

Dr. Twila Tardif - Your Brain Adapts: The Science of Learning Multiple Languages

Welcome to this episode of Exploring the Humanities, Women's Voices from the Hong Kong Polytechnic University. Our podcasts allow us to showcase the exciting and innovative work being done by our colleagues in the humanities. Intersecting with fields as varied as aviation, mental and physical health, virtual reality, GenAI, design, neuroscience...

My name is Xin Sun and I am an Assistant Professor from the Faculty of Humanities, Department of Language Science and Technology at the Hong Kong Polytechnic University. Today we have a very special guest, Dr. Twila Tardif.

Dr. Twila Tardif is currently a Professor of Pediatrics at the School of Medicine at the National University of Singapore (NUS). She has spent decades studying how children develop in different cultures from the United States to China to Japan. And she has held faculty positions in Hong Kong, in the US at the University of Michigan and now at NUS. So, Dr. Twila Tardif, thank you for being here today.

- Thank you, Professor Sun. It's a great honor and pleasure to be here, and especially to be here as your guest and proud former mentor.

Thank you, Twila. I had a really great experience working with you at the University of Michigan when I was doing my PhD. So, when I was going to the States for my graduate studies, I was very shocked by the cultural differences. That's what brought me to research in culture-related topics. And I'm very curious about your experience, like what brought you to studying different cultures and the psychology behind them.

- Thanks, so actually I grew up in a city that had many different cultures and even in my own family, there were different cultures. I was pretty much used to the idea that people had "cultures" and I had the opposite experience when I went to the US. When I went to the US, I went to a place where there really weren't as many different cultures in one place.
- I grew up in Canada and then I did my graduate school in the US like you. But then when I came to China and started teaching in Hong Kong, I was really fascinated by some of the differences. And I was interested in really thinking about how families, cultures, and even languages shape who we become. So, I started looking at not just what the differences are,

but also what the commonalities are.

So what were the first few studies you did?

- I actually did my dissertation research in Beijing – a long time ago. It was primarily Chinese-speaking and I was going around to different families each day, recording and transcribing what the families' said. My first finding was actually that the children who were one and a half, not quite two years old, at the time were using a lot of verbs. That really surprised me because children learning English use a lot of nouns early on. And so that was a really surprising finding for me. So that started my research on language learning.

Yeah, because in the Western textbooks, when we study language acquisition, it says that there's a noun bias in babies during their first few years of life, they will hear a lot more nouns than other word classes from their mothers. But you found something different. And at that time, what were you thinking? Were you like, oh, I'm gonna tell people that Chinese is different, or are you worried that people wouldn't believe you?

- I wasn't worried about it. Maybe I should have been. It was interesting for me because I didn't actually realize that was happening until a few weeks into my study, when I had to report to my advisor. At that time, we didn't have easy texting and e-mailing and so on. So we talked once a month over the phone and I had to give her an idea of what I was finding.
- I decided to just count up the words and I was so surprised. So I was counting all these words, and I was like, wait, they can say "grab", they can say, so in Chinese, na (拿), and bao (抱), and all of these words that English-speaking kids just don't know early on. I actually thought I had made a mistake and I counted and I recounted and I counted again. And then I told her and she said, "What?! Did you count right?"
- Anyway, I think that it's really interesting because when we talk to young kids, we just use the language that's natural for us and we don't really pay a lot of attention unless they're saying things that matter to us like "mama" (媽媽), "dada" (爸爸), everybody knows when they say that. But if they're saying things like "grab" or "want" or "bottle", it's not as memorable to us. That was actually a surprise for me as well. Publishing it was a little difficult because it was a surprising finding in the field. So, it was a little challenging.

So what are the linguistic or psychological mechanisms that you think make Chinese different from English? What drives this difference? Will Moms say more verbs if they are

Chinese monolingual? Is there a cultural driver?

- I don't think it's cultural. I think so in Chinese, if you start speaking Chinese, you can say, if I want more coffee and I'm your guest, you would ask me in English, "more?" or "more coffee?" And if you were to say that in Chinese, whether it's Mandarin or Cantonese, you'd say something like "jung yiu" (仲要) or "hai yao ma?" (還要嗎). And you're not talking about the coffee.

We're talking about the action.

- Right, or even if like "hai yao" (還要), it's like "still want". And in English, it's "more ...coffee". So everything's focused on the substance, whatever it is. I don't think it's cultural or linguistics. I think they go together. That's one of the things that I find so fascinating, is that culture, language, thinking, emotions – it's all just like one big thing that you start to tease apart when you look at different pieces of it. But I wouldn't say it's culture or language. I'd say they go together.

That was the first study, the dissertation you did in Beijing. Then you moved to Hong Kong. So how did you feel about Hong Kong at that time? And what were the first few studies you did here that you would like to share?

- Well, Hong Kong obviously is very different from Beijing. And at that time, it was much more different from Beijing than it is now. What really surprised me when I was living in Hong Kong at the time was that there was much more focus on Chinese medicine and like "leung" (涼) and "yit" (熱) and I had no understanding of that whatsoever. I remember I was sick and I wanted a friend of mine to pick up some mangoes, because I liked mangoes and I knew they had a lot of vitamin C. And she just brought back some oranges. And I was like, "why would she do that? It's mango season. Why are you bringing me oranges?" So I finally asked her and she's like, "唔得唔得", so it's like, because mangoes are heat-causing and oranges, but not tangerines, are not, which to me really didn't make a difference at the time. And I was just like so struck by these differences.
- And then I remember another time I was really excited about something and my friends were saying, "Don't get too excited, it's bad for your health." I was like, "what? How can being happy be bad for your health?" And again, it was like this idea of "中庸", so you're supposed to be like balanced. If you're out of balance, it doesn't matter if it's good balance or bad balance, which I think actually Western psychology is kind of catching up with this

idea -- positive stress and negative stress is still stress. But that was my first introduction to it.

- So I started doing some research on how children and parents handle emotions. In Western cultures, we think about the psychology of emotions. And my Chinese friends, and especially my Hong Kong friends at the time, were much more focused on physical aspects. So instead of saying, "I'm nervous," they would say, "My stomach's upset," or "My heart's beating fast." “心跳”
- Whereas I just wasn't as aware of those physical symptoms. I might be experiencing them, but I wouldn't have been as aware of them. And I wouldn't describe my emotions in that way. I also had Japanese colleagues and Japanese friends at the time, and one of them was really talking to me in this way that I didn't understand. She was talking about emotions as these social things. And I was like: "Well, okay, I get it." But then I realized: "Okay, we all have all three aspects." Even in Western cultures, our emotions have effects on each other. Sometimes you try to hide your emotions, mask your emotions, you don't express them as openly. Other times ... you don't laugh at a funeral. Sometimes you do because you're trying to honor the person. But if somebody just tells you their mother died, you're not going to laugh.

Right.

- Whereas if somebody is trying to tell a joke and it's supposed to be funny, even if it's not, we try to laugh. So, there are social aspects to it. We think about emotions. We probably spend most of our time just sorting through emotions and feelings. And there's also a psychological component, no matter what culture you're in. And then there's this physical component, even in Western cultures, of course you have sweaty palms or your heart's beating faster or so on.
- I thought about it and it wasn't like different cultures have these different aspects, but it was more like there was a spotlight on one aspect. Maybe there's more of a social spotlight in Japan and then maybe more of a physical spotlight in Chinese cultures. And then more of a mental, psychological spotlight in Western, at least in Anglo-European cultures. That actually led me to doing some research on children's and parents' socialization or how they help children express and really become more mature in expressing their emotions.

And that speaks to your study on gifts, right?

- Yeah.

Tell us more about it.

- I had these experiences, but I wanted to test this idea and say, is it true that these different cultures have these different emphases? So together with my colleagues in Japan, Beijing, Hong Kong and the US, we came up with a study where we had children from each of the Chinese culture, Japanese culture and US sort of Anglo-Western cultures. And we gave them these different situations. One of the situations was a classic paradigm in developmental psychology where we say, okay, we're gonna give you a gift. We tell four-year-old children, "we're going to give you a gift." And we give them like five or six objects to choose from. And one of them is really cool, like a red fire truck or bubbles or something that kids like. Then we had things like a pencil, just a regular pencil. And then we had things like a broken comb, which nobody really wants, or a bottle cap. We asked the kids to rank order which one they liked best, then second best, and then which one they didn't like. And we were "mean" experimenters.
- So instead of giving the kid the one that they chose – we told them that we would give them the best one – and we went out and somebody else came back and gave them the wrong gift. We were looking at the kids' expressions and we looked at what their faces were showing, what they said, and we even asked them how they felt. And we also looked at their body language and what they were doing.

So, what did you find?

- It was pretty interesting. In all three cultures, the kids were just not happy about the gift. There was not a single kid, even though these were well-socialized kids, not a single one said, thank you. Nobody says, thank you. They all just kind of stared at the person.
- And that person – also part of the way the study is set up – it was horrible being that person. They were supposed to just read a book and not really make eye contact with the child. Then they got up and left and left the child alone for it was just a minute, but it was the world's longest minute.

I'm sure!

- And then the nice person came back and apologized and so on. But during those two minutes where the bad person gave them the bad gift and the minute where they were by

themselves, we looked at what the kids did. And it was so interesting because the American kids would actually - some of them cried.

- I remember my own daughter, she just looked so sad. When the good person came back, what was really interesting is that the American kids were happy when they said sorry and gave them the good gift. But the Chinese and Japanese kids were like, "I don't trust you anymore", especially the Japanese kids. They were just like, "Whoa, you've done something. You somehow tricked me." So, they were very attuned to the social situation. The Chinese kids were kind of in between. So, they were happy at the beginning, as they were choosing the gift. They were sad in the middle, but not quite as sad as the American kids. But then they didn't get happy at the end, like the American kids did. So, each culture kind of had its own way, even though all of the kids certainly were happier at the beginning than in the middle or at the end.
- They were also more likely to show their emotions when they were by themselves than when that stranger was there. If the kids cried, they usually cried when they were by themselves or when the good person came back.

Interesting.

- I was nine when there was a big exhibit that came from China and also Taiwan at the time which was showing all kinds of artwork. It was the first time I had seen Chinese writing. And I was so amazed by it. I loved horses at the time. And there was this one exhibit, it had a painting of a horse, beside the painting of the horse, it had the character for "ma" (馬) at different times in Chinese history and showed like 5,000 years of that character. And I had never even thought - I loved reading, I loved learning language, but I never realized that language could change. So that was like this mind-opening experience. Not only did I see these things that were characters for the first time, but also this idea that you could write the same word in different ways over time.
- That really got me interested in how languages differ, but it really wasn't until actually after I came back from Hong Kong to the University of Michigan, where I really started thinking about not just how spoken languages differ, but how written languages differ and how children learning different written languages might have different strategies for learning them. Some of that was based on colleagues of mine in Hong Kong that I had worked with who were doing work on reading. And then some of that was actually your dissertation advisor was really interested in reading. She was interested in bilingualism, and it was one

of those moments where it's like, oh, I actually know how to read in both of these languages. And oh, is it different? Is it not different? So that really started my thinking about it.

Let's talk about your work on bilingualism. And we studied this actually together. As we both are like multilinguals and we're sort of the opposite, you studied English as your native language and Chinese as your second language. And I studied Chinese as my native language and English as a second language. So, when you studied Chinese, what kind of differences did you find?

- I would say for me learning Chinese, two things. One was that it was so hard for me to learn to read in Chinese. I tried and failed four times and gave up completely on learning to read Chinese. And then the fifth time, I finally decided, okay, I'm going to do this. I remember I had a tutor at the time and she made me write out each character 20 times. It felt so boring, but somehow, I realized that in the process of writing it, I finally learned how to read it. But I never had to learn to write English in order to read in English. Instead, I would look at the word and sound it out.
- And if I didn't know how to write the word, then I would say it out loud. And then I would just try and spell it based on the letters and the sounds that I knew. So, when I had to kind of see this character and know how it was pronounced, know what it means and then match it to this symbol, I was so surprised.
- Then I remember one of my friends in China, we were kind of comparing notes on what was interesting or hard. I remember I would always ask somebody how to say something and I would have them repeat it a couple of times. But my Chinese friends would ask me how it's written. I was so surprised that they couldn't remember just by how it was heard or write it down themselves. And they were surprised that I kept asking them to repeat the sound. It was just really interesting. I think that kind of relates to when you learn English, you learn ABC and then you learn "B is for B", you learn B, A, O. Whereas kids now, if they're learning pinyin, they do that. But traditionally, they didn't learn that. They learned characters. So, you learn "da" (大), "xiao" (小), and you make up ways of remembering it. Like I remember teaching my daughter like "da" (大), "xiao" (小) and I just like would make this big body gesture and then like a little body gesture.
- Then I remember being so amazed when I learned about the concept of radicals or bushou" (部首) where I was just like, whoa, you can tell what something means from, or at least guess what it means, from this meaning component. Think about English, "chicken,"

“rooster,” “hen,”; “stallion,” “mare,” “horse.” How can you tell that they're all horses? Whereas in Chinese, it's really easy: “muji” (母雞), “gongji” (公雞), “xiaoji” (小雞), whereas in English, it's completely different. I was really interested in how the different meaning parts and the sound parts go into learning to read.

Right. We all know that in order to read, we need to sound it out, we need to know the meaning and we need to know its visual form, what it looks like.

- Yeah, what it looks like.

And you were talking about when we learn to read in English, what's more important seems to be bridging the sound with the print, or what it looks like. What we found in bilingual kids we were interested in – what about both languages you would learn Chinese in the Chinese way, and you learn English in an English way.

- The main message is that the brain is incredibly flexible, and at the same time, the brain adapts to what it is exposed to. If you're exposed mostly to Chinese, then your brain is ready to learn Chinese. When you then learn English, whether it is spoken English or written English, you're using the skills that you already learned to learn this new language. Similarly, when I learned Chinese, I used my skills from English to learn Chinese, which thankfully we have skills from whatever language we learn first.
- It's really cool that we can share those skills across languages. It's not like we have to start from the beginning and learn from being a baby all over again. We can learn languages at different times in our lives, and we use the skills that we have.
- For instance, learning Mandarin made it much easier for me to learn Cantonese. And learning Cantonese actually made it easier for me to learn Japanese than going from Mandarin to Japanese, because Japanese kanji are pronounced more like an older version of Chinese. Also, they're written in traditional characters, whereas I learned Mandarin in China, and it was all simplified characters. So, it was really a different experience, but our brains are incredibly well-adapted to being able to learn new things based on what we've already learned.

Okay, so then the take-home for this line of research: what would you say to parents? If I wanted to raise my kid to be bilingual, would that be a good thing? And when should I expose them?

- Absolutely, it's a good thing. I think that what's most important is that whatever languages you speak, you speak directly to and with your child, and you take that time rather than giving them a device and having them just listen, because that's not how kids learn language. They learn it from interaction. They learn it from people who care about them. And so, I don't think it matters which language you speak, as long as you speak it with the child.
- I also think it's important that you use a language that you're confident and comfortable in. Even if you want the child to learn English, that child is going to learn English when they go to school or go to class, but if they don't have a strong base in whatever language their parents are using, then they're not going to be very good at English either. So, you're better off using whatever language you're most comfortable in with a young child. And they can learn a school language in school.
- At the same time, if your family is multilingual and dad speaks one language, mom speaks another language, and grandparents speak another language, then by all means, use all of the languages. It's not going to confuse the child because kids are a lot smarter than we realize. Language is not just the words. Language is the sounds and the grammar. It's like the music of the language. If you hear different languages, even if you can't hear the words, you know it's a different language. Even if you can't hear the words of Mandarin or Cantonese, you know whether it's Mandarin or Cantonese. I know whether something is English or French or German, even if I can't hear the words because I heard the “music” of those different languages. So, the main thing is just use languages you're confident in and don't be afraid to expose your child to different languages.

I really agree with that. And to add on to that, the same thing goes with visual expression. If you're a bilingual baby, you can tell. You can tell that person is switching languages even without hearing it, just by seeing their mouth moving. If you're a monolingual baby, after a certain age, you wouldn't be able to distinguish them.

Thank you so much for sharing your incredible work with us today. It's been really, really enlightening.

- Thank you for having me and it's been fun to talk with you.

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University. For more episodes or information, visit our website or follow us on Spotify. Stay tuned for discussions with leading voices from the Faculty of Humanities and beyond.