



WHITE PAPER

Automatic Grammatical Morphology in a Free AAC App

Design and clinical rationale for the language engine in Expressive Go 5.0



Smarty Ears

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Expressive Go 5.0

iPad · iPhone · Mac (Apple silicon)

SUMMARY

Many people who use aided augmentative and alternative communication (AAC) compose messages without the grammatical morphemes that spoken English relies on: verb agreement, tense markers, plurals and articles. Research reviews attribute this in part to the extra selections, time and effort each morpheme costs, and to how rarely those morphemes are modeled on AAC systems (Binger & Light, 2008; Sutton, Soto & Blockberger, 2002). Expressive Go is a free, symbol-based speech-generating app that applies English morphology automatically, using the part of speech encoded in each tile's Fitzgerald Key color and the words already in the message. A user who selects *she* + *eat* hears “she eats”; *yesterday* + *we* + *go* becomes “yesterday we went”; *2* + *swing* becomes “2 swings.” Every change is shown on the symbol in the message strip as well as spoken.

This paper describes how the engine works, what it covers in version 5.0, how it may be used in intervention, and its current limitations. It is a design description, not an outcome study.

Keywords: AAC, morphology, syntax, grammatical morphemes, aided language modeling, Fitzgerald Key, speech-generating device, core vocabulary

1 Background

Speaking English requires a small set of grammatical morphemes, used constantly: third-person -s (“she *eats*”), past tense -ed and irregular past forms (“we *went*”), progressive -ing, auxiliaries (“has eaten,” “*will go*”), plural -s and the articles *a* and *an*. In typical development these emerge early and in a fairly predictable order (Brown, 1973).

For people who communicate with graphic symbols, the picture is different. Aided messages are frequently short, and grammatical morphemes are often missing, even in people whose receptive language suggests they know them (Binger & Light, 2008; Sutton et al., 2002). Proposed reasons include the cost of each additional selection, symbol sets that do not represent inflections, and limited exposure to models of grammatical aided language. Morphology matters for more than correctness: tense and agreement carry meaning (“she *played*” vs. “she *plays*”), and grammatically complete messages are generally easier for unfamiliar listeners to understand. Both are part of communicative competence as described by Light and McNaughton (2014).

AAC systems have addressed morphology in several ways: dedicated morpheme keys the user selects (for example, a -ed or -s button), pop-up word-form menus, and software that predicts or applies inflections. Each places the work in a different spot. Morpheme keys keep the user in full control but add selections. Word-form menus add a navigation step. Automatic application

removes the extra selections but makes decisions on the user's behalf. Expressive Go takes the third approach and pairs it with a manual override (the Time button) and visible feedback, both described below.

2 Design principles

- **Part of speech comes from color.** Every tile already carries a Fitzgerald Key color (Fitzgerald, 1954). The engine reads that color to decide whether a word can be inflected and how, so a noun tile such as *swing* or *slide* (orange) is never conjugated as a verb, even though both words can also be verbs.
- **No extra selections for routine grammar.** Agreement, plurals, articles and adverbs are applied as the message is built, without additional taps.
- **Tense is user-controlled.** Tense can't be inferred reliably from a single word, so the user sets it with a time word (*yesterday*, *tomorrow*) or with the Time button. Either one changes only the next verb.
- **Every change is visible.** The message strip shows each symbol with the inflected word under it (*Went*, *Will go*, *Eats*), so the morphology is something the user and partner can see and point to, not only hear.
- **Stored, not guessed, where English is irregular.** Irregular verbs, irregular plurals and article exceptions are kept in lists. Spelling rules handle the regular cases.
- **Free and private.** All features are free, with no ads, no account and no data collection, so cost is not a barrier to trial, home use or carryover.



Figure 1. The Core board (119 buttons) with Fitzgerald Key colors: yellow people/pronouns, green actions, orange things, light blue describing words, brown time and adverbs, purple questions, pink prepositions, white conjunctions. The message strip reads *He eats and she drinks*: the user selected the base forms *eat* and *drink*.

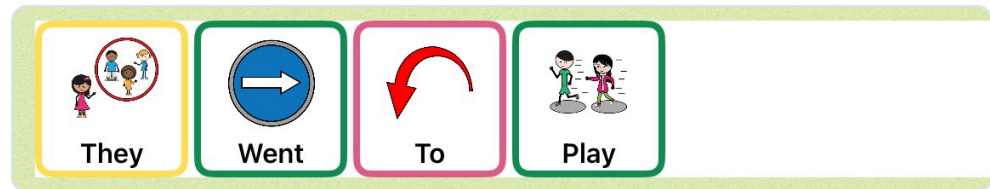
3 How the engine works

Each time a tile is selected, the engine looks at three things: the tile's part of speech (from its color), the word or two immediately before it in the message, and the current tense state. It then picks the form that is added to the strip and spoken. The verb rules are checked in a fixed order: progressive, then perfect, then tense, then agreement. The first one that applies wins.

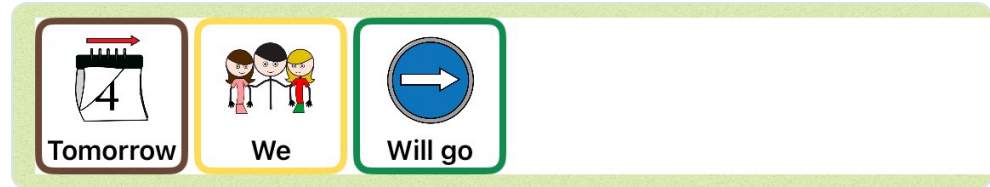
Rule	What triggers it	Examples (selected → spoken)
Subject–verb agreement	A green tile follows a subject word. The agreement table has 1,982 verb and phrase entries, each with forms for 24 subject words: <i>I, you, he, she, it, we, they, ze, this, that, one, everyone, someone, somebody, anyone, anybody, nobody, something, mom, dad, boy, girl, teacher, friend</i> .	<i>he + eat → he eats</i> <i>mom + go → mom goes</i> <i>they + want → they want</i>
Time words	A time tile sets the tense of the next verb. Past: <i>yesterday, last, before, past, evening, night, dusk, midnight</i> . Future: <i>tomorrow, later, soon, next, future</i> . Reset to present: <i>today, now, always, morning, noon</i> .	<i>yesterday + we + go → yesterday we went</i> <i>tomorrow + I + eat → tomorrow I will eat</i>
Time button	One button cycles present → past → future → perfect. Its icon and color show the state. It applies to the next verb only, then returns to present.	<i>they + [past] go → they went</i> <i>we + [future] play → we will play</i> <i>she + [perfect] eat → she has eaten</i>

Rule	What triggers it	Examples (selected → spoken)
Past of <i>be</i>	Past tense of the <i>is</i> tile follows the subject.	I + [past] is → I was you + [past] is → you were
Present of <i>be</i> and <i>have</i>	The <i>is</i> and <i>have</i> tiles agree with the pronoun before them.	I + is → I am, they + is → they are she + have → she has
Perfect aspect	A verb after <i>has</i> , <i>have</i> or <i>had</i> takes the past participle.	has + do → has done have + be → have been
Progressive aspect	A verb after <i>is</i> , <i>am</i> , <i>are</i> , <i>was</i> , <i>were</i> , <i>be</i> , <i>being</i> , or after a <i>be</i> + pronoun pair in either order (question form), takes <i>-ing</i> .	is + run → is running is + he + go → is he going
Future with <i>be</i> and <i>can</i>	Future <i>be</i> becomes "will be"; future <i>can</i> becomes "will be able to." "Will" is never doubled.	tomorrow + it + is → it will be [future] can → will be able to
Irregular verbs	151 irregular verbs are stored with past and past participle. Tiles that are already a past form (<i>went</i> , <i>did</i>) are recognized.	fall → fell / fallen swing → swung has + did → has done
Spelling rules	Regular verbs follow English spelling: silent <i>e</i> , consonant + <i>y</i> , doubling for short CVC verbs and for longer verbs with a stressed final syllable, and <i>-ic</i> → <i>-icked</i> .	stop → stopped, hug → hugging open → opening, begin → beginning cry → cried, panic → panicked
Phrase tiles	1,027 of the verb entries are multi-word phrases. Only the verb (the first word) is inflected.	go to school → went to school brush teeth → brushed teeth
Plurals	An orange or yellow tile after a number above 1 (2–10, <i>two–ten</i>) or a quantifier (<i>many</i> , <i>some</i> , <i>few</i> , <i>all</i> , <i>these</i> , <i>those</i> , <i>several</i> , <i>multiple</i> , <i>no</i>). Spelling rules (<i>-es</i> , <i>-ies</i>) and 13 stored irregular plurals.	2 + cookie → 2 cookies many + child → many children 3 + box → 3 boxes
Articles	When the previous word is <i>a</i> or <i>an</i> , it is corrected by the sound of the next word, including silent <i>h</i> and "you"/"w" sounds. Only articles are corrected.	a + hour → an hour an + uniform → a uniform want + one → want one (unchanged)
Adverbs	A light-blue tile after a green action tile becomes an adverb (59 stored forms). It stays an adjective after <i>be</i> and linking verbs (<i>feel</i> , <i>look</i> , <i>seem</i> , <i>get</i> , <i>become</i> , <i>smell</i> , <i>taste</i> , <i>sound...</i>) and when there is no natural <i>-ly</i> form.	run + slow → run slowly I + feel + sad → I feel sad run + fast → run fast

Time button: past
they + [past] + go + to + play



Time word: future
tomorrow + we + go



Agreement
he + eat + and + she + drink



Figure 2. Message strips as they appear in the app. Each symbol keeps its picture and color; only the word under it changes (*Went*, *Will go*, *Eats*, *Drinks*). The spoken output matches the strip.

4 Clinical applications

Aided language modeling with visible morphology

Aided language input, in which partners model on the learner's own system while speaking, has a strong research base (Ronski & Sevcik, 1996; O'Neill, Light & Pope, 2018). With automatic morphology, a partner who models *she + eat* produces a correctly inflected spoken model, “she eats,” and a visual one: the *Eats* label under the symbol. Clinicians can point to that change to draw attention to it (“Look, it says *eats*, because it's *she*”), contrast minimal pairs (*I eat / she eats*, *we go / we went*), and model the same core verbs in several forms across a session.

Tense, time concepts and narrative

Because tense is set by the user, not inferred, it can be a therapy target in its own right. Time words connect tense to a concept the learner can choose (*yesterday*, *tomorrow*). The Time button gives direct practice in marking past, future and perfect. Personal narratives and event retells (“yesterday we went to the park,” “tomorrow I will see grandma”) are natural contexts. Children's early multi-symbol messages are the subject of growing research (for example, Binger, Kent-Walsh, King & Mansfield, 2017), and tense marking is a natural next step once two- and three-symbol combinations are established.

Intelligibility for listeners

For some users, the goal is not to learn morphology but to be understood quickly by teachers, peers and community members. Automatic morphology produces spoken messages that sound like typical English sentences without extra selections. That can matter in brief interactions with

unfamiliar partners, such as at a playground, a store or a doctor's office.

The same board at home, at school and in the community

All Voices, Any Place is a partnership between Smarty Ears, which makes Expressive Go, and Smarty Symbols, which makes communication boards installed as printed signs at school playgrounds, parks, libraries, zoos and pediatric clinics. Each public board has a QR code that opens Expressive Go. The app includes a digital replica of each board, with the same words in the same places. A child who practices on the replica at home sees the same symbol layout on the printed board, and families who discover a board in the community have a free speech-generating option immediately.

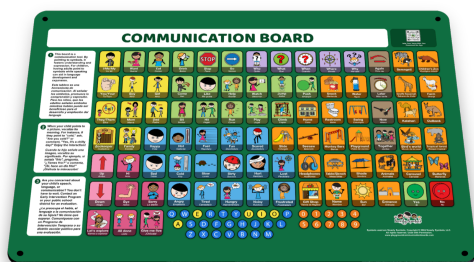


ON THE PLAYGROUND · School Playground board, Ludlow Elementary School

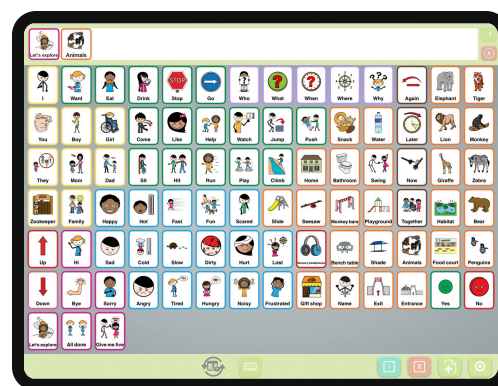


IN THE APP · School Playground board

Same words, same places. Top row on both: I · Eat · Drink · Want · Who · What · How · When · Where · Why · Bench table · Bathroom · Home · Again · Later.



AT THE ZOO · Zoo Playground board (printed design)



IN THE APP · Zoo board

Same words, same places. Top row on both: I · Want · Eat · Drink · Stop · Go · Who · What · When · Where · Why · Again · Elephant · Tiger. Bottom row: Let's explore · All done · Give me five.

Figure 3. Printed communication boards by Smarty Symbols and their digital replicas in Expressive Go, by Smarty Ears, through the All Voices, Any Place partnership. The printed board is a silent visual support. The app adds a voice and the grammar engine. On the printed boards, each tile is filled with its Fitzgerald Key color. In the app, the same color frames the tile.

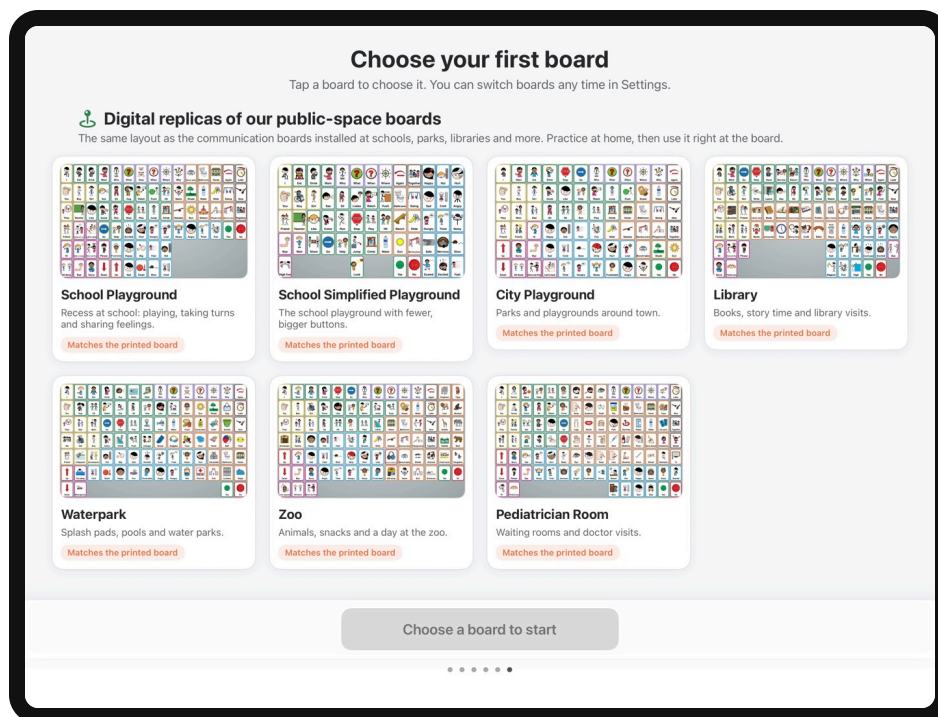


Figure 4. The board picker shows all 11 boards with button counts: four everyday communicators (Starter 30, Growing 48, Advanced 84, Core 119) and seven replicas of public-space boards (School Playground, Simplified School Playground, City Playground, Library, Water Park, Zoo, Pediatrician Room).

5 Supporting features in version 5.0

Access and motor support

- **Ignore accidental double taps:** a second tap within a short interval is ignored, for users whose fingers bounce or who tap twice.
- **Speak words as you tap them** (on or off): hear each word as it is selected, or build silently and speak the whole message.
- **Go back to Home** after each selection, **say folder names**, and **clear the message** after speaking.
- **Lock the app** to hide editing and settings (press and hold to unlock). Links, the Info area and backup are behind a parental gate.

Voices and languages

- iOS system voices in English, Spanish and Portuguese, including enhanced voices downloaded in iOS Settings; adjustable speaking rate.
- Menus and settings in English, Spanish, Portuguese and French. Automatic grammar applies to English.

Continuity

- Back up every board, custom picture, folder and setting to one file (Files, iCloud Drive, AirDrop or email) and restore it on the same or a new device. The app keeps a safety copy before restoring.

Vocabulary and display

- 26,000+ symbols from Smarty Symbols (smartysymbols.com), with diverse skin tones, family types and people with disabilities, searchable in the app, plus the user's own photos.
- Add, hide and recolor words and folders; capital or lowercase labels; words above or below the picture; several fonts.
- A keyboard for typing words that aren't on the board, with letter, word or silent feedback.

Privacy

- No account, analytics, advertising or tracking. App Store privacy label: *Data Not Collected*.

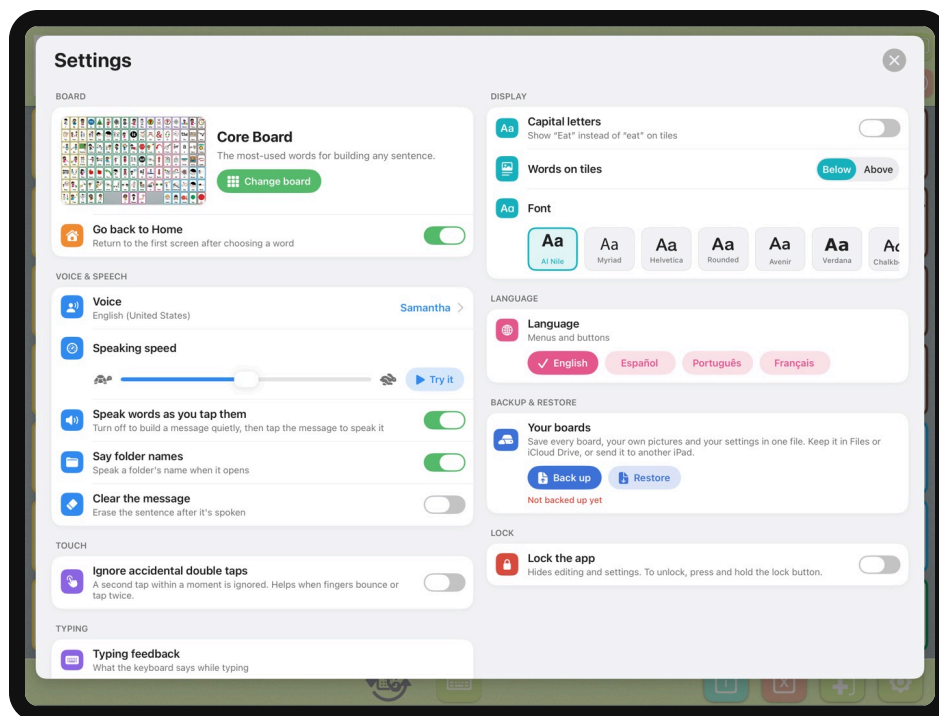


Figure 5. The Settings screen in 5.0, with a preview of the current board and a short explanation under every option.

6 Considerations and limitations

- **Automatic morphology is always on.** The engine inflects on the user's behalf. When the goal is independent selection of specific morphemes, clinicians should weigh this. The visible label change can still serve as a model and as a talking point, but the user is not required to choose the morpheme.

- **Context is local.** Agreement looks at the word immediately before the verb. “The girl eats” works because *girl* is directly before *eat*, but compound or distant subjects (“my mom and dad,” “the girl with the ball”) may not agree as expected.
- **Time words follow a fixed list.** Some of them can be ambiguous: *night* and *evening* set past tense, which may not match “tonight we will...” Using the Time button gives explicit control.
- **Plurals follow quantifiers, not meaning.** Mass nouns after a number may receive a plural -s, and only 13 irregular plurals are stored.
- **English only.** Spanish and Portuguese voices and menus are available, but inflection rules are applied only in English.
- **No outcome data yet.** This paper describes design and intended use. The effects of automatic morphology on expressive grammar, rate or listener comprehension in Expressive Go have not been studied. Smarty Ears welcomes research collaboration.

Questions for the field. When does automatic morphology support grammatical development, and when could it replace learning the user would otherwise do? Does visible inflection on the symbol (rather than speech alone) change how learners attend to morphemes? How should clinicians sequence agreement, tense and aspect for children who already combine two or three symbols? We would value the perspectives of AAC clinicians and researchers on these questions.

7 Availability

\$0

All features free. No ads, purchases or account.

11

Boards, 30 to 119 buttons, plus custom boards and folders

151

Irregular verbs; 1,982 verb and phrase entries

26,000+

symbols from Smarty Symbols, plus the user's own photos

Expressive Go 5.0 runs on iPad and iPhone with iOS/iPadOS 15.6 or later, and on Mac computers with Apple silicon. It is available free on the App Store: apps.apple.com/us/app/expressive-go/id6464439073. A full feature overview with an interactive grammar demonstration is at smartyearsapps.com/expressive-go.

References

- Binger, C., Kent-Walsh, J., King, M., & Mansfield, L. (2017). Early sentence productions of 3- and 4-year-old children who use augmentative and alternative communication. *Journal of Speech, Language, and Hearing Research*, 60(7), 1930–1945.
- Binger, C., & Light, J. (2008). The morphology and syntax of individuals who use AAC: Research review and implications for effective practice. *Augmentative and Alternative Communication*, 24(2), 123–138.
- Brown, R. (1973). *A first language: The early stages*. Harvard University Press.
- Fitzgerald, E. (1954). *Straight language for the deaf: A system of instruction for deaf children* (2nd ed.). Volta Bureau.
- Light, J., & McNaughton, D. (2014). Communicative competence for individuals who require augmentative and alternative communication: A new definition for a new era of communication? *Augmentative and Alternative Communication*, 30(1), 1–18.
- O'Neill, T., Light, J., & Pope, L. (2018). Effects of interventions that include aided augmentative and alternative communication input on the communication of individuals with complex communication needs: A meta-analysis. *Journal of Speech, Language, and Hearing Research*, 61(7), 1743–1765.
- Romski, M. A., & Sevcik, R. A. (1996). *Breaking the speech barrier: Language development through augmented means*. Paul H. Brookes.
- Sutton, A., Soto, G., & Blockberger, S. (2002). Grammatical issues in graphic symbol communication. *Augmentative and Alternative Communication*, 18(3), 192–204.

About Smarty Ears. Smarty Ears develops apps and materials for speech-language pathologists, educators and families. Smarty Ears develops, publishes and owns Expressive Go, which was designed by speech-language pathologist Barbara Fernandes.

About the partnership. The symbols in Expressive Go come from Smarty Symbols (smartsymbols.com), which also makes the communication boards installed in more than 650 communities. Smarty Ears and Smarty Symbols partner on All Voices, Any Place, which connects each public board to the app.

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