Received: 16 April 2021 | Revised: 23 August 2021 | Accepted: 25 August 2021

DOI: 10.1002/icd.2269

COMMENTARY

WILEY

Optimal input for language development: Tailor nurture to nature

Angela Xiaoxue He

Department of English Language & Literature, Hong Kong Baptist University, Kowloon Tong, Hong Kong SAR, China

Correspondence
Angela Xiaoxue He, Department of English Language & Literature, Hong Kong Baptist University, 224 Waterloo Road, Kowloon Tong, Hong Kong SAR, China.
Email: angelahe-axh@hkbu.edu.hk

Abstract

In acquiring a native language, the input children receive, to an unneglectable extent, shapes the rate of acquisition and the ultimate achievement. This in turn has cascading effects on many aspects of later development, including but not limited to language. Providing optimal input for early language development, therefore, is of major interest to scientists, parents, and educators. This thought paper highlights two less-discussed factors in the formula of optimal input—the balance between input quantity and quality, and the timing of input provision. Correspondingly, two points are made: first, given significant limitations in processing abilities in early development, increased quality is sometimes achieved via decreased quantity; second, endowed with a sleep-mediated memory consolidation system, input provision should consider "sleep" as a reference point in timing. Both points boil down to a central theme that nurture (i.e., input) should be tailored to suit nature; in particular, optimal input should take best advantage of the endowments provided by our nature (e.g., sleep to consolidate memory) and to circumvent the limitations set by nature (e.g., processing limitations).

KEYWORDS
child language acquisition, language input, language processing, myelination, nature and nurture, sleep and memory

Spiders spin delicate webs; bats produce echolocation sounds; bees accurately estimate solar azimuth. Humans use language. The ability to learn and use a language is part of the human biology. Provided a healthy human brain and proper input, a native language 'grows' in human infants, naturally and seemingly effortlessly. In broad strokes, the growth of a native language follows more or less the same trajectory, as dictated by our biological blueprint, just like other aspects of development (e.g., teething, depth perception, synaptic pruning).

Nonetheless, within the boundaries set by nature, unneglectable individual differences have been observed, in terms of both the rate of acquisition and ultimate achievement, and a key affecting factor is, of course, nurture—the language input (see Rowe & Snow, 2020, for a recent review). Due to the complexity of 'language' and its close interdependence with other domains of human cognition, early language development has been shown to have cascading effects on many aspects of later development, including language itself, and also cognitive and social-communicative skills, which in turn affect later performance in school and beyond (e.g., Bleses, Makransky, Dale, Højen, & Ari, 2016; Walker, Greenwood, Hart, & Carta, 1994). Parents and educators, therefore, strive to improve children's early language development by providing optimal input.

But what is optimal input? Input is the resources for learning, but not all resources will be or can be utilized by the learner. Input (i.e., what is provided) does not equate to intake (i.e., what is absorbed) (see, for example, Omaki & Lidz, 2015; He & Arunachalam, 2017, for discussion). Optimal input should be one that maximizes the learner's intake. Input tailored to the learner, therefore, has a higher chance to achieve so.

The idea of 'input tailoring' is not new. In fact, infant-directed speech—speech used by parents when speaking with their infants—is the most widely used tailored input and has been shown to be helpful in several aspects of language development (e.g., Ma, Golinkoff, Houston, & Hirsh-Pasek, 2011; Thiessen, Hill, & Saffran, 2005; Werker et al., 2007). It is supportive because it is suitable—its slower speech rate, greater pitch variations, simpler vocabulary, shorter sentences, longer pauses and increased repetitions (compared to adult-directed speech) all suit the early stages of language development.

Thus, optimal, to a large degree, is suitable—suitable to the individual child's developmental stage, his/her interests, requests or focusses and many other idiosyncratic aspects. Here, in light of the consensus in language acquisition theories that embrace the interaction of nature and nurture (albeit with varying degrees/emphases[1]), I would like to highlight optimal input as 'nurture that is tailored most appropriately to suit nature'.

In this article, among the many factors of potential impact, I discuss two less-considered directions towards optimal input. In one, input could be optimized to minimize the potential negative effect of a limitation set by our nature, and in another, input could be optimized to maximize the potential positive effect of an endowment provided by nature. Importantly, in both, the 'nature' at issue is not specifically linguistic but regards general cognitive development. In doing so, I hope to encourage more synergy between nature and nurture, as well as between linguistic and non-linguistic domains in development.

1 | LESS IS MORE: QUANTITY AND QUALITY OF INPUT

What is optimal input? The easiest answer to this question, also the most widely practiced, is one that focusses on quantity. Quite often, I heard concerns from busy working parents worrying they are not talking enough to their children, who then desperately seek alternative ways to feed their children with more input (e.g., TVs, audiobooks). But in fact, while input quantity definitely plays a role (e.g., Hart & Risley, 1995), quality weighs more (e.g., Rowe, 2012). For instance, non-interactive input such as language heard from television shows is not as effective as input from a live interlocutor (O'Doherty et al., 2011; Roseberry, Hirsh-Pasek, & Golinkoff, 2014; Zimmerman et al., 2009).

This consensus in academia—quality matters more—is not unknown to the general public but not as deeply recognized as the straightforward and easy-to-remember message 'the more, the better'. More quantity is often equated to more quality. As a result, parents are often suggested to speak more, use more (types of) words, expand on sentences, etc. The real picture, however, is way more subtle.

Sometimes, even though it is the more the better, which dimension of quantity to increase makes a difference. For example, the best predictor of vocabulary development in infancy is not how many words are heard, nor how many types of words are heard, but how often a specific word is repeated (Newman, Rowe, & Bernstein Ratner, 2016).

And, sometimes, the more, counterintuitively, the worse. In an experiment testing 3-year-olds' abilities to learn new verbs (He, Kon, & Arunachalam, 2020), two events (each representing a candidate meaning of the new verb) were presented—in one, a boy was engaged in an action; in the other, a girl was engaged in a different action. Children either heard 'the boy is pilking' or 'the tall boy is pilking', from which they were expected to find the event of the boy (rather than that of the girl) and map it to the new verb 'pilk'. The only difference between the two types of sentences was the inclusion/exclusion of an adjectival modifier, a seemingly extremely trivial difference. However, this small difference in the input turned out to make a big difference in children's performance. The additional information, although truthfully describing the scene (i.e., the boy was indeed tall), was shown to be a hurdle: Children hearing 'the tall boy' failed to learn the verb, when their peers who heard 'the boy' were successful. In addition, changing the scenes into a tall boy and a short boy (instead of a short girl), which made the extra information necessary (for distinguishing the two scenes), did not alter the result.

A closer look into children's eye gazes provided evidence that the hindrance likely arose from children's limited processing ability. In other words, while the additional modifier provided extra truthful information, to utilize that information, the learner must be able to process it—that is, to convert the input into their intake. This seemingly easy step, however, was not so easy for young children after all. This result held with different types of adjectives, across different languages and even with older 5-year olds (Arunachalam, He, & Song, 2020).

Therefore, a clear message is: An increase in input quantity is only meaningful when it is intake-able. This message, again, is not unknown to us. But knowing is one thing, doing is another. Our daily speech overflows with over-specific descriptions (e.g., Engelhardt, Bailey, & Ferreira, 2006; Ferreira, Slevc, & Rogers, 2005), even in speech to young children (e.g., Arunachalam, 2016). We do so, in part, to achieve clarity and reduce ambiguity. For adult listeners, such efforts are often not harmful because adults' processing capacity has a high enough threshold to handle most of the over-specifications. Children, however, are different. They need to process the input to learn a language; meanwhile, they are also learning how to process (Kidd, Bavin, & Brandt, 2013; Omaki & Lidz, 2015; Trueswell & Gleitman, 2007).

Language processing is not at all trivial and can be quite costly on our cognitive resources. To process a phrase even as simple as 'the tall boy', the following steps must be involved: build a phonological representation and retrieve the lexical-semantic information for each individual word, build a syntactic parse of the phrase that integrates lexical-semantic information into a structured whole and derive the meaning of the whole from the parts. In doing so, multiple brain regions are involved (e.g., BA41 and BA42 for auditory processing, BA45 for lexical semantics, BA44 for syntactic parsing[2]), and the coordination and communication among them is crucial for effective and efficient processing.

However, the neurological structure essential for information transfer across brain regions takes time to mature. Specifically, the fibre tracts that connect cerebral cortices undergo 'myelination' to reach a mature state. Myelination is the process of generating myelin—the fatty sheath surrounding neuronal axons, which is critical for determining the speed of information transfer. A myelinated axon, compared to an unmyelinated one, may have an action potential 10–100 times faster (Laule et al., 2007). Ontogenetically, the neuronal axons are largely unmyelinated at birth and take years to get fully myelinated (e.g., Branson, 2013). And certain fiber tracts (e.g., the pathway for handling syntactic structure and syntax–semantic integration) are not completely matured until 7 to 10 years of age (see Friederici, Chomsky, Berwick, Moro, & Bolhuis, 2017, for a review). Thus, in early development, the ability to 'take in' the input is limited, and this limitation is set by our nature (see Chevalier et al., 2015, for discussion of the relation between myelination and processing speed).

Coming back to our discussion about optimal input, despite the advocacy of input quality, most focus is still on quantity. Even when we do think about quality, we seldom think of improving quality as a result of reducing quantity. Recognizing the limitation set by our biology—extremely limited processing capacity in early development, language input should be optimized to achieve a balance between informativity and processability.

2 | SLEEP TO REMEMBER: TIMING OF INPUT

What is optimal input? In answering this question, an even less-considered factor (than input quality) is, the timing of input provision. When cooking a dish, in addition to the ingredients themselves, when to add them is also crucial. But the 'when' factor does not seem to be part of most people's formula for optimal language input. If any, attention has been given to 'when in development', much more than, for example, 'when in the day'. Here, I would like to accentuate this factor (in its latter sense) and its relation to 'memory'.

To successfully acquire a language, encoding new linguistic knowledge is only step one; retaining it in memory is an important next step. New memories are often fragile and subject to forgetting. For instance, in some learning situations, children were reported to forget the meaning of a newly learned word after only 5 min (Horst & Samuelson, 2008; Kucker & Samuelson, 2012). There are, of course, ways to alleviate this—repetition, for example, is one such attempt. But even better, proper timing of input provision may double the effect with half the effort. How? Let us consider a 'magic' that comes from an endowment of our biology—sleep.

We are designed to live in wake–sleep cycles. A significant amount of our time is spent in an asleep state, and even more so at the early stages in development. We all know that sleep is necessary and has considerable health benefits. But when faced with a choice between sleep and learning, many people go for the latter (or at least, they take it as the right choice), and consider sleep a 'big fat waste of time'. This unwise choice is seen in adults, as well as in children whose parents do not want them to lose at the starting line.

As a matter of fact, however, when we are asleep, learning does not come to a pause. Plenty of research has shown that sleep greatly benefits learning, through its 'magic touch' on new memories: During sleep, new memory encodings are repeatedly reactivated through the hippocampal–cortical pathway, leading to stabilized and strengthened representations that are eventually transferred to the long-term memory (see for example, Diekelmann & Born, 2010; Klinzing, Niethard, & Born, 2019; Rasch & Born, 2013; Stickgold & Walker, 2013; for reviews).[3]

Young children have long nocturnal sleeps and take frequent daytime naps (Iglowstein, Jenni, Molinari, & Largo, 2003; Louis, Cannard, Bastuji, & Challamel, 1997); in addition, they also engage in a larger proportion of slow-wave sleep that is believed to particularly support memory consolidation (Ohayon, Carskadon, Guilleminault, & Vitiello, 2004). Hence, they may be in an advantageous position to make the best use of sleep in gaining new knowledge, linguistic knowledge included (e.g., Wilhelm, Prehn-Kristensen, & Born, 2012). Thus, it is a pity, and somehow an irony, to see that on the one hand, parents strive to improve children's early language input, but on the other, they let such a precious learning aid go wasted. Often, many parents prefer that their infants/toddlers are asleep, but mostly for reasons other than a good understanding of the benefits of sleep on learning (e.g., to reduce crankiness in a child). Without a good understanding, best timing of input provision will not be applied.

But it is not the general public to blame, as public awareness almost always lags behind scientific discovery. In science, although both language acquisition and sleep research are mature fields, their marriage is new. Research in child language acquisition has only just begun to explore the importance of retention, let alone the role of sleep there within.

In a 2009 study (Yuan & Fisher, 2009), 2-year olds successfully learned new verb meanings; plus, those newly learned verb meanings were vividly retained and readily retrieved after a delay of 1 or 2 days. This was truly impressive, given the challenges in the learning situation: Children had to learn the new verbs from a brief dialog between two people (i.e., less than 30 s), and the dialog alone (i.e., no accompanying observational support)! Quite possibly, the impressive retention effect might be (at least partially) attributed to the magic touch of sleep, which was necessarily involved over the 1- or 2-day delay. Sleep, however, was not manipulated—all children slept. A recent study (He, Huang, Waxman, & Arunachalam, 2020) conducted a similar verb-learning experiment targeting children with similar age and explicitly manipulated sleep. Children took part in a two-visit study: In the first visit, they learned new verbs and were then tested on their verb-learning performance in an eye-tracking paradigm; in the second visit, they received the same test as before. Crucially, the two visits were separated by a 4-h delay, during which half of the children stayed awake and half took a nap. Results confirmed the 'magic' of sleep—an increase in performance in children who napped but a decrease in those who were awake.

The above is only one example. In recent years, more and more evidence for the benefit of sleep in early language development has emerged. Sleep has been shown to benefit memories and generalizations of new words (e.g., Friedrich, Wilhelm, Born, & Friederici, 2015; He, Huang, Waxman, & Arunachalam, 2020; Horváth, Liu, & Plunkett, 2016; Sandoval, Leclerc, & Gómez, 2017; Williams & Horst, 2014), as well as abstraction of grammatical rules (e.g., Gómez, Bootzin, & Nadel, 2006; Hupbach, Gómez, Bootzin, & Nadel, 2009).

Although there are still many subtleties and nuances to be figured out, the large bulk of research, to date, has demonstrated a beneficial effect of sleep. We are designed to learn during wakefulness and to keep practicing during sleep. Why not take advantage of this natural endowment? In particular, while many factors in the formula of optimal language input are related to socio-economic status that is unequal across families, sleep is a resource relatively equal to all, and this resource, is not scarce, especially for young children.

Therefore, when talking about optimal language input, 'timing' should not sit in the dark corner. Provided the magic effect of post-learning sleep, parents may consider arranging quality input before naptime or bedtime. In fact, the practice in many families—bedtime story—may be even more important than we think! Beyond individual families, in kindergartens, preschools and other early education centres, a sleep break may be added or even enforced, in a similar way as a lunch break or a physical exercise break is enforced.

Speaking of practice, questions regarding the precise details of the sleep-related formula will naturally arise: How long should the sleep be? How soon after learning should sleep happen? To what extent are the effect of daytime naps and that of nocturnal sleeps similar and different? What sleep stages are the most beneficial to memories, and how does that vary depending on the specific types of memory encodings (e.g., declarative vs. procedural memories)? These, and many other questions, are exactly the questions guiding current investigations in the field of sleep science. From a developmental linguist's perspective, a pressing need is to bring more synergy between the sleep research and the language acquisition research. To achieve so, recognizing the 'when' factor in our language input provision formula is an important initial step.

To conclude, this thought article discusses optimal input for early language development. So, what is optimal input? The answer, in short, is quality input provided in an appropriate quantity, with appropriate timing. What is 'appropriate'? Suitable is appropriate—suitable to our nature. Towards optimal language input, we should maximize the beneficial effect of our natural endowments and minimize the negative influence of natural limitations. We say that we know this. But do we? The most-heard suggestion about language input is still: 'Talk more!' If there is one message to take home, take this: Sometimes, less is more, and timing matters.

CONFLICT OF INTEREST

I declare there is no conflict of interest in this article, whether financial or professional.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

ORCID

Angela Xiaoxue He https://orcid.org/0000-0003-2679-1536

ENDNOTES

[1] Some theories argue that children's linguistic knowledge is deduced from innate biases (e.g., Chomsky, 1965); some argue that it is induced from the input (Tomasello, 2000). This tension between nature and nurture is *not* the focus of this paper; rather, their inter-dependent relation is.

[2] Brodmann Area (BA) is a term in cytoarchitecture; the division of BAs (BA 1–52) is based relative distribution of cell types across cortical layers. The exact mappings between BAs and linguistic functions are more complex and subtle than the simplified mention here.

[3] This is one major mechanism through which sleep consolidates memory, according to the predominant theory Active Systems Consolidation (ASC). But there are also other theories, such as Synaptic Homeostasis (e.g., Tononi & Cirellio, 2003). Only ASC is discussed here for simplicity.

REFERENCES

Arunachalam, S. (2016). A new experimental paradigm to study children's processing of their parent's unscripted language input. *Journal of Memory and Language*, *88*, 104–116.

Arunachalam, S., He, A. X., & Song, H. (2020). When less is more: Evidence from verb learning in Korean 4- and 5-year-olds. In *Poster presented at the 45th Boston University Conference on Language Development (BUCLD), virtual conference*.

Bleses, D., Makransky, G., Dale, P. S., Højen, A., & Ari, B. A. (2016). Early productive vocabulary predicts academic achievement 10 years later. *Applied PsychoLinguistics*, *37*(6), 1461–1476.

Branson, H. M. (2013). Normal myelination: A practical pictorial review. *Neuroimaging Clinics*, *23*(2), 183–195.

Chevalier, N., Kurth, S., Doucette, M. R., Wiseheart, M., Deoni, S. C. L., Dean, D. C., III, … LeBourgeois, M. K. (2015). Myelination is associated with processing speed in early childhood: Preliminary insights. *PLoS One*, *10*(10), e0139897.

Chomsky, N. (1965). *Aspects of the Theory of Syntax*. Cambridge, England: MIT Press.

Diekelmann, S., & Born, J. (2010). The memory function of sleep. *Nature Reviews Neuroscience*, *11*, 114–126.

Engelhardt, P. E., Bailey, K. G., & Ferreira, F. (2006). Do speakers and listeners observe the Gricean Maxim of Quantity? *Journal of Memory and Language*, *54*(4), 554–573.

Ferreira, V. S., Slevc, L. R., & Rogers, E. S. (2005). How do speakers avoid ambiguous linguistic expressions? *Cognition*, *96*(3), 263–284.

Friederici, A. D., Chomsky, N., Berwick, R. C., Moro, A., & Bolhuis, J. J. (2017). Language, mind and brain. *Nature Human Behaviour*, *1*, 713–722.

Friedrich, M., Wilhelm, I., Born, J., & Friederici, A. D. (2015). Generalization of word meanings during infant sleep. *Nature Communications*, *6*, 6004.

Gómez, R. L., Bootzin, R. R., & Nadel, L. (2006). Naps promote abstraction in language-learning infants. *Psychological Science*, *17*(8), 670–674.

Hart, B., & Risley, T. R. (1995). *Meaningful differences in the everyday experience of young American children*. Baltimore, MD: Paul H Brookes Publishing.

He, A. X., & Arunachalam, S. (2017). Word learning mechanisms. *Wiley Interdisciplinary Reviews: Cognitive Science*, *8*(4), e1435.

He, A. X., Huang, S., Waxman, S. R., & Arunachalam, S. (2020). Two-year-olds consolidate verb meanings during a nap. *Cognition*, *198*, 104205.

He, A. X., Kon, M., & Arunachalam, S. (2020). Linguistic context in verb learning: Less is sometimes more. *Language Learning and Development*, *16*(1), 22–42.

Horst, J. S., & Samuelson, L. K. (2008). Fast mapping but poor retention by 24-month-old infants. *Infancy*, *13*(2), 128–157.

Horváth, K., Liu, S., & Plunkett, K. (2016). A daytime nap facilitates generalization of word meanings in young toddlers. *Sleep*, *39*(1), 203–207.

Hupbach, A., Gómez, R. L., Bootzin, R. R., & Nadel, L. (2009). Nap-dependent learning in infants. *Developmental Science*, *12*(6), 1007–1012.

Iglowstein, I., Jenni, O. G., Molinari, L., & Largo, R. H. (2003). Sleep duration from infancy to adolescence: Reference values and generational trends. *Pediatrics*, *111*(2), 302–307.

Kidd, E., Bavin, E. L., & Brandt, S. (2013). The role of the lexicon in the development of the language processor. In D. Bittner & N. Ruhlig (Eds.), *Lexical bootstrapping: The role of lexis and semantics in child language* (pp. 217–244). Berlin, Germany: De Gruyter Mouton.

Klinzing, J. G., Niethard, N., & Born, J. (2019). Mechanisms of systems memory consolidation during sleep. *Nature Neuroscience*, *22*, 1598–1610.

Kucker, S. C., & Samuelson, L. K. (2012). The first slow step: Differential effects of object and word-form familiarization on retention of fast-mapped words. *Infancy*, *17*(3), 295–323.

Laule, C., Vavasour, I. M., Kolind, S. H., Li, D. K., Traboulsee, T. L., Moore, G. W., & MacKay, A. L. (2007). Magnetic resonance imaging of myelin. *Neurotherapeutics*, *4*(3), 460–484.

Louis, J., Cannard, C., Bastuji, H., & Challamel, M. J. (1997). Sleep ontogenesis revisited: a longitudinal 24-hour home polygraphic study on 15 normal infants during the first two years of life. *Sleep*, *20*(5), 323–333.

Ma, W., Golinkoff, R. M., Houston, D. M., & Hirsh-Pasek, K. (2011). Word learning in infant-and adult-directed speech. *Language Learning and Development*, *7*(3), 185–201.

Newman, R. S., Rowe, M. L., & Bernstein Ratner, N. (2016). Input and uptake at 7 months predicts toddler vocabulary: The role of child-directed speech and infant processing skills in language development. *Journal of Child Language*, *43*(5), 1158–1173.

O'Doherty, K., Troseth, G. L., Shimpi, P. M., Goldenberg, E., Akhtar, N., & Saylor, M. M. (2011). Third-party social interaction and word learning from video. *Child Development*, *82*(3), 902–915.
Ohayon, M. M., Carskadon, M. A., Guilleminault, C., & Vitiello, M. V. (2004). Meta- analysis of quantitative sleep parameters from childhood to old age in healthy individuals: developing normative sleep values across the human lifespan. *Sleep*, *27*(7), 1255–1273.
Omaki, A., & Lidz, J. (2015). Linking parser development to acquisition of syntactic knowledge. *Language Acquisition*, *22*(2), 158–192.
Rasch, B., & Born, J. (2013). About sleep's role in memory. *Physiological Reviews*, *93*, 681–766.
Roseberry, S., Hirsh-Pasek, K., & Golinkoff, R. M. (2014). Skype me! Socially contingent interactions help toddlers learn language. *Child Development*, *85*(3), 956–970.
Rowe, M. L. (2012). A longitudinal investigation of the role of quantity and quality of child-directed speech in vocabulary development. *Child Development*, *83*(5), 1762–1774.
Rowe, M. L., & Snow, C. E. (2020). Analyzing input quality along three dimensions: Interactive, linguistic, and conceptual. *Journal of Child Language*, *47*(1), 5–21.
Sandoval, M., Leclerc, J. A., & Gómez, R. L. (2017). Words to sleep on: Naps facilitate verb generalization in habitually and nonhabitually napping preschoolers. *Child Development*, *88*(5), 1615–1628.
Stickgold, R., & Walker, M. P. (2013). Sleep-dependent memory triage: Evolving generalization through selective processing. *Nature Neuroscience*, *16*(2), 139–145.
Thiessen, E. D., Hill, E. A., & Saffran, J. R. (2005). Infant-directed speech facilitates word segmentation. *Infancy*, *7*(1), 53–71.
Tomasello, M. (2000). The item-based nature of children's early syntactic development. *Trends in Cognitive Sciences*, *4*(4), 156–163.
Tononi, G., & Cirelli, C. (2003). Sleep and synaptic homeostasis: A hypothesis. *Brain Research Bulletin*, *62*(2), 143–150
Trueswell, J. C., & Gleitman, L. R. (2007). Learning to parse and its implications for language acquisition. In G. Gaskell & G. T. M. Altmann (Eds.), *Oxford handbook of psycholinguistics* (pp. 635–657). Oxford, England: Oxford University Press.
Walker, D., Greenwood, C., Hart, B., & Carta, J. (1994). Prediction of school outcomes based on early language production and socioeconomic factors. *Child Development*, *65*(2), 606–621.
Werker, J. F., Pons, F., Dietrich, C., Kajikawa, S., Fais, L., & Amano, S. (2007). Infant-directed speech supports phonetic category learning in English and Japanese. *Cognition*, *103*(1), 147–162.
Wilhelm, I., Prehn-Kristensen, A., & Born, J. (2012). Sleep-dependent memory consolidation—What can be learnt from children? *Neuroscience and Biobehavioral Reviews*, *36*(7), 1718–28.
Williams, S. E., & Horst, J. S. (2014). Goodnight book: Sleep consolidation improves word learning via storybooks. *Frontiers in Psychology*, *5*(184), 1–12.
Yuan, S., & Fisher, C. (2009). "Really? She blicked the baby?" Two-year-olds learn combinatorial facts about verbs by listening. *Psychological Science*, *20*(5), 619–626.
Zimmerman, F. J., Gilkerson, J., Richards, J. A., Christakis, D. A., Xu, D., Gray, S., & Yapanel, U. (2009). Teaching by listening: The importance of adult-child conversations to language development. *Pediatrics*, *124*(1), 342–349.

How to cite this article: He, A. X. (2021). Optimal input for language development: Tailor nurture to nature. *Infant and Child Development*, e2269. https://doi.org/10.1002/icd.2269