**Appendix A Studies Included in the Synthesis**

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**Appendix B Example Measures of Explicit and Implicit Knowledge**

|  |  |  |
| --- | --- | --- |
| *Constructs* | | *Measures* |
| Grammar | Explicit knowledge | * Untimed written grammaticality judgment: learners judge whether given sentences are grammatical (and make corrections to ungrammatical sentences) (Kasprowicz et al., 2019; Lado, 2017; Yalçın & Spada, 2016; Yilmaz & Granena, 2019) * Metalinguistic knowledge: learners explain a rule violation in a sentence or select an accurate description of the rule violation (Granena, 2013; Roehr & Ga´nem-Gutie´rrez, 2009; Suzuki & DeKeyser, 2015) * Adding morphological endings: learners add grammatical features to bare words (Suzuki & DeKeyser, 2017) * Discrete item description: learners describe discretely presented pictures using clues (Suzuki & DeKeyser, 2017) * Written production: learners are asked to write in response to given prompts (Kourtail & Revesz, 2020; Sheen, 2008) * Error correction: learners correct grammar errors in given sentences (Sheen, 2008) * Multiple choice: learners select the correct answer from several options (Talamini et al., 2018; Yilmaz, 2013) |
|  | Implicit knowledge | * Elicited imitation: learners listen to and repeat grammatical and ungrammatical sentences correctly in the L2 (Kourtail & Revesz, 2020; Li, 2013) * Word monitoring: learners respond to a monitored word that immediately follows the target structure in auditorily presented grammatical and ungrammatical sentences (Granena, 2013; Suzuki & DeKeyser, 2015) * Self-paced reading: learners read grammatical and ungrammatical sentences, and their performance is represented by the difference in reading time between grammatical and ungrammatical sentences (VanPatten & Smith, 2014). * Auditory grammaticality judgment: learners listen to sentences and judge whether they are grammatical (Granena & Long, 2013) * Free oral production: learners perform an oral task, and their accuracy rate is calculated (Granena & Long, 2013; Yalçın & Spada, 2016) * Recognition: learners read and judge whether they have seen sentences in the treatment/exposure stage (Hamrick, 2015) * Sentence matching: learners match sentences with pictures based on meaning (Kasprowicz et al., 2019; Lado, 2017) * Coefficient of variance (CV): ratio between the standard deviation of reaction time and mean reaction time for correct responses (Pili-Moss et al., 2020; Suzuki, 2018). A decrease in CV represents faster reaction time as well as lower variability of learning outcomes. It is a measure of automatization and restructuring. * Dictation: learners write down sentences containing the measured linguistic structure (Sheen, 2008). * Trials to criterion: the number of items learners complete before they start to answer three items correctly in a row during the instructional treatment (VanPatten & Borst, 2012). Each item requires the learner to choose one of two pictures based on the meaning of a sentence they read. * Limited oral production: learners give brief descriptions to discrete pictures (Yilmaz, 2013; Yilmaz & Granena, 2019). |
| Vocabulary | Collocations | * Phrase completion: learners complete multiword units (Granena & Long, 2013) * Phrasal judgment: learners judge the appropriateness of multiword units (Granena & Long, 2013); scoring can be based on both accuracy and reaction time (Yi, 2018) |
|  | Words | * Picture naming: learners name pictures orally (Li & DeKeyser, 2017) * Word comprehension: learners hear a word and then select a picture that matches its meaning (Li & DeKeyser, 2017) * Dictation: learners write down words they hear (Talimini et al., 2018) * Translation: learners translate words from L1 to L2 (Winke, 2005) |
| Pronunciation |  | * Reading aloud * Sentences: learners read sentences and their speech samples were rated in terms of accentedness (Granena & Long, 2013; Hu et al., 2013; Smemoe & Haslam, 2013; Winke, 2005) * Words: learners read a list of words (Li & DeKeyser, 2017) * Sound recognition: learners hear a word and select the right pronunciation (Li & DeKeyser, 2017) * Spontaneous production: learners freely speak about a topic and are rated in terms of accentedness, fluency, comprehensibility and segmental (sounds) and suprasegmental (stress, rhythm, etc.) accuracy (Saito et al., 2019a, b; SSLA and Bilingualism; Smemoe & Haslam, 2013) |
| Speaking |  | * Tasks * Monologue (Granena & Long, 2013; Smemoe & Haslem, 2013) * Interviews (Sparks et al., 2012) * Measured aspects * Objective measures: and calculations were made for complexity, accuracy, and fluency based on the transcripts (Granena, 2019); task-specific measures may be included, such as the past tense and relative clauses (Kormos & Trebits, 2012) * Subjective measures: the speech samples were rated holistically by native speakers (Smemoe & Haslam, 2013; Sparks et al., 2012) |
| Reading/Listening |  | * Multiple choice (Roehr-Brackin & Tellier, 2019) * Translation (reading comprehension): learners translate sentences from L2 to L1 (Winke, 2005) * Recall (listening comprehension): learners listen to a text and write down main ideas (Winke, 2005) |
| Writing |  | * Sentence making (for children): children copy key words and see examples with pictures before writing their own sentences (Roehr-Brackin & Tellier, 2019) * Letter writing: learners write a letter in response to a letter they read (Sparks et al., 2012) |
| Overall proficiency | | * Michigan Test of English Language Proficiency: standardized test consisting of grammar, vocabulary, and reading (Hummel & French, 2016). * General Certificate of Second Education national exams (Kaufman et al., 2010) * Test developed by researchers comprising reading, listening, and writing (Kiss & Nikolov, 2005) * Course grades (Sparks et al., 2012) * Cambridge First Certificate Exam (Safar & Kormos, 2008) * Tests created based on the ACTFL guidelines (Sparks et al., 2012) * Defense Language Proficiency Tests (Winke, 2013) |