The Optimal Period for Learning New Function Words in Children

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1. Introduction

The distinction between lexical and functional categories is fundamental in natural languages. Functional items (such as determiners, auxiliaries, tense markers, etc.) are a tiny set of morphemes that are highly frequent, phonetically and prosodically weak, and syntactically important. Their meanings are more complex and less transparent in word-to-world mapping, generally defined by their relations with other classes of words and morphemes in the phrase structure. In contrast, lexical words (also called content words), including nouns, verbs, adjectives and adverbs, are a massive set that occupy nearly the entire dictionary. In comparison to functional items, lexical items are highly infrequent, phonetically and prosodically stronger, and semantically more important. One common aspect shared by lexical and functional categories is that they both require language-specific vocabulary learning. Each item must be learned from the input of the native language.

Our particular interest concerns functional morphemes in child language. Research on the early acquisition of lexical and functional categories has evolved significantly over the past decades. It is well known that children's speech production before two years of age contains primarily lexical items, lacking functional morphemes (Brown, 1973). This observation led to the conventional claim that functional items are absent in early grammar. However, evidence from perception and comprehension studies during the past twenty years revealed that the acquisition of functional morphemes begins as early as that of lexical items, from the first year of life. The binary distinction of lexical and functional categories is perceived based on their phonetic and prosodic patterns by infants from birth (Shi, Werker, & Morgan, 1999; Shi & Werker, 2001, 2003). From six to 11 months of age infants begin to track specific function words and bound functional morphemes of their native language, and use them to facilitate the segmentation of other words in running speech (e.g., Höhle & Weissenborn, 2003; Shi, Werker, & Cutler, 2006; Shi, Cutler, Werker, & Cruickshank, 2006; Hallé, Durant, & de Boysson-Bardies, 2008; Shi &

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 Proceedings of the 46th annual Boston University Conference on Language Development, ed. Ying Gong and Felix Kpogo, 713-725. Somerville, MA: Cascadilla Press.

Lepage, 2008; Marquis & Shi, 2012; Kim & Sundara, 2015; Kim & Sundara, 2021). From about one year of age infants use functional items to categorize novel lexical words (e.g., Höhle, et al., 2004; Shi & Melançon, 2010; Cyr & Shi, 2013; Babineau, Shi, & Christophe, 2020; Ying, Yang, & Shi, in press), to track non-adjacent grammatical dependencies (e.g., Santelmann & Jusczyk, 1998; Höhle, Schmitz, Santelmann, & Weissenborn, 2006; Soderstrom, White, Conwell, & Morgan, 2007; Van Heugten & Shi, 2010), to analyze phrase structures (Massicotte-Laforge & Shi, 2015, 2018; Koulaguina, Legendre, Barrière, & Nazzi, 2019; Shi, Emond, & Badri, 2020), and to interpret meanings of neighboring lexical words (e.g., Kedar, Casasola, & Lust, 2006; Oshima-Takane, et al., 2011; Kedar, Casasola, Lust, & Parmet, 2017; He & Lidz, 2017; de Carvalho, He, Lidz, & Christophe, 2019). Infants are not impeded by the weak phonetical forms of functors, even when they are reduced to a single clicitized consonant (e.g., recognizing the prefixal verb number agreement marker /l/ versus /z/ in French at 14 months of age, Culbertson, et al., 2016).

It is notable that the tracking of the forms of functors is closely tied to their utterance positions from the earliest stage, with parallel syntactic consequences. For instance, at eight months, an age when the forms of functors in the native language start being learned (e.g., Shi & Lepage, 2008), infants' perception of functors in an artificial language reflects the word order characteristic of their native language: Italian babies showed the opposite phrasal parsing preference in comparison to Japanese babies, corresponding to the head directions of their respective languages (Italian versus Japanese) (Gervain, et al., 2008).

Let us consider the case of determiners in detail. Determiners are complex and subtle in meaning, e.g., definiteness versus indefiniteness. Some different determiners even have no conceptual distinction. For instance, the masculine and feminine singular definite determiners *le* and *la* in French are indistinguishable in meaning (i.e., 'the' for both). While the mastery of the semantics of determiners might take a long time, the forms of these items and their syntactic properties are acquired in early infancy. Already at eight months of age English- and French-learning infants can recognize familiar determiners and distinguish them from prosodically matched nonsense syllables (e.g., Shi, Werker, & Cutler, 2006; Hallé, Durant, & de Boysson-Bardies, 2008; Shi & Lepage, 2008;). After their first birthday, German- and French-learning infants perceive determiners as a common class and use them to categorize an adjacent novel word as a noun (Höhle, et al., 2004; Shi & Melançon, 2010). After 1.5 years of age, infants' responses to determiners show enriched phrase structural knowledge. In the study of Massicotte-Laforge and Shi (2015), sentences containing all non-words except French determiners were presented to French-learning infants; one group of infants was familiarized with [*Un*$_{\text{det}}$ *felli mige*] [*vur la*$_{\text{det}}$ *gosine*] in which the initial three words formed a prosodic phrase, and another group with [*Un*$_{\text{det}}$ *felli*] [*mige vur la*$_{\text{det}}$ *gosine*] in which the initial two words formed a prosodic phrase. Then, all infants were tested with the third word in new two-word utterances, i.e., as a noun co-occurring with a new determiner (e.g., *Le*$_{\text{det}}$ *mige* 'The mige') versus as a verb co-occurring with a

subject pronoun (e.g., *Tu*$_{pron}$ *miges* 'You mige'). Their responses to the test utterances showed that infants had correctly interpreted the sentential phrase structures based on the disambiguating prosodic groupings. Specifically, they categorized the non-adjacent third word as a noun in [*Un*$_{det}$ *felli mige*] [*vur la*$_{det}$ *gosine*], but as a verb in [*Un*$_{det}$ *felli*] [*mige vur la*$_{det}$ *gosine*], suggesting that their determiner and phrase structural representations were sophisticated and adult-like. In a subsequent experiment the determiners in the familiarization sentences were replaced by prosodically matched nonsense determiners such that all words in each sentence were novel (Massicotte-Laforge & Shi, 2020). We found that for the first type of prosodic groupings (i.e., [*Guin felli mige*] [*vur ti gosine*]), infants could no longer categorize the third word as a noun, even though it fell within the same prosodic phrase as the nonsense determiner. This means that neither the determiner-like prosody of *guin* nor the appropriate phrasal grouping was sufficient for guiding infants to categorize the noun. They expected a real determiner in its designated syntactic position in order to predict a noun.

Taken together, this body of literature provides a convincing demonstration that functional morphemes emerge early in acquisition. The forms of functors and the associated phrase structures are rapidly acquired during the initial two year of life.

In the present study we explore a new question about functional morphemes. We focus on the language-universal characteristics that functors are a tiny set of structurally important members occurring extremely frequently, in contrast to lexical words, which are a massive set of open-class items each occurring infrequently. Indeed, unlike lexical words, for which new members are learned throughout the lifespan, functional morphemes appear to be completed as a small set in one's lexicon in the initial years of life, that is, becoming a closed class. The occurrences of this tiny set in required syntactic positions make them highly frequent and appear as the anchors of phrase structures, which are the plausible mechanisms underlying the remarkable learning of functors and the use of these items for phrase structure analysis during the initial two years of life. Given this reasoning, we proposed the following general hypotheses: the optimal window for learning new functors is the initial few years of life when basic phrase structures are being acquired; after the optimal period, the class is closed, that is, disfavoring new members for functors.

To test our hypothesis, we conducted a perceptual experiment, in which we first introduced a new pseudo-determiner along with real determiners, and then examined children's acceptance of the new determiner in a spontaneous syntactic task (as in Massicotte-Laforge & Shi, 2020). Participants were toddlers of two age groups, 24 months and 30 months. In light of the previous findings on infants' impressive knowledge and use of functors during the initial two years of life, including the findings of our prior experiments in this task (Massicotte-Laforge & Shi, 2015, 2018, 2020), we expected that 24-month-olds are still at the optimal stage for learning new functors; they should spontaneously accept the new functor into the determiner set after the brief introduction. For 30 months of age, we expected to observe a potential decline

in the same task. This age was chosen with the following considerations. It is well known that from 24 to 30 months of age, children's speech production reaches the stage of grammatical explosion, with enriched morpho-syntactic markings. The grammatical explosion is consistent with the sophisticated representations of functors and phrase structures shown in recent infant perceptual and comprehension studies, as discussed above. The evidence is clear that rudimentary phrase structures are in place around this age. With respect to determiners, 30-month-olds have shown adult-like representation of determiner feature agreement in hierarchical phrase structures (Shi, Legrand, & Brandenberger, 2020). We thus reasoned that by 30 months of age, spontaneous acceptance of a new determiner might decline.

2. Methods

2.1. Participants and stimuli

Monolingual Quebec-French-learning toddlers were recruited for this study. The younger group consisted of 21 infants aged 24 months. The pre-determined sample size was 24 infants, which was not possible to be accomplished for this age due to the COVID-19 pandemic. The sample was complete for the older group: 24 children aged 30 months.

The stimuli for the brief training phase were determiner phrases (DPs) in the Det+Noun structure. We used six pseudo-nouns: *gope, cagère, banes, mouveille, fime, ravoles*. Three French determiners (*un* 'a', *ton* 'your', *des* 'some') were paired with the pseudo-nouns to form six DPs: *un gope, ton cagère, des banes, un mouveille, ton fime, des ravoles*. A pseudo-determiner *guin* (a CV form with a nasal vowel) was paired with the same pseudo-nouns to yield six more DPs: *guin gope, guin cagère, guin banes, guin mouveille, guin fime, guin ravoles*. The 12 DPs were recorded by a female native Quebec-French speaker. The final selected stimuli included one token for each real determiner DP and two tokens for each *guin* DP.

The stimuli of the familiarization phase were sentences taken from one of the two conditions of Massicotte-Laforge and Shi (2020). They were two sentences each contained all novel words, i.e., [*Guin*$_{\text{pseudo-det}}$ *felli*] [*mige vur ti*$_{\text{pseudo-det}}$ *gosine*], and [*Guin*$_{\text{pseudo-det}}$ *felli*] [*crale vur ti*$_{\text{pseudo-det}}$ *gosine*]. A female native Quebec-French speaker recorded the sentences by mimicking the prosody of real French sentences with the same intended phrase structure, such as [*Ton cheval*] [*dort dans le desert*] 'Your horse sleeps in the desert'. The speaker naturally produced a prosodic break after the second word in each of the sentences. Thus, within each sentence the first prosodic phrase corresponded to the intended DP, and the second corresponded to the intended VP (verb phrase). At the word level, *guin* and *ti* were intended to be pseudo-determiners, *felli* and *gosine* were intended to be pseudo-nouns, *mige* and *crale* were intended to be pseudo-verbs, and *vur* was intended to be a pseudo-preposition. The pseudo words conformed to the typical phonological patterns of their respective grammatical classes in French. The final stimuli consisted of three tokens for

each of the two all-non-word sentences. More details about the properties of the stimuli are in Massicotte-Laforge and Shi (2020).

The stimuli of the test phase consisted of a new determiner *le* ('the') and a subject-pronoun *tu* ('you') in French, co-occurring respectively with the second word (*felli*) of the familiarization sentences. Thus, *felli* was used as a noun in *Le felli* ('The felli'), and as a verb in *Tu fellis* ('You felli'). Note that the *-s* spelling in the verb utterance is phonetically silent. The stimuli were the test stimuli of Experiment 3 in Massicotte-Laforget and Shi (2018), which had been recorded by the same speaker who produced the stimuli of Massicotte-Laforge and Shi (2015, 2020). There were 10 tokens of *Le felli* and 10 of *Tu fellis*, and the two sets were prosodically matched (see details in Massicotte-Laforge & Shi, 2018).

The visual stimulus for the speech of the familiarization and test phases was an animation of a cartoon character who "spoke" the speech stimuli while doing gentle body and head motions. The attention-getter was a zooming star accompanied by bird songs. An animation of moving balloons with water bubble sound served as the stimulus of the pre-trial. These stimuli were the same as in our previous study (Massicotte-Laforge & Shi, 2015, 2018, 2020). The animation of the moving balloons was also used to accompany the speech stimuli of the brief training phase.

2.2. Procedure and design

The procedure was the same as in our previous studies (Massicotte-Laforge & Shi, 2015, 2018, 2020). The experiment was conducted in an acoustic chamber. The parent held the infant on his or her lap and listened to music through masking headphones. A large central LCD screen about one meter in front of the child presented the visual stimuli, and the auditory stimuli were played from loudspeakers attached to the left and right sides of the screen. The parent was asked to avoid interacting with his/her child. A camera below the screen sent live video of the child to a TV monitor in the adjacent control room. The researcher in the control room, who was blind to the audiovisual stimuli, launched the experiment and coded the infant's looks using a computer program (Oakes, Sperka, Debolt, & Cantrell, 2019), which presented the audiovisual stimuli and automatically recorded the child's looking data. Each trial was initiated by the child's looking to the center screen.

The experiment started with a short pre-trial, which presented the moving balloons with water bubble sound. This trial aimed at acquainting the child with the room and the audiovisual equipment. Then, the brief training phase presented two trials, each lasting 17 s. One of the two trials presented three of the real determiner DPs together with the six *guin* DPs, and the other trial presented the remaining three real determiner DPs together with the six *guin* DPs (different tokens). The DPs within a trial were separated by a silence period of approximately 700 ms. The order of the DPs in each trial was randomized. In total, all children heard 34 seconds of the brief training trials.

The familiarization and test phases were fully infant controlled in that a trial not only was initiated by the child's look, but also could be terminated by the child. A trial would stop if the child looked away from the central screen for at least 2 s or if the maximum length of the trial was reached. The attention-getter was presented between trials to attract the child back to the screen for the next trial. The familiarization trials presented the tokens of the all-non-word sentences in a random order. The maximum trial length was 23 s (if the child looked at the screen until the end of a trial). The familiarization trials were repeated until the child accumulated the pre-established total looking time, which was 92 s. The test phase, which automatically followed the familiarization trials, presented the tokens of *Le felli* and those of *Tu fellis* in alternating trials (12 trials in total, six for each type). The maximum trial length was 20.2 s. The ISI (inter-stimulus interval) in both the familiarization and test trials was 1 s.

The design was similar to that of our previous studies (Massicotte-Laforge, 2018, 2020). The added brief training phase was crucial for assessing children's ability to learn new functors and to encode/process them syntactically. None of the pseudo-nouns in the brief training utterances appeared again in later phases of the experiment. This aspect was important for our goal of testing children's abstraction of the newly introduced determiner and their generalization of this item to other syntactic contexts. Since the word *felli* in the familiarization sentences following the pseudo-determiner *guin* was intended to be a noun, the test trials presenting the target word in the Det+N structure (i.e., *Le felli* 'The felli') were grammatical, and those presenting the Pron+Verb structure (i.e., *Tu fellis* 'You felli') were ungrammatical. All children in our experiment heard the brief training DPs, the familiarization sentences, and the two types of test trials. The only counterbalancing needed was the status of the first test trial: half of the toddlers heard the grammatical test trial first, and the other half heard the ungrammatical trial first. Table 1 shows the stimuli and design.

Table 1: Stimuli and design

Brief Training
(DPs, in Det+N structure)
(French Dets: *un* 'a', *ton* 'your', *des* 'plural indefinite'; pseudo-Det *guin*; all 6 nouns are non-words) (The DPs with *guin* each occurred twice, and those with real determiners each occurred once) *un gope; ton cagère; des banes; un mouveille; ton fime; des ravoles;* *guin gope; guin cagère; guin bane; guin mouveille; guin fime; guin ravole*
Familiarization
$[[\text{Det N}]_{\text{DP}}\ [\text{V Prep Det N}]_{\text{VP}}]_{\text{S}}$
(The all-non-word sentences were each produced with two prosodic phrases; the production modeled after a real French sentence: *Ton cheval dort dans le désert* 'Your horse sleeps in the desert') $[[\textit{Guin felli}]_{\text{DP}}\ [\textit{mige vur ti gosine}]_{\text{VP}}]_{\text{S}}$ $[[\textit{Guin felli}]_{\text{DP}}\ [\textit{crale vur ti gosine}]_{\text{VP}}]_{\text{S}}$
Test
(Det+N vs. Pron+V)
(French function words: *le* 'the', *tu* 'you'; non-word *felli*) Grammatical (Det+N): $\textit{Le}_{\text{Det}}\ \textit{felli}$ Ungrammatical (Pron+V): $\textit{Tu}_{\text{Pron}}\ \textit{fellis}$

Note: All the non-words in the stimuli conform to French phonology. The *-s* ending in the spelling of the training words and in the test word *fellis* is phonetically mute.

2.3. Predictions

In the brief training phase, the utterances with real determiners should allow toddlers to categorize the following non-word (e.g., *gope*, *mouveille*) as a noun. This ability has been demonstrated by infants as young as 14 months of age in previous work that used the same kind of stimuli (Shi & Melançon, 2010). The same novel nouns co-occurring with the pseudo-word *guin* in the same structure (*guin*+N) thus provides a model for learning *guin* as a new determiner. If toddlers could learn the new determiner *guin* and use it to categorize the adjacent novel word *felli* in the familiarization sentences as a noun, they should then perceive the test utterance *Le felli* as grammatical and *Tu fellis* as ungrammatical. In this case, we would predict a discrimination of the two types of test trials. If, on the contrary, toddlers were unable to learn and use *guin* during the brief training and familiarization, we should expect no discrimination

of the test trials. We predicted that our younger group (24-month-olds) would discriminate the test trials, but the older group (30-month-olds) might not.

3. Results

Toddlers' looking times while listening to the grammatical versus ungrammatical test trials were calculated. In particular, the average looking time per trial for grammatical trials and that for ungrammatical trials were calculated for each child. As is generally done in this procedure (e.g., Cooper & Aslin, 1994; Shi & Melançon, 2010), we removed the first test trial of each type, which are usually unstable. The data of each age group were first analyzed separately in paired t-tests. As predicted, the 24-month-olds discriminated the two types of test trials significantly (Grammatical: M = 8.02 s, SE = .79; Ungrammatical: M = 9.73 s, SE = .94; t (20) = -2.553, p = .019, two-tailed), demonstrating that they categorized the novel noun using the pseudo-determiner *guin*. The longer looking to ungrammatical trials (a novelty preference) is identical to that observed in our previous categorization studies using similar stimuli and design (Shi & Melançon, 2010; Massicotte-Laforge & Shi, 2015, 2018, 2020); in those studies, a novelty preference was consistently present whenever an experiment showed a categorization effect. In contrast to the 24-month-olds, the 30-month-olds showed no discrimination in our task (Grammatical trials: M = 9.58 s, SE = .90; Ungrammatical trials: M = 9.49 s, SE = .85), t (23) = .133, p = .896. The results are displayed in Figure 1.

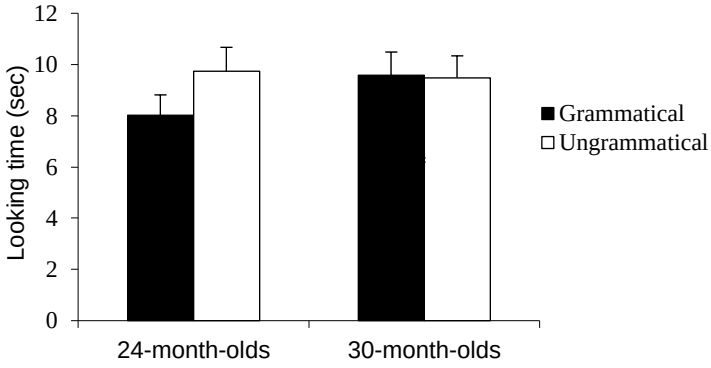

Figure 1. Mean looking (listening) times (and standard errors) in Grammatical versus Ungrammatical test trials. 24-month-olds discriminated the two types of test trials significantly, showing the same novelty preference as in Massicotte-Laforge and Shi (2015, 2018) that used real determiners for familiarization. 30-month-olds showed no discrimination.

To evaluate if the two age groups were statistically different in their responses, we further analyzed the data in a 2 x 2 mixed ANOVA, with Grammaticality (i.e., grammatical versus ungrammatical) as the within-subject

factor, and Age (i.e., 24 months versus 30 months) as the between-subject factor. We predicted that if the two age groups differed in their responses to grammatical versus ungrammatical trials, it must be demonstrated by a larger novelty effect (longer looking to ungrammatical trials than to grammatical trials) in the 24-month-olds; thus, a one-tailed statistic was justified to assess the interaction of the two factors. Results revealed that there was an interaction of the two factors (Grammaticality x Age), F (1, 43) = 3.247, p = .0395, indicating that the younger group outperformed the older group in the categorization performance. We found no main effect of Grammaticality, F (1, 43) = 2.587, p = .115, nor a main effect of Age, F (1, 43) = .341, p = .562.

4. Discussion

The goal of our experiment was to test the hypothesis that the optimal period for learning new functional items is the initial few years of life. This idea is motivated by the language-universal property of functors in natural languages, namely, a tiny set of items occurring highly frequently due to their obligatory positions in the phrase structure. The extremely high frequency of these items in input speech provides an ideal opportunity for infants to track the items and store their forms in the early lexicon. Consistent with this property, many perceptual studies found that infants are impressive in learning functors and use them for analyzing syntax during their first two years of life, as discussed in the Introduction. We reasoned that by age two to three, the highly frequent functors must have been heard sufficiently often by infants such that the accumulation of the forms of this tiny set might be complete; that is, the child may no longer expect to add more members into their established functional categories (unless there are compelling reasons).

Our experiment tested this hypothesis with toddlers aged 24 months and 30 months. We expected that 24-month-olds are still at the optimal period of adding new members to functional categories. The acceptance of a new determiner should be efficient since infants have already started representing this category syntactically from 14 months of age (Shi & Melançon, 2010). Thus, although our brief training phase only presented the new functor *guin* 12 times (in six DPs), the 24-month-olds learned it easily, and furthermore, they generalized it automatically in their analysis of other contexts in the familiarization and test phases. Our task involved fast learning and spontaneous syntactic responses, requiring no processing of meaning. The 24-month-olds' performance was impressive; they quickly accepted *guin* into the determiner category by tracking its distribution relative to the other real determiners in the training DPs, without needing *guin* to occur frequently. The successful categorization by the 24-month-olds contrasted with the lack of evidence for categorization in the 30-month-olds in the same task. These results suggest that the optimal period for adding new functors to the lexicon is likely the initial 2.5 years of life, after which the willingness (implicit or explicit) to accept new functors into the established system might begin to decline.

In a recent study (Babineau, de Carvalho, Trueswell, & Christophe, 2021) French-speaking 3-to-4-year-olds and even adults were able to learn a new functor, which might suggest that there is no decline for learning new functors. Participants in that study were trained with a new functor *ko* (occurring 60 times) either as a new determiner or a new subject pronoun, mixed among familiar words in a story in French. They later used the new functor to recognize the meaning of a novel noun (depicted by an object) or of a novel verb (depicting an action), depending on the respective training. Since the training and testing always included semantics, participants could have learned the novel word *ko* as denoting the concept of objects or the concept of actions without necessarily incorporating *ko* as a new functor syntactically. The training was 10 times longer than the brief training in our study, in addition to semantic and discourse cues. Hence, if the processing of *ko* in their task was syntactic, it could be driven by the intensive training, which would not be inconsistent with our idea of the optimal period for learning new functors in younger children.

Our experiment, on the other hand, was a pure syntactic task, and the measure was children's spontaneous and intuitive responses to the grammaticality status of the newly introduced functor in phrase structures. We presented neither semantic nor discourse cues throughout the experiment. The speech stimuli were all non-words, except three real determiners in the brief training phase. Despite the potential challenge of numerous novel words and varying utterance structures, our 24-month-olds succeeded in the task. Their learning of the new determiner was efficient and spontaneous, demonstrating that they were at the optimal stage of learning new functors.

Returning to the issue considered above: can new functors be learned at all after the optimal period? Our suggestion is yes, although the process might be less spontaneous and less efficient, potentially needing more training. We could expect 30-month-olds to succeed in our task if we increase the training time or provide more support in the training stimuli (for example, adding more real determiners, using familiar nouns, giving semantic-discourse contexts). In artificial grammar studies, training is usually intensive, or massive, in comparison to the brief training in our study. Nevertheless, older children and adults have shown the ability to learn new functors in those studies (e.g., Hudson Kan & Newport 2005; Wonnacott, Newport & Tanenhaus, 2008, Schuler, Yang & Newport, 2016). It is also known that older children and adults can learn new functional morphemes in a second language, and in that case the younger the learner, the better they learn functors, a phenomenon that might be explained by age-related brain plasticity for syntactic acquisition. The term "optimal period" in our proposal therefore focuses on the idea that learning new functors is most efficient and automatic during the initial two to three years, after which the process is less optimal, but still possible.

Alternative accounts might also explain the different responses exhibited by 24- and 30-month-old toddlers. The older toddlers, with likely more advanced and refined knowledge of functional categories, might reject a new functor unless there is a linguistic justification. In our task the pseudo-determiner was

introduced without a linguistic reason, which did not bother the younger group. At 24 months of age, toddlers seem to be still wide open to accumulate new members of functional categories and are thus automatically ready to accept a new determiner. At 30 months, however, the determiner category might be perceived as being complete, and a new member would only be acceptable if a new linguistic feature is introduced to the category (e.g., for a structural distinction). Language-specific characteristics of functional categories might also play a role. More research is needed to address these questions.

In sum, our study was motivated by the language-universal characteristics of functors: a tiny, closed class of syntactically structured items that occur highly frequently. Our results showed that the optimal period for learning new functors is the initial few years of life, after which children are less inclined to accept new functors. This agrees with the fact that new functors are rarely created in existing languages, and when they do emerge, they usually evolve from content words through grammaticization (e.g., *going to* becoming *gonna*). We propose that children learn functors mostly structurally, and they start disfavouring new functors when their rudimentary phrase structure representations are in shape, by around 2.5 years of age.

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Proceedings of the 46th annual Boston University Conference on Language Development

edited by Ying Gong
and Felix Kpogo

Cascadilla Press Somerville, MA 2022

ISSN 1080-692X
ISBN 978-1-57473-077-7 (2 volume set, paperback)

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