator originates in Spec-TP of the infinitival clause and moves directly to Spec-CP without crossing any maximal projection other than TP, yielding illicit Spec-Spec-dependency in violation of anti-locality.

By contrast, DegCs permit an apparent subject gap, as shown in (2). DegCs is assumed to contain an independently projected Degree Phrase (DegP) within the adjectival domain (Brillman & Hirsch, 2016). The operator’s movement path crosses DegP on its way to the matrix clause, thereby satisfying the anti-locality requirement. This structural contrast forms the theoretical background of the experimental design.

- (1) * Anneke_i is *tough* *e_i* to talk to Ian.



- (2) Anneke_i is *too* smart *e_i* to talk to Ian.



2.2. TCs in Japanese

Japanese exhibits constructions that are superficially similar to English TCs, but differ fundamentally in their syntactic derivation. Adjectives such as *-yasui* ‘easy’ and *-nikui* ‘difficult’ permit subject-oriented interpretations without invoking A’-movement. As illustrated in (3), Japanese *-yasui/-nikui* predicates allow both object-oriented and experience-oriented readings of the matrix subject, neither of which requires overt or covert operator movements.

- (3) a. kono hon-ga (John-ni) yomi-niku-i
 this book-NOM (John-DAT) read-hard PRES
 ‘This book is hard (for John) to read.’
 b. saikin watasi-wa totemo netuki-niku-i
 recently I-TOP very get_to_sleep-hard-PRES
 ‘Recently, I have had a lot of difficulty falling asleep.’
 (cf. Takezawa, 1987)

Despite their interpretive similarity to English TCs, Japanese *-yasui/-nikui* constructions have consistently been considered to lack extraction from embedded object positions (Inoue, 1978; Saito, 1982; Takezawa, 1987). Instead, the adjective forms a complex predicate with the embedded verb, deriving the relevant interpretation through restructuring, rather than syntactic movement.

As a result, Japanese *tough*-like constructions do not instantiate structural configurations to which locality or anti-locality constraints apply. This typological difference has direct implications for L2 acquisition: Japanese learners of English (JLEs) may initially analyze English TCs using an L1-based non-movement strategy, allowing target-like interpretations without positing A’-movement, obscuring the relevance of anti-locality. This study tests whether learners move beyond this L1-based analysis and acquire sensitivity to the structural constraints governing English TCs.

2.3. Individual differences, anti-locality, and L2 sentence processing

Nakamura (2025), building on a comprehensive review of prior research on anti-locality, investigated the validity of the anti-locality constraints in English extraposition from a theoretical linguistics perspective. Drawing primarily on data from native speakers (NSs) of English, the study argues that anti-locality is operative in extraposition structures. At the same time, Nakamura (2025) showed that anti-locality effects in extraposition emerge only as weak tendencies at the group level and vary substantially across individuals. Importantly, this variability is argued to reflect grammar-processing interface factors rather than differences in the underlying grammatical representation. This study leaves important implications for investigations of anti-locality, particularly with respect to how individual variation should be interpreted in processing-based designs.

These findings also have direct implications for SLA. If substantial individual variability is already observed in NSs, such variability in L2 learners cannot be straightforwardly attributed to incomplete grammatical knowledge or simple L1 transfer. Rather, variability in L2 performance may reflect differences in how universally available grammatical constraints—such as anti-locality—are accessed, weighted, or temporarily overridden during real-time sentence processing (Slabakova, 2016). From this perspective, non-categorical or gradient effects in L2 learners do not necessarily indicate representational deficits, but may instead arise from interface-level factors involving processing efficiency, resource allocation, or susceptibility to competing structural cues. These observations motivate a “layered view” of L2 grammar, in which stable grammatical representations coexist with variability arising from processing-level interactions, an issue we return to later in the Discussion.

2.4. Summary

Anti-locality provides a principled account of the contrast between English TCs and DegCs, while this contrast is absent in Japanese due to the lack of A'-movement in *tough*-like constructions. At the same time, recent work has shown that anti-locality is variably accessible even in native grammars, suggesting that the grammar-processing interface is a source of individual differences. These observations motivate an individual-difference approach to L2 syntax, in which learner variability is treated as theoretically informative rather than as noise.

3. Research questions

To investigate how anti-locality is represented and utilized in L2 grammar, this study addresses the following research questions:

RQ1. Do JLEs distinguish between TCs and DegCs in terms of acceptability, reflecting their sensitivity to anti-locality constraints?

RQ2. Do anti-locality violations in TCs give rise to online processing costs for Japanese learners and, if so, do such costs align with their offline acceptability judgments?

RQ3. Are there stable individual differences in Japanese learners' judgments and processing of anti-locality-sensitive dependencies that form distinct learner profiles across tasks?

4. Experiment

This study employed a two-experiment design. Experiment 1 used an offline acceptability judgment task (AJT) to examine learners' grammatical knowledge and to identify stable individual difference profiles via cluster analysis. Experiment 2 employed a self-paced reading task (SPRT) with the same materials to examine whether and how anti-locality violations give rise to online processing costs, and whether such effects align with the learner profiles identified in Experiment 1.

4.1. General method

4.1.1. Participants

The final dataset included 60 participants, comprising 48 JLEs and 12 NSs. The JLE participants were first-year undergraduates at a national university in Japan. English proficiency was estimated based on TOEIC scores in the CEFR B1–B2 range. All JLE participants were native speakers of Japanese and had received formal English instruction, primarily through classroom-based education. NSs were recruited through Prolific. They were native speakers of British English, aged 23–40 years and had no history of language-related disorders. Originally the number of NS participants was 16. To ensure reliable baseline judgments, NSs whose mean acceptability ratings fell below 3.5 in either the TC1_N or EAG_O conditions, both uncontroversially grammatical, were excluded. This resulted in a final NS sample of 12 participants.

4.1.2. Materials and design

Four construction types were tested:

- (I) **TC1** (*easy*-type TCs): *easy*, *difficult*
e.g., The teacher is *easy* to trust (the parents) at school.
- (II) **TC2** (non-*easy*-type TCs): *comfortable*, *useful*
e.g., The teacher is *comfortable* to trust (the boy) at school.
- (III) **DegC** (degree constructions): *too* + adjective
e.g., The teacher is *too* dishonest to trust (the boy) at school.
- (IV) **EagC** (*eager*-type control constructions): *eager*, *willing*
e.g., The teacher is *eager* to trust (the boy) at school.

Each construction were constructed under two object conditions, “null” and “overt”, yielding a 4×2 factorial design (four tokens per condition, 32 targets in total). The concrete stimulus sentences were constructed as illustrated below. The vertical bars (||) indicate the region boundaries used in SPRT. Each sentence was segmented into regions corresponding to the “subject noun phrase”, “copula”, “predicate adjective”, “infinitival marker”, “verb”, optional “object noun phrase”, and final “adverbial phrase”. An example stimulus is shown below:

The teacher is || ...

easy / comfortable / too dishonest / eager|| to || trust|| (the parents)|| at school.

[TC1] [TC2] [DegC] [EagC] [Verb] [(NP)] [ADV]

4.2. Experiment 1: Acceptability judgment task (AJT)

4.2.1. Procedure

In Experiment 1, participants completed an offline AJT. Sentences were presented individually and participants rated their acceptability on a five-point Likert scale (1 = completely unacceptable, 5 = completely acceptable). The AJT was designed to investigate learners’ grammatical knowledge of anti-locality independent of real-time processing demands. The responses from the JLE participants were subsequently analyzed using cluster analysis to identify stable judgment profiles.

4.2.2. Cluster analysis

Following Nakamura (2025), individual differences were not treated as reflecting the presence or absence of grammatical knowledge, but as systematic variations in how grammatical constraints are accessed and enforced in linguistic tasks. We assume that the anti-locality constraint is part of UG and is, thus, available in principle in L2 grammar, while its surface realization may vary due to processing-related factors (cf. Slabakova, 2016). Based on these assumptions, we predicted at least three general learner profiles.

1. **Constraint-faithful learners**, whose judgments consistently reflect grammatical restrictions
2. **Transfer-affected learners**, whose judgments are shaped by L1-based interpretive strategies
3. **Good-enough learners**, whose judgments rely primarily on semantic plausibility

Constraint-faithful learners are expected to show clear contrasts between grammatical baselines and anti-locality-violating TCs. **Transfer-affected learners** are predicted to exhibit attenuated contrasts reflecting L1-based interpretive strategies, accompanied by increased processing cost when syntactic constraints conflict with preferred L1-compatible interpretations. In contrast,

good-enough learners are expected to show relatively uniform and higher acceptability ratings driven by semantic plausibility, as well as reduced sensitivity to anti-locality in online processing, reflected in reduced reading-time effects.

These theoretically motivated profiles provided the basis for setting the number of clusters to $k=3$ in the subsequent k -means cluster analysis and generated distinct predictions for online processing patterns examined in Experiment 2. Clustering was performed on the standardized subject-by-condition mean acceptability ratings using k -means clustering ($k=3$). Principal Component Analysis (PCA) was conducted to assess the structures of the resulting clusters.

4.2.3. Results

K -means analysis identified three clusters (JLE_1–JLE_3). PCA showed that the first two components accounted for 53.4% of the variance, with PC1 reflecting sensitivity to TCs and PC2 differentiating baseline preferences. The clusters occupied partially separable regions in the PC space (Figure 1), and descriptive statistics are summarized in Table 1 and Figure 2.

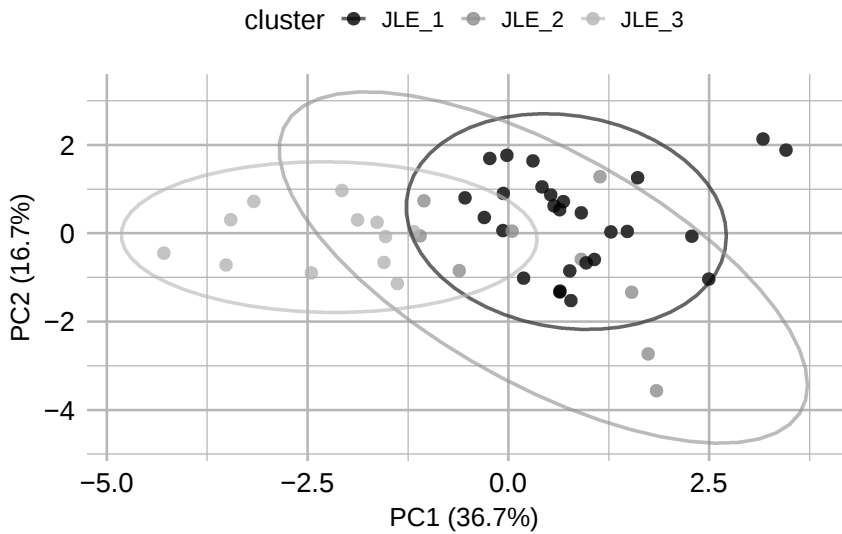
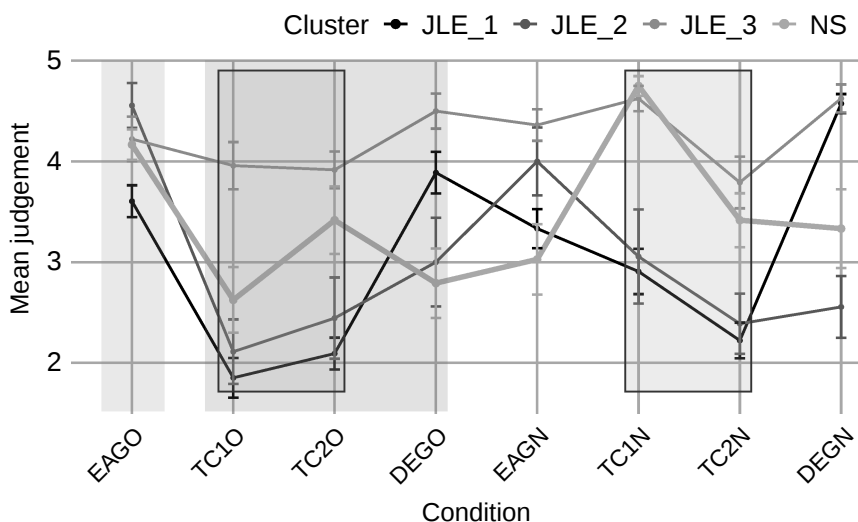


Figure 1. Principal Component Analysis (PCA) plot of JLE clusters

Table 1. Descriptive statistics of acceptability by learner cluster and condition

Condition	JLE_1 (<i>n</i> =27)	JLE_2 (<i>n</i> =9)	JLE_3 (<i>n</i> =12)	NS (<i>n</i> =12)
	M(SD)	M(SD)	M(SD)	M(SD)
	[95% CI]	[95% CI]	[95% CI]	[95% CI]
DEG_N	4.57 (0.49) [4.38, 4.77]	2.56 (0.92) [1.85, 3.26]	4.63 (0.48) [4.32, 4.93]	3.33 (1.61) [2.66, 4.01]
DEG_O	3.89 (1.07) [3.47, 4.31]	3.00 (1.32) [1.98, 4.02]	4.50 (0.60) [4.12, 4.88]	2.79 (1.53) [2.14, 3.44]
EAG_N	3.33 (1.01) [2.93, 3.73]	4.00 (1.01) [3.22, 4.78]	4.36 (0.54) [4.02, 4.70]	3.03 (1.75) [2.44, 3.62]
EAG_O	3.60 (0.82) [3.28, 3.93]	4.56 (0.67) [4.04, 5.07]	4.22 (0.77) [3.73, 4.71]	4.17 (1.42) [3.68, 4.65]
TC1_N	2.91 (1.17) [2.45, 3.37]	3.06 (1.40) [1.98, 4.13]	4.63 (0.43) [4.35, 4.90]	4.75 (0.53) [4.53, 4.97]
TC1_O	1.85 (1.03) [1.45, 2.26]	2.11 (0.96) [1.37, 2.85]	3.96 (0.81) [3.44, 4.47]	2.63 (1.66) [1.92, 3.33]
TC2_N	2.22 (0.92) [1.86, 2.59]	2.39 (0.89) [1.70, 3.08]	3.79 (0.89) [3.23, 4.36]	3.42 (1.56) [2.76, 4.07]
TC2_O	2.09 (0.82) [1.77, 2.42]	2.44 (1.21) [1.51, 3.37]	3.92 (0.63) [3.51, 4.32]	3.42 (1.61) [2.74, 4.10]

**Figure 2. Mean acceptability ratings by condition for learner cluster and NSs**

The descriptive results are reported from three perspectives. First, baseline EAG_O was rated highly across all groups, confirming access to subject-oriented interpretations. Second, overt-object TCs (TC1_O/TC2_O) were consistently rated lower than DEG_O, indicating sensitivity to anti-locality, with the clearest contrast in JLE_1 and NS and reduced effects in JLE_2 and JLE_3. Finally, higher ratings for null-object than overt-object TCs across groups suggest that the

observed degradation reflects anti-locality effects rather than a general failure to represent object interpretations.

4.2.4. LME results

A linear mixed-effects model (LME) was fitted to the acceptability ratings with fixed effects of cluster, condition, and their interaction, and random intercepts for item and participant.

First, the baseline EAG_O was rated relatively highly across all groups (estimated marginal means: JLE_1 = 3.65, JLE_2 = 4.41, JLE_3 = 4.40, NS = 4.04). Pairwise comparisons (Bonferroni-adjusted) showed that JLE_3 rated EAG_O higher than JLE_1 ($\beta = 0.74$, $p = .037$), while no other between-group differences reached significance, supporting EAG_O as a stable baseline.

Second, anti-locality-related degradation was assessed by comparing grammatical DEG_O with ungrammatical overt-object TCs (TC1_O / TC2_O). The LME showed that TC1_O and TC2_O were substantially reduced relative to DEG_O (e.g., in JLE_1, TC1_O: $\beta = -2.76$, $p < .001$). The degree of this reduction differed across profiles: JLE_1 showed a large drop from DEG_O to TC1_O, whereas the drop was smaller in JLE_2 and JLE_3. Consistent with this gradient pattern, post-hoc tests within TC1_O showed that JLE_3 rated TC1_O higher than both JLE_1 ($\beta = 2.05$, $p < .001$) and JLE_2 ($\beta = 1.71$, $p < .001$), indicating quantitatively different anti-locality effects across profiles.¹

Finally, object-references in TCs were evaluated by comparing overt-object TCs with their null-object counterparts. Across groups, TC1_N was consistently rated higher than TC1_O, indicating that the observed degradation is associated to the overt-object configuration rather than a general difficulty with TCs. Between-group contrasts further showed that in TC1_N, JLE_3 and NS rated sentences higher than JLE_1 (JLE_1 vs. JLE_3: $\beta = 1.67$, $p < .001$; JLE_1 vs. NS: $\beta = 1.90$, $p < .001$), whereas in TC1_O, JLE_3 remained the most permissive (JLE_1 vs. JLE_3: $\beta = 2.05$, $p < .001$; JLE_3 vs. NS: $\beta = 1.20$, $p = .015$). Overall, these results indicate that group differences reflect profile-specific sensitivity to the grammatical conditions licensing overt objects in *tough* structures, rather than a uniform failure of object representation.

4.3. Experiment 2: Self-paced reading task (SPRT)

4.3.1. Procedure

In Experiment 2, participants completed an SPRT using a moving window paradigm. Sentences were presented word-by-word, and reading times (RTs) were

¹ Regarding the NSs' unexpectedly high ratings on TC2, the adjectives (*useful*, *comfortable*) may allow event-oriented or control-like reinterpretations, unlike canonical *tough* predicates (*easy*, *difficult*), and, in the case of *comfortable*, involve competition with alternative constructions. These semantic properties could weaken the salience of the structural dependency underlying TC2 and invite NS-specific processing strategies. Further work is needed to disentangle predicate-specific effects from predicate-specific semantics and structural constraints.

recorded for each region. Critical regions include the embedded verb, object, and sentence-final adverbs, where anti-locality-related processing costs are expected to emerge.

4.3.2. Results

RT data from the SPRT were analyzed following a two-step screening procedure.

First, the participants were screened using a separate comprehension (CQ) test. Following CQ-based screening, the final sample comprised 26 JLE_1 learners, 7 JLE_2 learners, 10 JLE_3 learners, and 12 native speakers, after excluding participants with insufficient accuracy (Accuracy rate < 70%).

The RT analyses focused on the following regions, corresponding to the critical spillover window: “verbs”, “determiners”, “nouns”, and “adverbs”. Raw RTs shorter than 50ms and longer than 10,000ms were excluded (2.01%). Subsequently, RTs deviating by more than ± 3 SD from the mean within each region $\times$ condition $\times$ group condition were excluded (an additional 1.99%). In total, 67 observations (3.95%) were excluded from the analysis (from 1,695 to 1,628 data points). RTs were log-transformed for statistical modeling, whereas raw RTs were retained for descriptive visualization.

Descriptive statistics were computed for each region $\times$ condition $\times$ cluster combination. Figure 3 illustrates the mean logRTs with standard errors across regions separately for each cluster. Visualization revealed a marked increase in RTs in the adverb region for ungrammatical TCs (TC1_O and TC2_O), particularly in JLE_2, whereas DegC and EagC showed more stable profiles across clusters. NSs exhibited comparatively attenuated slowdowns, suggesting more efficient processing of anti-locality-related dependencies.

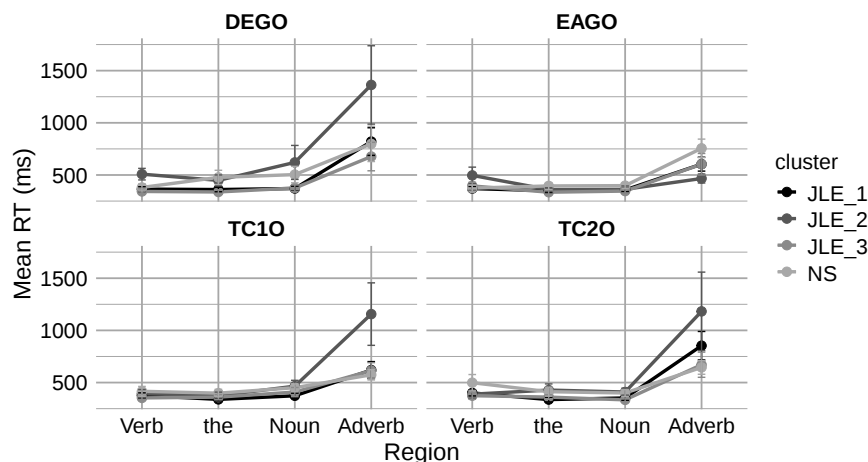


Figure 3. Mean LogRTs by region and condition

4.3.3. LME results

The LME revealed a robust region effect, such that RTs at the Adverb region were significantly slower than those at the baseline Verb region ($\beta = 0.548$, $SE = 0.083$, $t = 6.64$, $p < .001$). No other region contrasts (The, Noun vs. Verb) were reliable ($ps > .74$). There were no reliable main effects of condition relative to DEG_O (EAG_O: $\beta = 0.003$, $p = .971$; TC1_O: $\beta = 0.017$, $p = .832$; TC2_O: $\beta = 0.083$, $p = .315$). As to cluster, JLE_2 showed a marginal tendency toward longer RTs relative to the reference cluster (i.e., JLE_1) ($\beta = 0.339$, $SE = 0.174$, $t = 1.94$, $p = .054$), whereas JLE_3 and NS did not differ from the reference ($ps > .71$).

Importantly, the model yielded evidence that cluster differences were localized to the spillover region. A two-way interaction between Adverb $\times$ EAG_O was significant ($\beta = -0.210$, $SE = 0.107$, $t = -1.97$, $p = .049$), and this pattern further interacted with cluster such that the Adverb $\times$ EAGO $\times$ JLE_2 reached significance ($\beta = -0.463$, $SE = 0.229$, $t = -2.02$, $p = .044$). This indicates that the EAG_O effect at the Adverb region varied across clusters, motivating follow-up simple-effects analyses.

This indicates that the EAG_O effect at the Adverb region varied across clusters, motivating follow-up simple-effects analyses. However, pairwise comparisons of estimated marginal means did not yield reliable cluster differences after Holm correction, likely reflecting limited power and substantial within-group variability (e.g., JLE_1 vs. JLE_2: $\beta = -0.329$, $SE = 0.141$, $t = -2.33$, $p = .137$). Nevertheless, inspection of the descriptive patterns suggests a tendency toward greater spillover costs in JLE_2, consistent with their transfer-affected profile.

5. Discussion

5.1. Revisiting anti-locality in light of L2 variability

The results from Experiments 1 and 2 allow us to characterize the three learner clusters as reflecting distinct grammatical-processing profiles.

JLE_1 can be characterized as constraint-faithful learners. In the AJT, this group showed clear contrasts between grammatical TC and anti-locality-violating overt-object TCs, generally paralleling the NS pattern. In the SPRT, JLE_1 exhibited no excessive slowdowns beyond the expected spillover region, suggesting stable access to the relevant grammatical constraints and relatively efficient online integration.

JLE_2 corresponds to transfer-affected learners. In the AJT, this group displayed attenuated contrasts between DEG_O and TC1_O, consistent with interference from L1-based interpretive strategies. Crucially, in the SPRT, JLE_2 showed marked slowdowns at the sentence-final adverb region in ungrammatical conditions, indicating increased processing cost when syntactic constraints conflicted with preferred interpretations. This dissociation between relatively permissive offline judgments and heightened online processing cost supports an interpretation in terms of conflict resolution at the grammar-processing interface.

JLE_3 aligns with good-enough learners. This group showed broadly permissive acceptability judgments across conditions in the AJT, including reduced ratings for anti-locality violations. In the SPRT, JLE_3 exhibited absent slowdowns, even in ungrammatical constructions, suggesting reduced sensitivity to syntactic violations during online processing and a greater reliance on semantic plausibility rather than detailed structural computation.

The present findings encourage us to reconsider how anti-locality has been interpreted in both theoretical and acquisition-oriented research. In the theoretical literature, anti-locality has been considered as a structural constraint on movement (Abels, 2003; Erlewine, 2016, 2020). The universal constraint predicts sharp contrasts such as the TC-DegC asymmetry. However, recent work has shown that even among native speakers, anti-locality effects may surface as gradience rather than categorical judgments (Nakamura, 2025)

Our result extends this observation to L2 learners. The overall pattern confirms the structural contrast between TCs and DegCs in the offline judgment. On the other hand, the online behavior of this contrast was not uniform across individuals. Additionally, the variability was not random: the cluster analysis showed structured profiles that were stable across items and partially aligned across tasks. This suggests that anti-locality is not simply “acquired or not acquired,” but rather differentially accessed across learners.

From this perspective, prior L2 findings that attribute variability to representational failure or incomplete parameter resetting may require reinterpretation. The present data indicate that learners can show evidence of abstract structural sensitivity even when behavioral realizations diverge. The contrast between JLE_1 and JLE_2 is particularly revealing: both groups appear to possess access to the relevant structural distinction, yet they differ in how this constraint is enforced during online comprehension.

5.2. A layered model of L2 syntax

To capture this pattern, we propose a layered model of L2 syntactic competence. Under this view, L2 sentence processing involves at least three interacting layers:

1. **Representational layer:** abstract grammatical constraints (e.g., anti-locality) available through UG;
2. **Activation layer:** task-dependent selection and weighting of competing structural representation; and,
3. **Processing layer:** real-time implementation of the selected representation, shaped by cognitive resources and prior experience.

In this architecture, UG constrains the space of possible representations at the representational layer. However, access to these constraints during comprehension depends on activation dynamics, which may vary across individuals. The processing layer further modulates how conflicts are resolved when multiple structural analyses compete.

This layered perspective naturally accounts for the three learner profiles observed here:

JLE_1: Constraint-faithful learners show alignment across layers: abstract constraints are robustly activated and efficiently implemented during processing.

JLE_2: Transfer-affected learners possess access to the constraint at the representational level but exhibit competition at the activation layer, leading to online slowdowns.

JLE_3: Good-enough learners may rely more heavily on semantic heuristics at the processing layer, reducing sensitivity to structural violations in both offline and online tasks.

This model reframes L1 transfer not as a representational deficit, but as a bias at the activation or processing layer. Japanese does not instantiate A'-movement in *tough*-like constructions; therefore, learners may initially prioritize non-movement analyses. The layered model predicts that such biases can coexist with UG-compatible representations, yielding stable but non-uniform behavioral outcomes.

5.3. Grammar-processing interface: UG without uniformity

The results support a conception of “UG without uniformity.” Universal constraints such as anti-locality appear to delimit the representational space available to learners, but they do not guarantee identical behavioral patterns across individuals.

This position is consistent with Slabakova's (2016) argument that adult L2 grammars remain constrained by UG, even when surface performance diverges. It also aligns with Nakamura's (2025) observation that individual differences among native speakers reflect interface-level variation rather than differences in grammatical reality.

Under this view, convergence in L2 grammar should not be defined just in terms of categorical group-level contrasts. Instead, acquisition involves the gradual alignment of representational, activation, and processing layers. The present study showed that learners may converge at the representational level while remaining heterogeneous in processing implementation.

The results are compatible with the view that UG-constrained representations are available to L2 learners at the representational level. At the same time, competition with L1-based strategies at the activation layer—where alternative structural analyses are selected and weighted—shapes which representations are prioritized, while variability at the processing layer affects how these selected analyses are implemented during real-time comprehension. The layered model thus provides a framework in which representational access, activation dynamics, and processing variability can be simultaneously accommodated.

6. Concluding remarks

This study tested whether Japanese learners of English acquire sensitivity to anti-locality in tough constructions and how such knowledge is reflected across offline judgments and online processing. Results showed (i) a detectable TC-DegC asymmetry in L2 learners, indicating access to an abstract constraint absent from the L1; (ii) stable learner profiles, suggesting non-uniform enforcement of the constraint; and (iii) partial dissociations between AJT and SPRT, pointing to grammar-processing interface effects. We argue for a layered view of L2 syntax in which UG constrains representations while individual differences arise from activation and processing strategies. Future work should extend this approach to other locality-sensitive dependencies and track how these profiles change over development.

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