

**Appendix S1: Categorization Criteria for Participants  
in Kweon and Bley-Vroman (2011)**

**Table S1.** Categorization criteria for participants in Kweon and Bley-Vroman (2011)  
(adapted from p. 216, Figure 1)

		<b>Object questions</b>	
		Non-contractor	Contractor
<b>Subject questions</b>	Non-contractor	CONSERVATIVE	CORRECTLY DIFFERENTIAL
	Contractor	BACKWARD	OVERGENERAL

**Appendix S2: Summary of Results in Kweon and Bley-Vroman (2011)**

**Table S2.** Summary of results in Kweon and Bley-Vroman (2011) (adapted from pp. 216–219, Figures 2–7)

<b>Task</b>	<b>Elicited production task</b>		<b>Oral repair task</b>		<b>Grammaticality judgment task</b>	
	<b>NS</b>	<b>L2</b>	<b>NS</b>	<b>L2</b>	<b>NS</b>	<b>L2</b>
<b>CONSERVATIVE</b>	8 (20.51%)	43 (41.3%)	5 (12.82%)	17 (16.67%)	0 (0%)	8 (8.16%)
<b>CORRECTLY DIFFERENTIAL</b>	21 (53.85%)	16 (15.4%)	18 (46.15%)	11 (10.78%)	36 (97.30%)	34 (34.69%)
<b>BACKWARD</b>	0 (0%)	9 (8.7%)	0 (0%)	2 (1.96%)	0 (0%)	14 (14.29%)
<b>OVERGENERAL</b>	10 (25.64%)	36 (34.6%)	16 (41.03%)	72 (70.59%)	1 (2.70%)	42 (42.86%)

Note. NS: Native speakers of English, L2: L1-Korean L2ers of English

### Appendix S3: Proficiency Data from L2 learners

To measure English proficiency, a picture narration task (PNT) was adopted in this study for both adults and children because the PNT does not require unfamiliar words or complicated syntactic structures (Park, 2014; Unsworth, 2005; Whong-Barr & Schwartz, 2002). This task was administered to all of the child and adult L2ers as well as 32 of the L1 adults and 37 of the L1 children. In the PNT, participants were asked to tell a story in English for each of three sets of four pictures, which showed everyday activities (a morning routine, fighting between friends, and night-time parenting) in sequential order (Park, 2014, p. 146).

Following Unsworth's (2005) operationalized definition of L2 proficiency as “the ability to produce lexically, morphologically, and syntactically complex and accurate utterances in the target language” (pp. 154–155), the production data from the PNT were measured in terms of (a) morphosyntactic complexity (total number of verbs divided by the total number of T-units<sup>1</sup>, producing a verbal density score), (b) lexical complexity (moving-average type-token ratio [MATTR]; Covington & McFall, 2010), and (c) morphological/syntactic/lexical accuracy (total number of error-free T-units divided by the total number of T-units) to produce a single composite proficiency score. Morphosyntactic complexity and lexical complexity were analyzed in Python (for the analysis script, see [https://github.com/Haerim-Hwang/NLP\\_Python/tree/master/Measure\\_English\\_proficiency](https://github.com/Haerim-Hwang/NLP_Python/tree/master/Measure_English_proficiency)). To analyze morphological/syntactic/lexical accuracy, two English native speakers were invited to manually code morphological, syntactic, and lexical errors based on the error coding procedure in Park's (2014, pp. 164–168) study. The Cohen's Kappa coefficient for the two raters' error coding was 0.735, indicating high reliability (Landis & Koch, 1977). Any disagreements in coding were resolved through discussion between the two coders and the author. Finally, a combined proficiency score was obtained by transforming the three sub-scores for each participant into z-scores based on the group mean and standard deviation and then adding them together. Proficiency scores of the child L2ers and the adult L2ers are respectively given in Table C-1 and Table C-2. Note that there happened to be a significant group difference between the adult L2ers and the child L2ers in proficiency scores when their z-scores were computed based on the two groups' mean and standard deviation: The former had higher proficiency scores than the latter ( $t(66) = 3.71, p < .001, \text{Cohen's } d = 0.90$ ).

---

<sup>1</sup> A T-unit is “one main clause plus whatever subordinate clauses happen to be attached to or embedded within it” (Hunt, 1966, p. 735).

**Table S3-1.** Proficiency data: Child L1-Korean L2 learners of English ( $n = 37$ )

Participant code	Number of T-units	Verbal density		Lexical diversity		Accuracy		Proficiency z-score
		Verbs/T-units	z-score	MATTR	z-score	Ratio of error-free T-units	z-score	
CL2_01	14	1.43	0.41	0.88	0.86	0.50	0.22	1.49
CL2_02	15	1.07	-0.88	0.88	0.89	0.60	0.63	0.63
CL2_03	13	1.46	0.53	0.78	-0.82	0.85	1.63	1.34
CL2_04	1	1.00	-1.12	0.86	0.63	0.00	-1.81	-2.30
CL2_05	13	1.08	-0.84	0.83	0.06	0.23	-0.87	-1.66
CL2_06	12	1.50	0.67	0.86	0.61	0.50	0.22	1.51
CL2_07	12	1.00	-1.12	0.79	-0.65	0.17	-1.13	-2.90
CL2_08	11	1.00	-1.12	0.81	-0.26	0.36	-0.33	-1.71
CL2_09	10	1.40	0.31	0.80	-0.54	0.20	-1.00	-1.22
CL2_10	10	1.40	0.31	0.77	-0.94	0.10	-1.40	-2.03
CL2_11	16	1.69	1.34	0.85	0.41	0.63	0.73	2.48
CL2_12	11	1.09	-0.79	0.80	-0.39	0.36	-0.33	-1.51
CL2_13	12	1.25	-0.23	0.84	0.31	0.25	-0.79	-0.71
CL2_14	5	1.20	-0.40	0.65	-3.14	0.00	-1.81	-5.35
CL2_15	12	1.33	0.07	0.74	-1.53	0.25	-0.79	-2.26
CL2_16	12	1.50	0.67	0.86	0.63	0.75	1.24	2.54
CL2_17	11	2.00	2.46	0.88	0.96	0.73	1.15	4.57
CL2_18	13	1.08	-0.84	0.88	0.93	0.46	0.07	0.16
CL2_19	16	1.88	2.01	0.88	0.87	0.75	1.24	4.12
CL2_20	16	1.31	0.00	0.88	0.95	0.88	1.75	2.70
CL2_21	9	1.22	-0.32	0.84	0.18	0.44	0.00	-0.14
CL2_22	16	1.75	1.56	0.90	1.22	0.44	-0.03	2.75
CL2_23	13	1.69	1.36	0.91	1.41	0.62	0.69	3.46
CL2_24	13	1.69	1.36	0.89	1.06	0.77	1.32	3.73
CL2_25	15	1.07	-0.88	0.77	-0.93	0.53	0.36	-1.45
CL2_26	12	1.08	-0.82	0.77	-0.95	0.50	0.22	-1.55
CL2_27	10	1.60	1.03	0.84	0.17	0.60	0.63	1.82
CL2_28	15	1.27	-0.17	0.89	1.03	0.53	0.36	1.22
CL2_29	16	1.00	-1.12	0.73	-1.65	0.44	-0.03	-2.80
CL2_30	6	1.00	-1.12	0.87	0.70	0.00	-1.81	-2.23
CL2_31	14	1.07	-0.86	0.75	-1.40	0.07	-1.52	-3.79
CL2_32	14	1.14	-0.61	0.81	-0.34	0.57	0.51	-0.44
CL2_33	13	1.23	-0.29	0.78	-0.89	0.77	1.32	0.13
CL2_34	12	1.08	-0.82	0.86	0.66	0.67	0.90	0.73
CL2_35	13	1.77	1.63	0.82	-0.05	0.46	0.07	1.65
CL2_36	12	1.17	-0.52	0.77	-0.98	0.33	-0.45	-1.96
CL2_37	12	1.08	-0.82	0.88	0.97	0.17	-1.13	-0.99

**Table S3-2.** Proficiency data: Adult L1-Korean L2 learners of English ( $n = 31$ )

Participant code	Number of T-units	Verbal density		Lexical diversity		Accuracy		Proficiency z-score
		Verbs/T-units	z-score	MATTR	z-score	Error-free T-units	z-score	
AL2_01	70	1.47	-0.16	0.86	-0.11	0.59	0.22	-0.06
AL2_02	19	1.95	1.48	0.85	-0.49	0.26	-1.55	-0.56
AL2_03	21	1.76	0.84	0.90	1.11	0.57	0.14	2.09
AL2_04	12	2.08	1.95	0.90	1.07	0.67	0.66	3.68
AL2_05	14	1.36	-0.56	0.85	-0.50	0.57	0.14	-0.92
AL2_06	15	1.73	0.74	0.85	-0.53	0.47	-0.44	-0.22
AL2_07	16	1.94	1.44	0.89	0.89	0.56	0.09	2.43
AL2_08	27	1.37	-0.51	0.86	-0.26	0.56	0.05	-0.72
AL2_09	12	1.08	-1.50	0.78	-2.77	0.58	0.20	-4.06
AL2_10	16	1.63	0.37	0.88	0.30	0.56	0.09	0.75
AL2_11	21	1.67	0.51	0.87	0.03	0.71	0.92	1.47
AL2_12	13	1.08	-1.52	0.83	-1.21	0.77	1.23	-1.51
AL2_13	24	1.83	1.09	0.88	0.61	0.58	0.20	1.90
AL2_14	13	1.54	0.07	0.89	0.76	0.38	-0.89	-0.05
AL2_15	12	1.33	-0.64	0.85	-0.54	0.67	0.66	-0.52
AL2_16	16	1.50	-0.06	0.94	2.27	0.88	1.81	4.01
AL2_17	28	1.86	1.17	0.86	-0.13	0.46	-0.45	0.59
AL2_18	13	1.23	-0.99	0.85	-0.55	0.69	0.80	-0.74
AL2_19	16	1.75	0.80	0.83	-1.09	0.81	1.46	1.17
AL2_20	14	1.29	-0.80	0.83	-1.06	0.71	0.92	-0.94
AL2_21	30	1.87	1.20	0.89	0.63	0.43	-0.62	1.21
AL2_22	12	1.25	-0.93	0.82	-1.61	0.58	0.20	-2.33
AL2_23	16	1.31	-0.71	0.84	-0.84	0.56	0.09	-1.46
AL2_24	25	1.76	0.83	0.88	0.35	0.16	-2.12	-0.94
AL2_25	13	1.31	-0.73	0.87	0.23	0.62	0.38	-0.12
AL2_26	20	1.25	-0.93	0.90	1.02	0.60	0.30	0.39
AL2_27	14	1.29	-0.80	0.85	-0.53	0.07	-2.61	-3.94
AL2_28	15	1.53	0.05	0.91	1.57	0.47	-0.44	1.18
AL2_29	13	1.23	-0.99	0.89	0.82	0.15	-2.15	-2.33
AL2_30	12	1.83	1.09	0.89	0.64	0.58	0.20	1.93
AL2_31	11	1.00	-1.79	0.86	-0.09	0.64	0.50	-1.38

### Appendix S4: Critical Stimuli for the Acceptability Judgment Task

Instructions: This is a ‘smiley face’ choice task. In this task, you will decide whether sentences are good/possible or bad/impossible in English. First, you will see a sentence on the screen while hearing that same sentence twice on the headphones. After you hear the sentence for the second time, a ‘smiley face’ scale will pop up on the screen. It is at this point that you can press a number on the keyboard to rate the sentence on a 4-point “smiley face” scale with an additional “I don’t know” option.

(a) Who + Gap, (b) \*Who + No gap, (c) \*If + Gap, (d) If + No gap

1. (a) I wonder who you wanna read with.  
 (b) \* I wonder who you wanna read.  
 (c) \* I wonder if you wanna read with.  
 (d) I wonder if you wanna read.
2. (a) I wonder who you wanna dance with.  
 (b) \* I wonder who you wanna dance.  
 (c) \* I wonder if you wanna dance with.  
 (d) I wonder if you wanna dance.
3. (a) I wonder who you wanna sing with.  
 (b) \* I wonder who you wanna sing.  
 (c) \* I wonder if you wanna sing with.  
 (d) I wonder if you wanna sing.
4. (a) I wonder who you wanna walk with.  
 (b) \* I wonder who you wanna walk.  
 (c) \* I wonder if you wanna walk with.  
 (d) I wonder if you wanna walk.
5. (a) I wonder who you wanna stay with.  
 (b) \* I wonder who you wanna stay.  
 (c) \* I wonder if you wanna stay with.  
 (d) I wonder if you wanna stay.
6. (a) I wonder who you wanna swim with.  
 (b) \* I wonder who you wanna swim.  
 (c) \* I wonder if you wanna swim with.  
 (d) I wonder if you wanna swim.
7. (a) I wonder who you wanna run with.  
 (b) \* I wonder who you wanna run.  
 (c) \* I wonder if you wanna run with.  
 (d) I wonder if you wanna run.

8. (a) I wonder who you wanna smile with.  
(b) \* I wonder who you wanna smile.  
(c) \* I wonder if you wanna smile with.  
(d) I wonder if you wanna smile.
9. (a) I wonder who you wanna start with.  
(b) \* I wonder who you wanna start.  
(c) \* I wonder if you wanna start with.  
(d) I wonder if you wanna start.
10. (a) I wonder who you wanna talk with.  
(b) \* I wonder who you wanna talk.  
(c) \* I wonder if you wanna talk with.  
(d) I wonder if you wanna talk.
11. (a) I wonder who you wanna eat with.  
(b) \* I wonder who you wanna eat.  
(c) \* I wonder if you wanna eat with.  
(d) I wonder if you wanna eat.
12. (a) I wonder who you wanna travel with.  
(b) \* I wonder who you wanna travel.  
(c) \* I wonder if you wanna travel with.  
(d) I wonder if you wanna travel.
13. (a) I wonder who you wanna drink with.  
(b) \* I wonder who you wanna drink.  
(c) \* I wonder if you wanna drink with.  
(d) I wonder if you wanna drink.
14. (a) I wonder who you wanna live with.  
(b) \* I wonder who you wanna live.  
(c) \* I wonder if you wanna live with.  
(d) I wonder if you wanna live.
15. (a) I wonder who you wanna cry with.  
(b) \* I wonder who you wanna cry.  
(c) \* I wonder if you wanna cry with.  
(d) I wonder if you wanna cry.
16. (a) I wonder who you wanna laugh with.  
(b) \* I wonder who you wanna laugh.  
(c) \* I wonder if you wanna laugh with.  
(d) I wonder if you wanna laugh.
17. (a) I wonder who you wanna wait with.  
(b) \* I wonder who you wanna wait.  
(c) \* I wonder if you wanna wait with.  
(d) I wonder if you wanna wait.

18. (a) I wonder who you wanna shout with.  
(b) \* I wonder who you wanna shout.  
(c) \* I wonder if you wanna shout with.  
(d) I wonder if you wanna shout.
19. (a) I wonder who you wanna pray with.  
(b) \* I wonder who you wanna pray.  
(c) \* I wonder if you wanna pray with.  
(d) I wonder if you wanna pray.
20. (a) I wonder who you wanna work with.  
(b) \* I wonder who you wanna work.  
(c) \* I wonder if you wanna work with.  
(d) I wonder if you wanna work.

## Appendix S5: Background Questionnaires

### L1-English adults and late/adult L1-Korean L2 learners of English

Please answer all of the following questions.

- Participant ID:
- Age:
- Gender:
- What is your native language (the language you are firstly exposed to)?
- What is your father's native language?
- What is your mother's native language?
- At what age did you begin acquiring English?
- What language do you usually speak at home?
- If you speak more than one language at home, how much do you use English (out of 100%)?
- Please list all languages you know in order of dominance and rate your proficiency on each language from 1 to 10 in the parentheses.
- How much reading proficiency do you have with the English language? Please choose one from 1 (very low proficiency) to 10 (very high proficiency).
- How much writing proficiency do you have with the English language? Please choose one from 1 (very low proficiency) to 10 (very high proficiency).
- How much listening proficiency do you have with the English language? Please choose one from 1 (very low proficiency) to 10 (very high proficiency).
- How much speaking proficiency do you have with the English language? Please choose one from 1 (very low proficiency) to 10 (very high proficiency).
- For native English speakers only: Do you speak Hawaiian pidgin? If so, how long have you used it? (If you don't know pidgin, just put "no" in the box.)
- For second language learners of English only: If you have ever lived in or visited a country where languages other than your native language are spoken, please indicate below the name of the country, the duration and period of the stay, and which languages you used while you were in that country. (e.g., US: January 2017–June 2018, 18 months)

**L1-English children and early/child L1-Korean L2 learners of English**

(Filled out by parents)

Please answer all of the following questions.

- Participant ID:
- Age:
- Gender:
- What is a native language of your child's mother?
- What is a native language of your child's father?
- What is the first language your child was exposed to as a child?
- What is your child's native language?
- At what age did your child begin acquiring English?
- What language does your child usually speak at home?
- If your child speaks more than one language at home, how much does he/she use English (out of 100%)?
- Please list all languages your child knows in order of dominance and rate his/her proficiency on each language from 1 to 10 in the parentheses.
- How much reading proficiency does your child have with the English language? Please choose one from 1 (very low proficiency) to 10 (very high proficiency).
- How much writing proficiency does your child have with the English language? Please choose one from 1 (very low proficiency) to 10 (very high proficiency).
- How much listening proficiency does your child have with the English language? Please choose one from 1 (very low proficiency) to 10 (very high proficiency).
- How much speaking proficiency does your child have with the English language? Please choose one from 1 (very low proficiency) to 10 (very high proficiency).
- For L1-English children only: Does your child speak Hawaiian pidgin? If so, how long have your child used it? (If your child doesn't know pidgin, just put "no" in the box.)
- For second language learners of English only: If your child has ever lived in or visited a country where languages other than your native language are spoken, please indicate below the name of the country, the duration and period of the stay, and which languages your child used while your child was in that country. (e.g., US: January 2017–June 2018, 18 months)

### Appendix S6: Individual Sensitivity Scores in the Acceptability Judgment Task

**Table S6-1.** Individual sensitivity scores of L1-English adults ( $n = 70$ ) in the acceptability judgment task

Participant code	Sensitivity score		Participant code	Sensitivity score
L1A_01	80.00		L1A_41	100.00
L1A_02	90.00		L1A_42	90.00
L1A_03	80.00		L1A_43	80.00
L1A_04	87.50		L1A_44	40.00
L1A_05	70.00		L1A_45	100.00
L1A_06	100.00		L1A_46	100.00
L1A_07	90.00		L1A_47	100.00
L1A_08	80.00		L1A_48	100.00
L1A_09	70.00		L1A_49	90.00
L1A_10	100.00		L1A_50	80.00
L1A_11	90.00		L1A_51	0.00
L1A_12	90.00		L1A_52	30.00
L1A_13	80.00		L1A_53	61.43
L1A_14	100.00		L1A_54	90.00
L1A_15	100.00		L1A_55	90.00
L1A_16	100.00		L1A_56	100.00
L1A_17	100.00		L1A_57	100.00
L1A_18	60.00		L1A_58	90.00
L1A_19	100.00		L1A_59	80.00
L1A_20	70.00		L1A_60	90.00
L1A_21	90.00		L1A_61	80.00
L1A_22	90.00		L1A_62	80.00
L1A_23	60.00		L1A_63	100.00
L1A_24	100.00		L1A_64	60.00
L1A_25	60.00		L1A_65	100.00
L1A_26	100.00		L1A_66	100.00
L1A_27	40.00		L1A_67	100.00
L1A_28	90.00		L1A_68	70.00
L1A_29	80.00		L1A_69	70.00
L1A_30	100.00		L1A_70	70.00
L1A_31	100.00			
L1A_32	80.00			
L1A_33	100.00			
L1A_34	100.00			
L1A_35	50.00			
L1A_36	80.00			
L1A_37	60.00			
L1A_38	100.00			
L1A_39	80.00			
L1A_40	40.00			

**Table S6-2.** Individual sensitivity scores of L1-English children ( $n = 39$ ) in the acceptability judgment task

<b>Participant code</b>	<b>Age in month</b>	<b>Sensitivity score</b>
L1C_05	3;3	0.00
L1C_06	3;11	23.34
L1C_07	4;0	30.00
L1C_14	4;3	2.50
L1C_04	5;0	-21.67
L1C_17	5;1	10
L1C_18	5;1	-25.00
L1C_26	5;2	33.34
L1C_02	5;4	10.00
L1C_12	5;4	7.50
L1C_20	5;10	50.00
L1C_21	5;11	25.00
L1C_33	5;11	80.00
L1C_28	6;1	90.00
L1C_24	6;3	50.00
L1C_32	6;3	80.00
L1C_22	6;6	100.00
L1C_37	6;6	90.00
L1C_25	6;7	90.00
L1C_09	6;8	30.00
L1C_19	6;8	70.00
L1C_34	6;8	90.00
L1C_13	6;9	20.00
L1C_31	6;9	90.00
L1C_39	6;9	50.00
L1C_23	6;10	60.00
L1C_36	6;10	100.00
L1C_11	6;11	40.00
L1C_16	6;11	90.00
L1C_29	6;11	100.00
L1C_15	7;1	40.00
L1C_30	7;1	90.00
L1C_38	7;1	100.00
L1C_27	7;2	90.00
L1C_35	7;2	50.00
L1C_08	7;6	20.00
L1C_01	7;7	40.00
L1C_10	7;8	60.00
L1C_03	7;9	40.00

**Table S6-3.** Individual sensitivity scores of child L1-Korean L2 learners of English ( $n = 37$ ) in the acceptability judgment task

<b>Participant code</b>	<b>Proficiency</b>	<b>Sensitivity score</b>
CL2_14	-5.35	20.00
CL2_31	-3.79	10.00
CL2_07	-2.90	0.00
CL2_29	-2.80	-40.00
CL2_04	-2.30	10.00
CL2_15	-2.26	60.00
CL2_30	-2.23	20.00
CL2_10	-2.03	10.00
CL2_36	-1.96	-20.84
CL2_08	-1.71	-7.50
CL2_05	-1.66	12.50
CL2_26	-1.55	40.00
CL2_12	-1.51	-10.00
CL2_25	-1.45	0.00
CL2_09	-1.22	33.34
CL2_37	-0.99	0.00
CL2_13	-0.71	25.00
CL2_32	-0.44	1.67
CL2_21	-0.14	8.34
CL2_33	0.13	30.00
CL2_18	0.16	45.84
CL2_02	0.63	30.00
CL2_34	0.73	10.00
CL2_28	1.22	10.00
CL2_03	1.34	40.00
CL2_01	1.49	30.00
CL2_06	1.51	50.00
CL2_35	1.65	30.00
CL2_27	1.82	90.00
CL2_11	2.48	30.00
CL2_16	2.54	60.00
CL2_20	2.70	100.00
CL2_22	2.75	70.00
CL2_23	3.46	20.00
CL2_24	3.73	47.50
CL2_19	4.12	50.00
CL2_17	4.57	100.00

**Table S6-4.** Individual sensitivity scores of adult L1-Korean L2 learners of English ( $n = 31$ ) in the acceptability judgment task

<b>Participant code</b>	<b>Proficiency</b>	<b>Sensitivity score</b>
AL2_09	-4.06	80.00
AL2_27	-3.94	50.00
AL2_22	-2.33	70.00
AL2_29	-2.33	80.00
AL2_12	-1.51	100.00
AL2_23	-1.46	100.00
AL2_31	-1.38	40.00
AL2_20	-0.94	10.00
AL2_24	-0.94	100.00
AL2_05	-0.92	50.00
AL2_18	-0.74	70.00
AL2_08	-0.72	40.00
AL2_02	-0.56	40.00
AL2_15	-0.52	40.00
AL2_06	-0.22	80.00
AL2_25	-0.12	70.00
AL2_01	-0.06	90.00
AL2_14	-0.05	40.00
AL2_26	0.39	0.00
AL2_17	0.59	90.00
AL2_10	0.75	50.00
AL2_19	1.17	50.00
AL2_28	1.18	90.00
AL2_21	1.21	30.00
AL2_11	1.47	70.00
AL2_13	1.90	50.00
AL2_30	1.93	32.50
AL2_03	2.09	50.00
AL2_07	2.43	80.00
AL2_04	3.68	90.00
AL2_16	4.01	100.00