Mandarin makes you more musical – and at a much earlier age than previously thought. That’s the suggestion of a new study from the University of California San Diego. But hold on there, overachiever parents, don’t rush just yet to sign your kids up for Chinese lessons instead of piano.

In a paper published in Developmental Science, an international team of researchers shows that among the preschool set – or young children between the ages of 3 and 5 – native speakers of Mandarin Chinese are better than their English-speaking counterparts at processing musical pitch.

The implications of the findings go beyond determining who may have a head-start in music, the researchers say. The work shows that brain skills learned in one area affect learning in another.

“A big question in development, and also in cognition in general, is how separate our mental faculties actually are,” said lead author Sarah Creel of the Department of Cognitive Science in UC San Diego’s Division of Social Sciences. “For instance, are there specialized brain mechanisms that just do language? Our research suggests the opposite – that there’s permeability and generalization across cognitive abilities.

The researchers conducted two separate experiments with similar groups of young Mandarin Chinese learners and English learners. They tested a total of 180 children on tasks involving pitch contour and timbre. Where the English and Mandarin speakers performed similarly on the timbre task, the Mandarin speakers significantly outperformed on pitch, aka tone.

Mandarin is a tone language. In a tone language, the tone in which a word is said not only conveys a different emphasis or emotional content, but an altogether different meaning. For instance, the syllable “ma” in Mandarin can mean “mother,” “horse,” “hemp” or “scold,” depending on the pitch pattern of how it’s spoken. Mandarin-language learners quickly learn to identify the subtle changes in pitch to convey the intended outcome, while “ma” in English can really only mean one thing: “mother.” It’s the linguistic attention to pitch that gives young Mandarin speakers an advantage in perceiving pitch in music, the authors conclude.

http://ucsdnews.ucsd.edu/pressrelease/mandarin_makes_you_more_musical
Both language and music contain pitch changes, so if language is a separate mental faculty, then pitch processing in language should be separate from pitch processing in music,” Creel said. “On the other hand, if these seemingly different abilities are carried out by overlapping cognitive mechanisms or brain areas, then experience with musical pitch processing should affect language pitch processing, and vice versa.”

Co-author Gail Heyman, of UC San Diego’s Department of Psychology, who specializes in development, added: “Demonstrating that the language you speak affects how you perceive music—at such an early age and before formal training—supports the theory of cross-domain learning.”

Tone languages are common in parts of Africa, East Asia and Central America, with estimates that as much as 70 percent of world languages may be considered tonal. Other tonal languages besides Mandarin include Thai, Yoruba and Xhosa.

Creel and Heyman’s work follows on a hypothesis first put forth by Diana Deutsch, also of UC San Diego, that experience with a tonal language leads to enhanced pitch perception in music. Deutsch studied skilled adult students of music and tested them on absolute or “perfect” pitch. Absolute pitch is the relatively rare ability to recognize a musical note without reference to any other notes.

Relative pitch, or understanding the pitch relationships between notes, is the focus of the present study. Relative pitch allows you to sing in key and be in tune with other people around you.

“We show for the first time that tone-language experience is associated with advanced musical pitch processing in young children,” the study co-authors write. “There are far-reaching theoretical implications for neuroscience and behavior, and our research has important practical implications for designing early intervention programs, or ‘brain training’ regimes.”

But that said, don’t ditch your child’s music lessons for language, or language lessons for music, Heyman and Creel caution. It’s still true that to succeed at music, you need to study music. And learning an additional language is a demonstrably good thing in itself, too—whether or not it makes you a better musician.

The other co-authors are: Mengxing Weng of Zhejiang Normal University, China; Genyue Fu of Hangzhou Normal University, China; and Kang Lee of Zhejiang Normal University, UC San Diego and the Ontario Institute for Studies in Education, Canada.

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For more: Developmental Science paper and Creel video summary of the research
Parents, listen next time your baby babbles

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Parents who try to understand their baby’s babbling let their infants know they can communicate, which leads to children forming complex sounds and using language more quickly. The study's results showed infants whose mothers attended more closely to their babbling vocalized more complex sounds and develop language skills sooner.

New research shows that how a parent responds to an infant’s babbling can speed up the child's language development.  Credit: Tim Schoon

Pay attention, mom and dad, especially when your infant looks at you and babbles.

Parents may not understand a baby's prattling, but by listening and responding, they let their infants know they can communicate which leads to children forming complex sounds and using language more quickly.

That’s according to a new study by the University of Iowa and Indiana University that found how parents respond to their children's babbling can actually shape the way infants communicate and use vocalizations.

The findings challenge the belief that human communication is innate and can’t be influenced by parental feedback. Instead, the researchers argue, parents who consciously engage with their babbling infants can accelerate their children's vocalizing and language learning.

"It's not that we found responsiveness matters," says Julie Gros-Louis, assistant professor of psychology at the UI and corresponding author on the study, published in the July/August edition of the journal Infancy. "It's how a mother responds that matters."

Researchers observed the interactions between 12 mothers and their 8-month-old infants during free play twice a month for 30 minutes over a six-month period. They noted how the mothers responded to their child’s positive vocalizations, such as babbling and cooing, especially when it was directed toward
the mother. Current research in Gros-Louis’s lab has found similar levels of responsiveness of mothers and fathers to infants’ babbling.

What researchers discovered is infants whose mothers responded to what they thought their babies were saying, showed an increase in developmentally advanced, consonant-vowel vocalizations, which means the babbling has become sophisticated enough to sound more like words. The babies also began directing more of their babbling over time toward their mothers.

On the other hand, infants whose mothers did not try as much to understand them and instead directed their infants' attention at times to something else did not show the same rate of growth in their language and communication skills.

Gros-Louis says the difference was mothers who engaged with their infants when they babbled let their children know they could communicate. Consequently, those babies turned more often to their mothers and babbled.

"The infants were using vocalizations in a communicative way, in a sense, because they learned they are communicative," Gros-Louis says.

In a survey a month after the study ended, mothers who were most attentive to their infants' babbling reported their children produced more words and gestures at age 15 months.

Gros-Louis was a postdoctoral fellow at Indiana when she, Andrew King, a senior scientist in psychology, and Meredith West, a psychology professor at Indiana, conducted the mother-infant study, titled "Maternal Responsiveness and the Development of Directed Vocalizing in Social Interactions."

"Julie is showing that social stimulation shapes at a very early age what children attend to," says King. "And if you can show the parent can shape what an infant attends to, there is the possibility to shape what the child is sensitive to. They are learning how to learn."

The current study builds upon previous research by King and West, published in 2003 in the journal of Proceedings of the National Academy of Sciences. In that study, mothers were instructed to respond positively -- such as smiling or touching -- each time their infants looked at them and babbled. The results found the babies learned to vocalize advanced syllable-like sounds more readily than the typical infant.

Gros-Louis and her colleagues took that research a step further by observing the interactions of mothers and infants over a longer period of time and without instructing the mothers how to respond. Thus, they added a control group -- the mothers who directed their babies' attention elsewhere versus those who actively engaged when their infants looked at them and babbled.

Once again, the results showed infants whose mothers attended more closely to their babbling vocalized more complex sounds and develop language skills sooner.

Combined, the two studies could change how people think about human communicative development. However, additional research involving more participants is needed to validate the findings, the researchers said.

"The debate here is huge," King says.