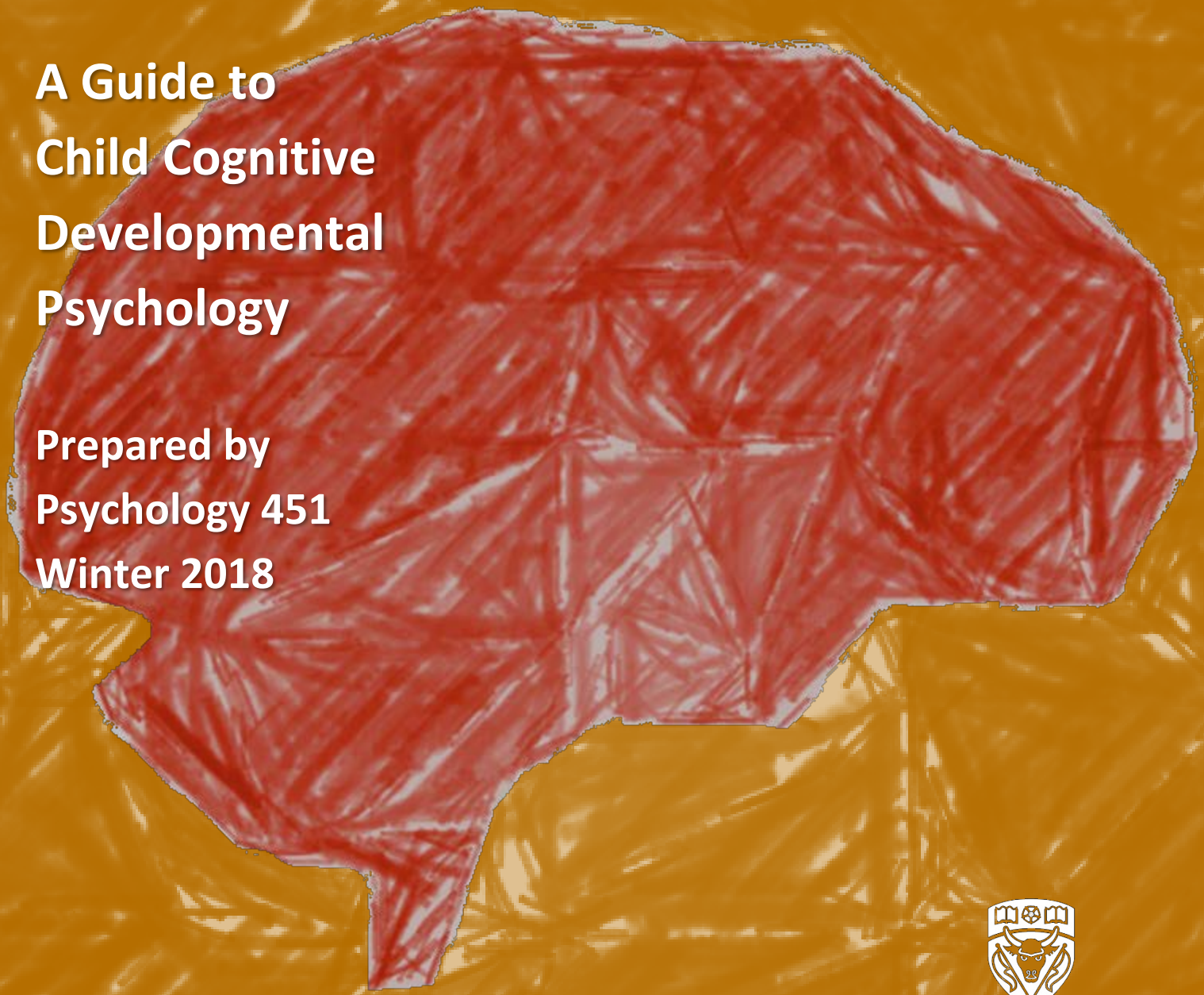
UCalgary Presents

Cognitive Development

Research Findings



A Guide to Child Cognitive Developmental Psychology

Prepared by
Psychology 451
Winter 2018

UNIVERSITY OF CALGARY

Message from the Editor

Every year, hundreds of researchers at dozens Canadian universities produce novel, important, and useful research on Child Development. This research is written into scholarly articles and showcased at academic research conferences. Occasionally, selective research findings are reported by newspapers, and media outlets in Canada.

Truthfully, most research conducted in the Ivory Towers of university does not reach its desired audience. Parents, teachers, childcare workers, and general audiences often are completely left out of our reporting system. The transmission of scientific knowledge from researchers to policymakers is especially problematic, with policies often being developed in reflection of outdated research. In short, Child Development researchers need to communicate research findings in more diverse ways.

This initial Newsletter project aims to address this problem. Most university undergraduate degree programs in Developmental Psychology focus on scholarly and academic writing, but not on the transmission of academic findings to non-scientific audiences. This is true despite the fact that most undergraduate Developmental Psychology students will pursue careers in education, law, public health, social work, government, and private business. Learning how to understand, critique, explain, and report on research findings in an accessible format is currently an overlooked skill, and one that I want to foster in my students.

This semester, the Winter 2018 cohort of Psychology 451: Cognitive Development engaged in a term-long class project. Each student selected a research article that has been published in a reputable, peer-reviewed journal in Developmental Psychology and then reported a summary of the article for general audiences. The reviews has been edited by our Teaching Assistants, Clara Lee and Devon Currie, by class students in a peer-review exercise, and by myself. I was immensely impressed with the quality of the work, and I hope you will be too.

Topics selected for discussion include the importance of bilingualism amongst children with Autism Spectrum Disorder, best practices for reading with your children, the impact of parenting and sibling relationships, the particular barriers of ADHD on child development, the importance of self-regulation, and more. There is certainly something for everyone.

Please enjoy our first edition of Cognitive Development Research Findings.

Kathleen Hughes, PhD, Instructor, Department of Psychology, Kathleen.hughes@ucalgary.ca

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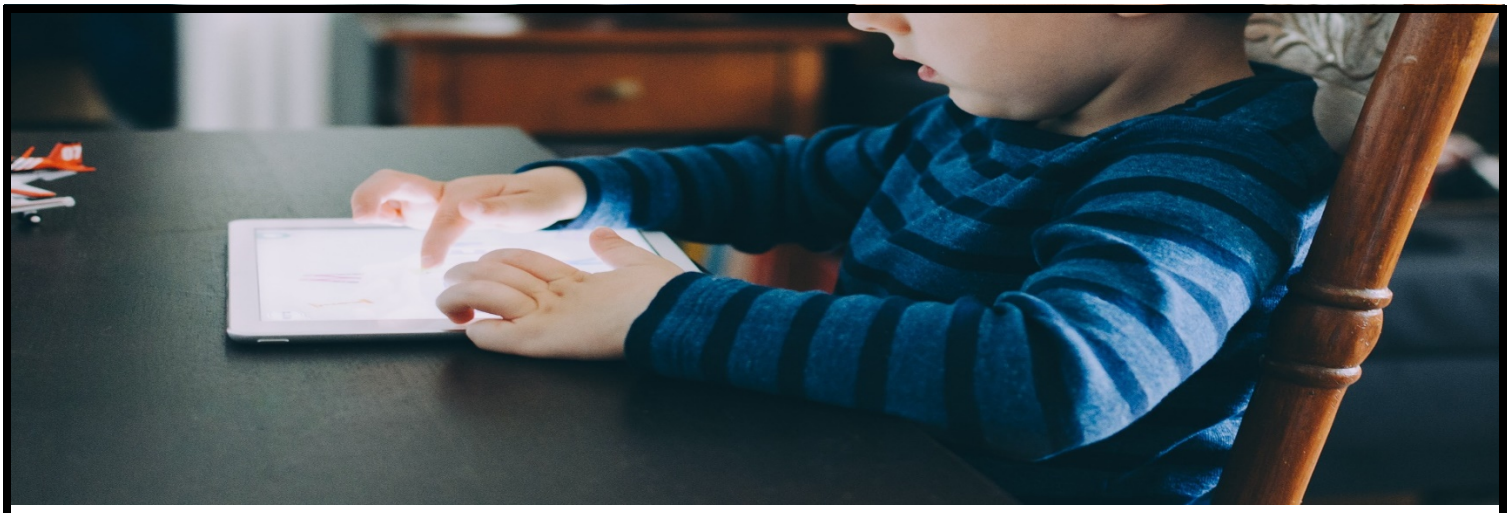


NOT ALL EDUCATIONAL APPS ARE CREATED EQUAL: HOW PARENTS CAN MAKE A DIFFERENCE

Sarah McBride

There is no doubt the use of educational apps among parents has become increasingly popular. Children as young as two (if not younger) have experience using tablets or smartphones. These apps claim to be "educational", but not all apps are created equal.

Many educational apps directed toward children may be fun to play with but lack any real educational value. There are many factors that can affect the educational value of an app including, the amount of activity (e.g., pressing or swiping) involved, how engaging the task is, the child's level of interest, prior experience, difficulty of the task and whether or not someone has demonstrated the solution.

> "HUMANS LEARN BEST WHEN THEY ARE ACTIVELY INVOLVED ("MINDS-ON"), ENGAGED WITH THE LEARNING MATERIALS AND UNDISTRACTED BY PERIPHERAL ELEMENTS, HAVE MEANINGFUL EXPERIENCES THAT RELATE TO THEIR LIVES, AND SOCIALLY INTERACT WITH OTHERS…"
>
> -Hirsh-Pasek et al. (2015)

Educational apps, however, often lack social demonstrations, instead, many demonstrate a task by showing virtual objects move on their own. Growing concern over children's ability to learn from apps has sparked new areas of research. In a study that examined preschooler's ability to learn how to assemble a virtual puzzle on a touchscreen, researchers found that children who were shown in-person how to assemble the puzzle performed significantly better than those who lacked a social demonstration.

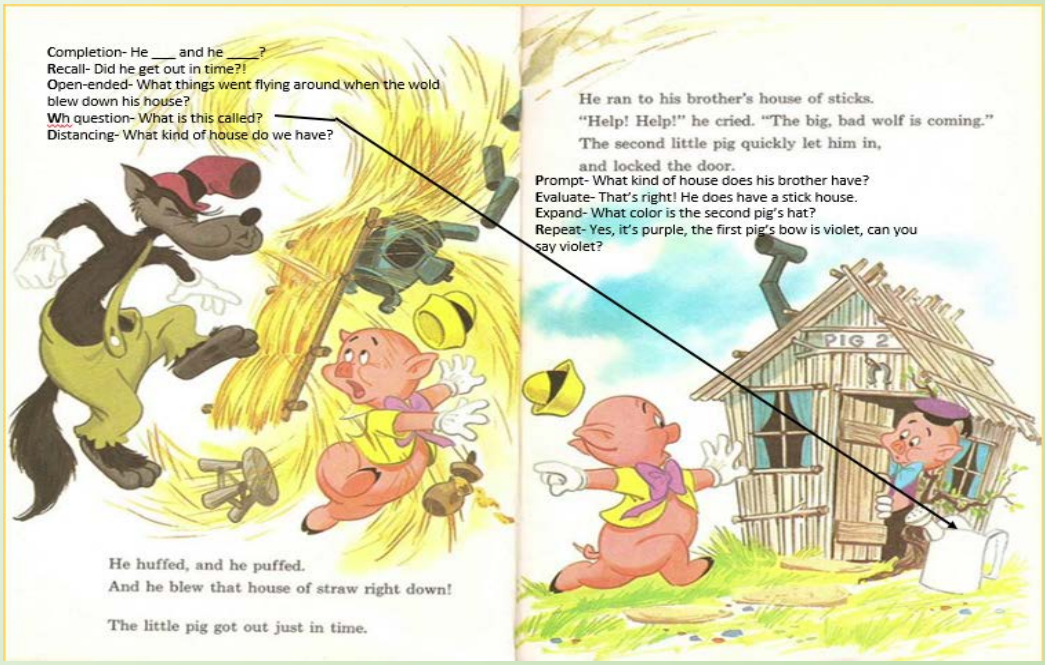
These findings should remind us of the importance of hands-on demonstrations and social interaction with children as they engage in, and learn from technology. This does not necessarily mean you should eliminate or drastically reduce your child's screen time, but rather engage in screen time alongside them.

Technology has become deeply embedded within our culture and our daily lives as an educational tool. It is important for children to learn how to use technology to the best of their ability in order to reap the full benefits educational apps have to offer. Parents should be aware, however, truly educational apps are engaging, interactive, and meaningful.

Improve your toddler's vocabulary and attention through interactive book-sharing

Afrida Ahmed

It is common knowledge by now that reading to your toddler can improve their language skills, but did you know it can also improve their sustained attention? In a recent study, parents and guardians of 14-16 month-old South African children were trained on interactive book-sharing. Interactive book-sharing, or dialogic reading, is all about child-directed learning. You follow your child's lead when reading- stopping and pointing out the words they struggle with, asking them questions based on their interest, and expanding the book's themes into the real world. Compared to children of parents who did not receive the training, children with parents that did receive training showed improvements in speech, vocabulary, and attention. The ability to maintain focus and attention has been linked to higher IQ scores later in life. This training program was created as a way of enriching the environment of children from low and middle income communities. Research has shown that an enriched, stimulating environment is essential for proper brain development in children. This is why children from high income families, who have access to many kinds of toys, books and/or musical instruments, tend to do better academically. However, an act as simple as book-sharing with your toddler can provide a similar level of enrichment. It provides a great alternative to families who have limited financial resources. They can borrow books from the library, or purchase some inexpensive second-hand books. If time is an issue instead, the activity only takes 5-10 minutes a day- essentially a bedtime story!



For effective dialogic reading, parents must follow PEER (prompt, evaluate, expand, repeat) and CROWD (completion, recall, open-ended, wh- question, distancing). These questions allow parents to be sensitive and responsive to their child's needs, and to provide encouragement and praise when it is appropriate. This intense, positive focus is rewarding to the child, who may also pick up some these attentional habits and skills. This is why dialogic reading may also help kids with attention disorders or with certain autism spectrum disorders.

Grit, Self- Regulated Learning, and academic Achievement

Lynn Lee

WHAT IS SELF-REGULATED LEARNING?

Over the past few decades, the field of educational psychology has bloomed with research in Self-Regulated Learning (SRL). SRL is how students regulate their own emotions, cognition, and behaviour in the context of a learning experience. One of the key components of SRL is motivation, which includes the students beliefs about their own capacity of success (self-efficacy), and their personal interest in the material they are learning (value).

Grit is an individual's passion, perseverance of effort, and consistent interest toward a long-term goal.

A 2014 study by Wolters & Hussain investigated investigated whether grit is related to SRL and academic achievement. What is Grit? It is an individual's passion, perseverance of effort, and consistent interest toward a long-term goal. The authors anticipated that grit would be linked to positive quality of learning behaviours, such as motivation and self-efficacy, as well as using strategies like planning, evaluating, and observing their progress.

They also predicted that the grit characteristic would be less present with behaviours that hinder learning, such as procrastination. Self- survey data were collected from 213 college students who were taking undergraduate and educational psychology courses. The results showed that students who indicated they were more diligent, worked harder, and were less discouraged by setbacks also expressed greater interest, value, and usefulness for their coursework and showed increased confidence that they could successfully complete academic tasks.

It was also found that "grittier" students tend to use more Self-Regulated Learning strategies such as time management, planning, and evaluating their own work. Additionally, high scores on grit was related to less procrastination.

How can this link between grit and academic success help students? What about fixed disposition given that it’s not plausible for educators to focus making students “grittier”? Optimistically, it seems that promoting self-regulated learning, like motivation and self-efficacy, is an excellent approach to increase academic success.

HIGH QUALITY INTERACTIONS LEAD TO HIGH QUALITY LEARNING

Irene Ha

Problem Solving Skills

The process of finding solutions to difficult or complex issues.

Self-Efficacy

One's belief in their ability to succeed in specific situations or accomplish a task.

Self-Fulfilling Prophecy

The self-fulfilling prophecy is when a person unknowingly causes a prediction to come true, due to the simple fact that he or she expects it to come true. In other words, causing something to happen by believing it will come true.

Help Your Child Find Their True Potential

It cannot be stressed enough how crucial high quality relationships are during the developmental period of children. The quality of the relationship between you and your child is an important factor in regards to your child's learning. Children have the tendency to pick up on behaviours and reactions of the people closest to them. Positive interactions between you and your child can help improve their problem solving skills.

Research has found that children will mimic behaviours of their primary caregivers during problem solving tasks which can determine how well they do on the task. In other words, if your child sees you reacting to situations with anger or frustration, your child will react to similar situations in the same way. Demonstrating positive reactions to difficult situations will translate to your child and help them get through difficult tasks in the future.

By simply giving your child positive feedback during problem solving tasks, you will increase their confidence which will lead to an increase in self-efficacy and a positive self-fulfilling prophecy. Believing in your child will allow your child to believe in themselves. Give your child the self-esteem boost they need in order to succeed.

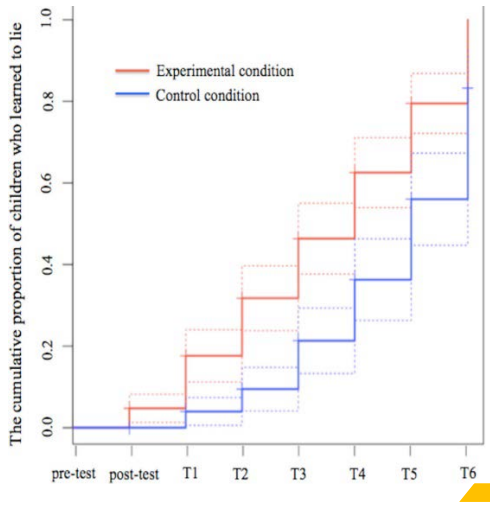
THE TRUTH ON CHILDREN'S LIES

WHY CATCHING YOUR CHILD IN A LIE IS ACTUALLY A GOOD THING

By Yomna Waly

It is natural to feel concerned catching your child in their first lie. After all, lying is unacceptable both socially and morally. While instilling honesty in your child should continue to be a priority, a fib or two at a young age is actually a good thing! It is a sign that their brain is functioning in more complex ways and that their knowledge of people is growing. In order to tell a lie, a preschooler has to understand that the information they know is different from what you know and that they can change your belief using their words. This is a major milestone of normal development and is called theory of mind.

Psychologists have long suspected that theory of mind contributes to children beginning to lie, inspiring psychologist X.P. Ding and his colleagues to test this idea. They knew that children typically start lying around the age of three so, the researchers played a hide and seek game with three year-olds who could not lie yet, by letting the child hide a piece of candy under one of two cups. Half of the children were given perspective taking training in which they learned about intentions, emotions and beliefs while the other children were trained on measurements and objects. All of the children were then given the opportunity to lie to the researcher in order to win the game. The study determined that children who were given perspective taking (PT) training lied much more often than the others who did not receive PT training as shown in the graph. Interestingly, the children that did not receive PT training also began to lie shortly after, showing that all children will begin to lie naturally. Even more interesting is they tested the three year-olds who received PT training again and found this effect continued long after the experiment was over.



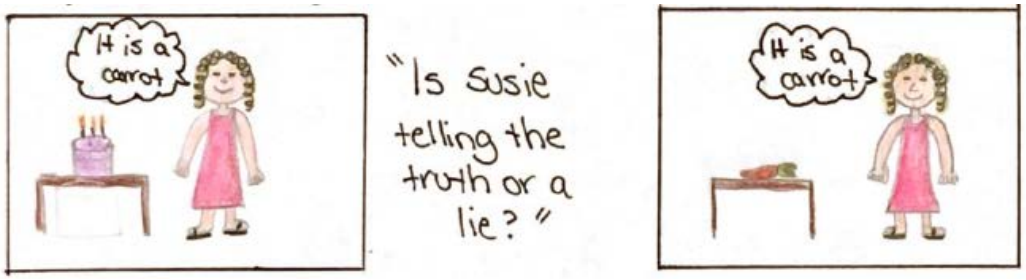
So, does this mean having perspective taking is bad? The answer is no. Quite the opposite, actually! A child who is developing typically will develop this awareness. Your child telling a few lies means that they understand that their behavior was wrong and that you would be upset at them. It also shows that they are aware that their behaviors have consequences. So next time you scold your preschooler for lying, remember to be relieved and maybe even a little proud. If you notice that your child is not showing similar lying behaviors to their peers, a trip to your doctor might be necessary since it could point to hidden problems, such as autism, that are best treated when caught early on.

At What Age Will Your Children Begin to Lie?

Cara Nania

Research suggests that children' s earliest lie telling begins between 2 and 3 years old. Very young children' s lies, however might just be false statements rather than intentional. Studies on the development of lie telling can help parents understand when they should expect their children to start being dishonest with them.

Williams, Leduc, Crossman, and Talwar (2017) were the first to look at the relationship between young children's actual lie-telling abilities, and whether or not they understand the difference between a truth and a lie. Children that were 2.5 years of age were told not to peek at a toy while the researcher left the room, but 90% of the children ended up looking at the toy. lo comparison to older children, most of the 2.5-year olds ended up admitting to peeking at the toy. This is because their lie telling is just developing, and they are not able to lie to the same extent as older children yet. To find out whether 2.5-year olds know the difference between a truth and a lie, a simple story was shown to them. lo the story, the characters speech bubbles either matched the picture or not, and the child was asked whether the character was telling a truth or a lie. The 2.5-year-old sample was able to identify both truths and lies. When lie telling is starting to take place, the ability to recognize lie telling is necessary for the development of these dishonest behaviours.



The results of this study can help parents understand that their children may be developing dishonest behaviours earlier than previously thought. Also, since children can tell the difference between a truth and a lie at such a young age, they may know if their parents are lying to them as well. Parents can use these findings to teach the importance of honesty early on, and also teach their children how to resolve situations without having to lie to others. Although 2.5 years old may seem like a very young age for a child to begin lying, it is all part of their healthy development.

Tips for encouraging ***honesty***

- Talk with your children about how much you value honest in your family.
- Model honesty through your actions and words.
- Ensure that you have clear rules and consequences about what is acceptable behaviour for your family.
- If your child lies, react in a calm tone and approach the situation as a teaching opportunity. o You might say, "Is that how you remember it happening? I'm pretty sure that's not what happened."
- If your child owns up to doing something wrong, praise them for being honest.
  - o You might say, "I am really glad you told me the truth. I like it when you are honest."
  - o This sends the message that you won't be upset with them for owning up to something, and it will promote honesty.

Diverse language exposure improves effective communication in pre-school children

Elgie Xhemalaj

Bilingualism, learning to speak two languages, has been said to give young children developmental advantages that make them better equipped to succeed in school and in life. Studies exploring the effects of bilingual exposure highlight advantages such as improved problem solving and superior test scores. But is going through the effort of raising children bilingually the only way to enrich their development?

Researchers at the University of Chicago have discovered that there may be distinctive developmental benefits to be gained elsewhere. They studied communication skills of preschool children who were fluent in only one language but were raised in a diverse environment where more than one language was being spoken. These preschoolers were found to be uniquely adept social communicators. They were able to understand others' point of view in a way that set them apart from children who were raised in a single language environment. The authors concluded that multilingual exposure during development gives young children an advantage in communicating effectively.

Communication is an important part of life. From an early age, a child must learn to interact with other people and understand their perspectives. These are hallmarks of good communication, and according to research, being exposed to language diversity is linked with an enrichment in these abilities even in early development. The findings have implications for how we raise children in the home, at school, and in the community. Contact between different languages and cultures should be encouraged and looked at as a positive thing, perhaps even as an opportunity for children to enhance their communication abilities. At school, diversity in languages can be embraced even more with an understanding that it helps children learn to interact effectively. Multicultural events that help to celebrate cultural differences in the community can be enriched by an added emphasis on languages.

"Language days" can be implemented in pre-school and school settings. Centered around sharing knowledge of immigrants' first languages, such events should emphasize everyone partaking in language activities. Educators can develop class projects intended for children to discover their roots and share their moth language with their classmates. Presentations and workshops lead by older peers can be introduced where children can teach each other how to say simple words or phrases in different languages. It may be even more important to incorporate language awareness events in less culturally diverse areas where children receive little exposure to foreign languages in the first place. Learning about languages they normally would not be exposed to would broaden cultural and linguistic understanding, and it could also have an enriching effect on the community as a whole.

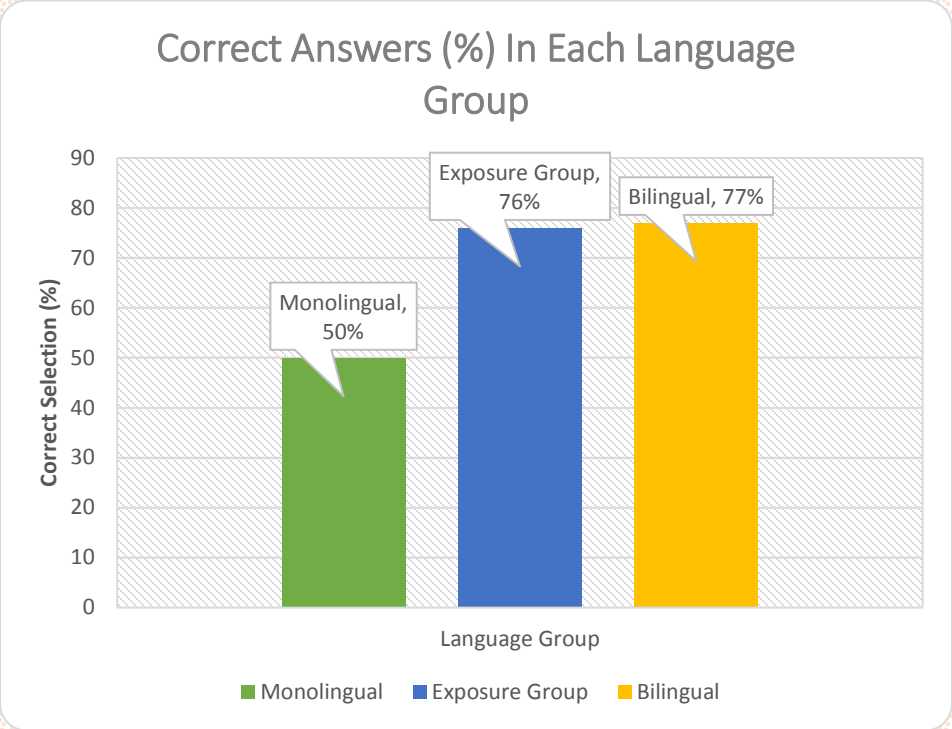
Source: Fan, S.P., Liberman, Z., Keysar, B., & Kinzler, K.D (2015). The exposure advantage: Early exposure to a multilingual environment promotes effective communication. *Psychological Science*, *26*(7), 1090-1097.

Improving Communication Skills in Your Child

Bertrand Kwon

Effective communication, is an essential part of your child's development. Communication is essential for all aspects of social-life and there is a lot at work for communication to be effective. Ineffective communication has been known to damage relationships and create arguments and other conflicts that otherwise could have been avoided. At the heart of effective communication involves the ability to understand the other person's point of view. Exciting new research suggests that early exposure to multiple languages may be able to give your child an advantage at becoming an effective communicator. There is a lot of information out there claiming all the great benefits of being bilingual, but there is not much mentioned about the benefits your child may experience by simply being exposed to more than one language. Researchers in a recently published study were able to test three different groups all aged between four and six.

The three groups were, children who only spoke one language (Monolingual), children who could speak two languages (Bilingual), and children who could speak only one language but were simply exposed to more than one language (Exposure). The researchers tested each of these groups on an exam that looked at how good the kids were at taking the point of view of another person. It was found that children who spoke only one language performed worse than either of the other groups. What was really surprising was that the group of bilingual children and the group that only spoke one language, but was exposed to more than one language performed almost exactly the same. That's right, the performance was almost exactly the same for the bilingual child and the children who were only exposed to more than one language. See the chart above!



Even if teaching your child a second language is not a high priority, it is highly recommended that you look for programs through schools, the public library, church, and even in family and friend social settings that allow the opportunity for your child to be exposed to other languages.

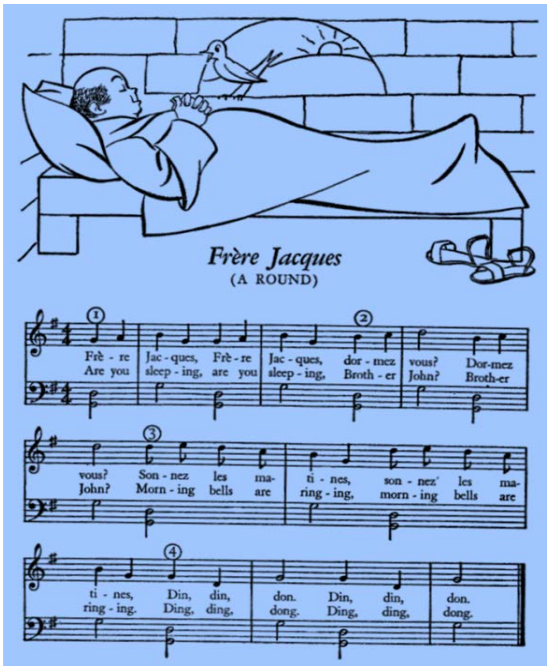
Talk N' Roll
By Kaitlin Roth

Those of us who aren't bilingual often find ourselves envious when someone divulges their knowledge of two, or three, or even five languages that they are able to speak. They suddenly seem so worldly, like more doors are open to their sophistication and the rest of us are left dreaming about what's behind them. Just imagine that this individual happens to also divulge that they play an instrument of some kind. Perhaps they are a cellist in an orchestra, a rock n' roll guitar god or goddess, or a trombonist in a jazz quartet. Either way the intimidation you feel is palpable as you start to wonder what you've been doing with your life.

As it turns out, being bilingual and being a musician may have benefits beyond being the coolest person at the party. Both have been shown to have similar benefits for your brain, especially when they are learned early in life. They both require the learning of a new type of language, be it reading or writing musical notation for piano or the characters and tones of the Thai language. There are many types of languages that possess an aspect of musicality to them, such as ones that have whistles, clicks, or hums. Music is a type of language. The notation is read and interpreted, it can sound different depending on the reader or instrument speaking the symbols, and it has to be learned. A study has shown that because the brain is still forming when languages or musical instruments are learned at young ages, this produces lasting positive effects on certain brain functions[1].

This study examined young adults who were bilingual, musicians, or both. Among them, the average age of learning a second language was around 4 years old and the average age of onset of musical training was around 8 years old. In this case it is found that bilinguals, musicians, and bilingual musicians are better at paying attention than others. Possessing any combination of the skills affected young adults' ability to pay attention to relevant information by ignoring irrelevant information that was competing for their attention. Because of these long lasting advanced attention effects, there are benefits to having second language lessons and music instruction in schools early on.

Although this is already quite common in schools, it could be more central to the curriculum. Also, it could be a requirement for schools globally to offer a music and language program and receive funding to do so. The USA, for instance, does not offer second language or music programs in all of their schools or they are not core subjects [2,3]. They could have positive impacts for kids at risk for, or diagnosed with ADHD. Instating programs that combine music and language could be helpful as well, for instance teaching songs in two languages like the one shown below [4]. It is important to take findings like these seriously when speaking of implementing them into the education system, as it gives us the power to better the futures of the children within it.



Bilingualism, is it beneficial?

By Kendra Morrison

Parents, teachers, and researchers often ponder what effect bilingualism actually has on children brain development. Does it affect their IQ, their problem-solving skills or maybe both? The major question is, what are the benefits of being bilingual?

This is topic has been studied greatly over the years. It was originally thought to not have any benefits in a child's brain development, however this was later discovered to not be true. The question at hand is what are the benefits of being bilingual and how is this studied? Researchers have discovered that being bilingual has many brain benefits. The results have shown that children who speak a second language can have better attention span and that they can multi-task better than monolinguals.

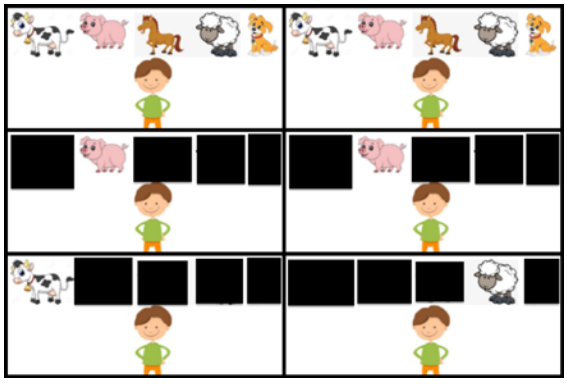
Looking at more specific studies, researchers have looked at how second language can affect children's ability to process reasoning tasks in academic learning. Using bilingual and monolingual students, they tested their reading comprehension and cognitive ability (similar to memory and attention) and errors (a mistake in doing something wrong). The results concluded that bilingual students did perform better on tasks that require attention, problem solving, and decision-making.

This information was gathered through standardized testing, more specifically in classroom settings. Through attention, reasoning, and performance, test researchers can gather information on children's brain development, and gain more knowledge of their weakness in regards to certain reasoning tasks. An example of a standardized test would be an attention performance test. Children would be presented with five visual animals or animal sounds and they would be asked to react when a certain sequence is shown, and ignore other combinations. An example would be to only react when they see a pig and a cow (For an example see image below). Bilingual students performed better on these tasks, as it is believed they were able to ignore all other irrelevant information.

These skills are important as children grow and use these skills for everyday tasks. Language is studied because it is a key skill in addition to supporting academic performance. The study of language is important as it assists in brain progress. Parents and educators should challenge children to learn new languages, as improving these specific skills have proven to be extremely beneficial.

Researchers need to study what aspect of bilingualism is affecting a children brain functions. For example is it knowing a second language that is beneficial towards bilingual children, or are these children at a advantage before to knowing their second language. Further research would give us the answers of how parents and educators could go a step further in advancing their attention, problem solving, and decision-making skills.

Overall, bilingualism has been shown to have an advantage on children's brain development. This topic although is greatly beneficial in knowing what is good for children, it needs more information regarding this topic and how parent and educators who do not speak second languages can incorporate this into their child's environment.



The future of the school system…?

Currently, for Special Education Programs, the Calgary Board of Education (CBE) delivers services in English with accommodations made for French. Services to promote bilingualism are not discussed.

The fact that bilingualism is associated with improved cognitive performance for children with ASD is applicable to the school system. CBE, for example, could adjust future school policies to include bilingualism in the daily program. Also, these findings would help gain funding to run various language programs and acquire new resources for schools.

The addition of bilingualism to current programs would be a great contribution. A child spends a large portion of their day at school so including elements that benefit cognition throughout their day is important for maximizing the child's growth.

Calgary Board of Education. (2008). *Administrative Regulation 3003- Special Education Programming*. Retrieved from the Calgary Board of Education website: https://www.cbe.ab.ca/programs/supports-for-students/exceptional-and-special-needs/complex-needs/Pages/default.aspx

With a vast daily input of information, it is common for parents to feel uncertain about all the advice available. When it comes to children's mental growth, parents want to provide only the best for their child. Many parents of children with autism spectrum disorder (ASD) have a false impression that bilingual speech negatively impacts their child. Researchers[1] recently conducted a study that says otherwise. They explored the influences bilingualism has on mental performance (also referred to as cognitive performance) for children with ASD. Bilingualism and ASD is important because false information has prevented parents from speaking bilingually to their child. In addition, the relationship between bilingualism and cognitive performance is promising for the daily living of children with ASD.

The study compared monolingual and bilingual children with ASD and found that bilingual children faced fewer cognitive difficulties. The findings also address the false impressions by confirming past research, which showed that bilingual exposure does not negatively impact children with ASD. This research calls out to the bilingual parents of children with ASD, to embrace their bilingual environment. In support of growing evidence that bilingualism benefits the brain, this research shows that children with ASD who are exposed to multiple languages are less likely to be in the severe range of the spectrum.

Despite not knowing all the facts now, the findings of this research are promising. The findings invite future research to explore the impacts of bilingualism on cognitive performance with more detail. Additionally, it will encourage research to focus on the age of a child and amount of bilingual exposure that should be taken into consideration to maximize the benefits. Importantly, this research has implications for both increasing bilingual exposure in the home and using bilingualism as an intervention strategy for ASD. Overall, incorporating bilingualism in daily life for children with ASD is encouraging because bilingualism is associated with cognitive benefits.

[1]Iarocci, G., Hutchison, S. M., & O'Toole, G. (2017). Second language exposure, functional communication, and executive function in children with and without autism spectrum disorder (ASD). *Journal of Autism and Developmental Disorders, 47*(6), 1818-1829. doi:10.1007/s10803-017-3103-7

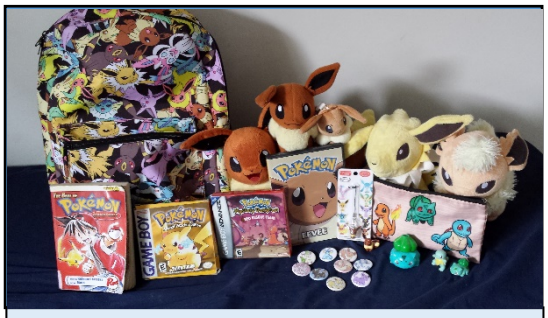
SPECIAL INTERESTS AND AUTISM

By Jennifer Williamson

What are Special Interests?

Special interests are an all-consuming passion for some topic of interest, such as dinosaurs or trains or even washing machines.

Although individuals with ASD enjoy these special interests, they present many challenges for parents and teachers. For example, children with ASD often refuse to start a new activity while engaged with their special interest.



Special interests often involve collecting or organizing objects.

Special Interests and the Reward System

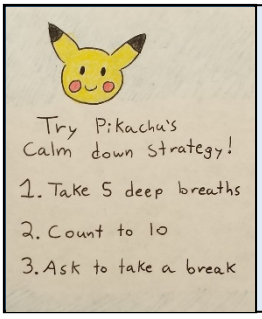
A 2014 study found that male children with ASD had more brain activity in reward areas when viewing images of their special interest than when viewing unrelated images. However, typically developing children did not display this enhanced reward response for special interests.

It is likely that this enhanced reward response makes special interests far more appealing for a child with ASD compared to other activities, thus interfering with daily functioning. This enhanced response to special interests may also explain previous work where people with ASD have a lowered response to more typical rewards such as money or faces.

Using Special Interests in Everyday Life

Due to the increased reward value of special interests, they are a powerful motivator for children with ASD. Consequently, special interests can be incorporated into everyday activities to increase their appeal. Some examples include:

- Using power cards to model socially appropriate behaviour
- Theming homework problems around special interests
- Granting access to special interests as a reward for completing chores
- Joining or creating a social club devoted to the child's interest



The Power Card Strategy

Power cards use a child's special interest or favourite character to model routines, social conventions and other behaviours.

Power cards break down a complex behaviour into simple steps.

A social story is used to explain the behaviour on the card, while the card itself is used as a visual reminder for the child.

Dominique McCleary

Early gross motor skills, like sitting up, crawling, walking and rolling over may be more important than you think. These skills actually show a major change in your child's physical, social, and brain development. Recent research has found a positive relationship between infant's early motor skills and their future communication skills, like a child's ability to produce and understand language.

Previous Research on typically developing children found that if a child had normal early gross motor skills then their language development would also be normal. However, if they had delayed early gross motor skills then their language development would also be delayed. Researchers were interested in finding out if similar results could be found in children with Autism Spectrum Disorder (ASD). ASD is a neurodevelopmental disorder that affects communication and behaviour. Doing this research could help spot ASD early on and hopefully allow us to start therapy earlier with these children.

Researchers looked into early gross motor skills and language development in children with ASD and again found that early gross motor skills such as learning to walk predicted the children's ability to produce and understand language as they grew older. If a child is able to point and make other movements, this will allow them to be exposed to more objects in their environment and learn many new words. But, if a child is delayed in their pointing and moving they will not be exposed to as many objects, and therefore, will learn less words.

The key take away from this research is that early gross motor skills are important and you should monitor your child's motor skills in order to make sure your child's development is on the right track. We can use this research to make parents more aware that a delay in early gross motor skills may be an early sign of ASD, which could allow us to identify ASD early on and begin therapy sooner. This could lead to a better outcome in the long run and we may be able to improve language development in children with Autism Spectrum Disorder.

A fun Activity for you and your child:

- Play a game of I Spy with your child! I Spy is a call and response game and can be played anywhere.
- I Spy can help you monitor your child's language development. It can show you how well they understand language and how well they can produce language.
- You or your child can be the spy. The spy picks an object from their surroundings and gives the other person hints as to what the object is. For example, *I spy with my little eye something that is red*. The spy continues to give hints until the guesser guesses correctly or they give up.
- This simple and fun game can give you a lot of information about your child's language development.

The Impacts of Theory of Mind on Autism Spectrum Disorder Individuals

Ashley Marcotte

As more people are diagnosed with Autism Spectrum Disorder (ASD), the importance of understanding how ASD individuals interpret emotional and mental states of their peers is increased. The ability to interpret other's mental and emotional states is defined as Theory of Mind (ToM), a component of our social cognition that begins to develop in the average child around the age of 4 or 5.

To help understand the extent of the differences between ASD individuals and typical developing individuals, Pino et al. investigated ToM in 94 children ages 5 to 13 years. 37 of the children were diagnosed with ASD. Both groups of participants were given the same two tasks to measure their ToM development. As predicted, the results found that the ASD individuals scored lower and there was a difference in the ways ASD individuals interpret mental and emotional information from their peers.

Why is this information important for educators? By understanding that there is a difference in understanding emotions, educators can create specialized programs to help increase their ToM development from a younger age. Since the rise of ASD diagnoses is relatively new, school curriculums have not adapted to the extra assistance ASD individuals require to reach their highest potential. Similarly, this research can assist educators in how to properly discipline a child with ASD because of the fundamental difference in processing emotions. If an ASD child is unintentionally insensitive to a peer, rather than giving a time-out, the educator should give a thorough explanation as to why their actions were harmful. Based on the information provided, teachers should be educated about the unique features of ASD individual's ToM deficiencies.

Ryan, a kind hearted, and incredibly intelligent 20 year old man was diagnosed with ASD at the age of six, and spoke with me about his experiences in the public school system.

Have you ever felt that the public school system was uneducated about ASD? Yes. There wasn't anybody I could talk to about autism in either my younger or older years in public schooling, which I believe led to a lack of understanding about myself.

Have you ever felt like you've unintentionally offended someone due to misinterpreting their emotions or intentions? Several times. It's something I think about to this day, mainly over not knowing how to act on occasion.

Have you ever felt offended, then later realize you may have misinterpreted their intentions?Again, many times. Sometimes it takes a fair amount of time, like a few days. Other times, it's something I realize almost immediately and regret.

Children with ADHD and Social Language

Tara McPhedran

Most current research has focused on the difficulties children with Attention-Deficit Hyperactivity Disorder (ADHD) have in terms of educational environments and learning. They have discovered that children with ADHD have troubles with tasks such as paying attention, listening to instructions, and sitting still. A recent study examined the language abilities of children aged 7 to 11 years diagnosed with ADHD. These researchers used parent evaluations, standardized language tests, as well as a narrative task to investigate the pragmatic abilities of children with ADHD. Pragmatics can be defined as the social aspects of language and includes skills such as how we use language in conversations, nonverbal gestures, making assumptions, and maintaining and narrative. Their results suggested that children with ADHD struggle with these aspects of language. For example, these children may have demonstrated difficulty with initiating, maintaining, and ending conversations appropriately. Their results also showed that some of these abilities predicted the child's social skills. This research is particularly important as it suggests that children have more problems with language rather than just those associated with attention and hyperactivity. Additionally, it indicates that using pragmatics directly affects a child's ability to socialize.

This study helps to provide insight into the challenges children with ADHD may have in social settings and in school environments. It offers an explanation for why behaviours may occur in students with attentional deficits and suggests a need for intervention strategies to better help these children succeed. Educators can alter communication styles and school board could prioritize individualized learning plans. Communication may be more effective when it is short, direct, and does not requires inferences from the speaker or the context. This study also shows that children with ADHD may struggle with maintaining a narrative meaning that they may require more structures in assignments that ask them to create stories. This research helps to create an understanding of areas of language that children with ADHD may struggle with, and can help construct an educational and social environment where children with and without ADHD are able to thrive.

Flip-A-Story!

In this activity children can flip over 3 or more cards and practice telling stories with a middle, beginning and end.

Working Memory Training for Children & Adolescents with ADHD

Liza Hartling

If you are a parent, child-care provider, or educator of a child or adolescent diagnosed with Attention-Deficit/Hyperactivity Disorder (ADHD), you understand that finding ways to help these children and teenagers to think and is always a top priority. Fueled by this goal, research has searched for ways that children with ADHD can cope with their daily struggles. These difficulties include maintaining attention, memory, planning, and other such skills. A study conducted by Beck et al. (2010) looked at how children and adolescents with ADHD benefited from participating in a program designed to help improve some of these skills.

What did this training involve?

The program the children completed, called Cogmed RM, was done at home, with the help of a parent or guardian, on a computer. They had to sit down at the computer to work on a total of 25 sessions over a 5- to 6-week period, with each session lasting 30 to 40 minutes of time. It was specifically designed to target and train the Working Memory of children and adolescents with ADHD.

What is Working Memory?

Working Memory is your ability to hold onto information in your head long enough to use it when completing a task. Unlike long-term memory, this is the part of your brain that is used when you need to think of something quickly, and make use of the information right away to get something done. This is a very important process, because it is the part of your brain that you use to remember instructions, complete tasks, and learn to the best of your ability.

Previous research has shown that programs such as these can benefit the skill set of children with ADHD, and this study worked to confirm that conclusion. In the end, this study found results that showed Working Memory and inattention was improved by the training program, and that taking the time to train Working Memory skills can be a truly beneficial opportunity for these children and adolescents to improve and learn.

Working Memory training can be fun!

Kroesbergen, van Noordende and Kolkman (2012) outlined classroom-based activities that can be done with children to help improve their Working Memory. Here is an example of one game that you can try at home or in the classroom:

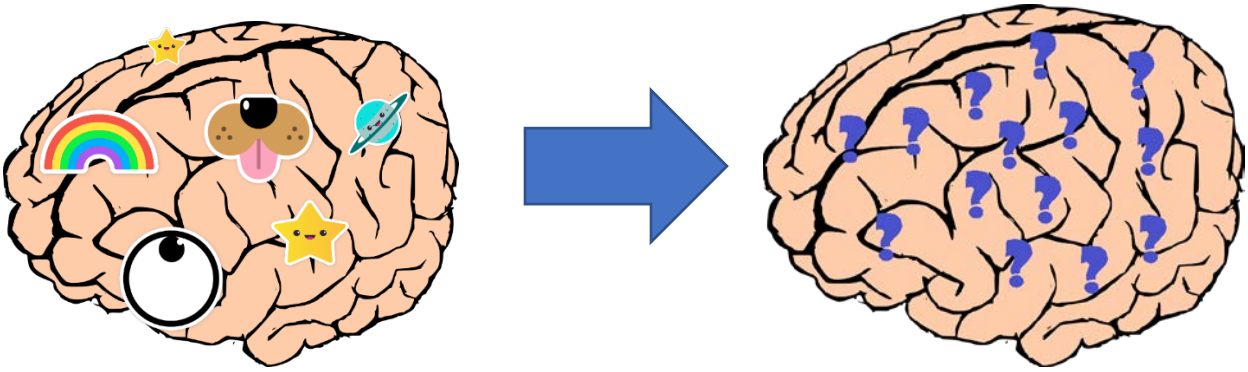
I'm going to the zoo…

The teacher/parent begins by saying "I'm going to the zoo, and I see…" and says an animal. Then, one at a time, each child has to say "I'm going to the zoo, and I see…" repeating the previously said animal and including a new animal, and so on.

ADHD May Lead to Higher risk of Dementia

Johnathan Milner

Scientists in Taiwan recently found that adults with ADHD – hyperactivity and/or attention challenges are more likely to develop dementia than those without. As ADHD is one of the most common developmental disorders of childhood, this study has important implications.



Does this mean I will one day get dementia if I have ADHD?

No. In this study, 5.5% of those with ADHD had dementia at the end of ten years compared to 4.4% without. This means 94.5% of people with ADHD did not have dementia by the end of the study. This study found that if there are two people of the same age, the person with ADHD is more likely to develop dementia than the one without.

Does this mean that ADHD causes dementia?

Not necessarily. A link between ADHD and dementia does not mean one causes the other. For example, those with ADHD are more likely to experience other difficulties which may increase the risk for dementia. Individuals with ADHD may struggle to obtain higher levels of education and may also be at risk for impulsive behaviours such as drug and substance abuse which may increase the chances of developing dementia.

What´s next?

More research is needed to be done to determine exactly why this relationship occurs. If there is a direct cause – more can be understood about how ADHD develops into dementia. If there are other factors that cause dementia in some people with ADHD, interventions may be targeted to reduce the risk.

What should I do if I have ADHD?

Take action to live healthy and prevent dementia by focusing on the things that you can control. Eating healthy, exercising, quitting smoking, lifelong learning, reducing alcohol consumption, and engaging in social activities are all controllable things that have been shown to reduce the risk of developing dementia as well as many other health problems.

Down Syndrome: The Importance of Gestures in Early Language Acquisition

Chantal Letkeman

Children with Down syndrome (DS) demonstrate both strengths and weaknesses while learning to communicate. They have relatively good comprehension of language, however, they often struggle with the verbal production of language. Although there has been extensive research describing the productive language delays in children with DS, recent developments in their development of this skill.

A recent study observed 18 to 24-month-old children with DS to help understand the relationship between cognition and vocabulary development. Over an 18-month period, they found that children with DS preferred to communicate primarily through gestures or through both gestures and words. The preference of gestures over spoken words is likely due to the physical and cognitive deficits (i.e. oral muscle weakness and poor auditory memory) associated with DS that affect verbal communication abilities. The study also revealed differences in vocabulary growth between the children, where some children increased their spoken or gestural vocabulary, while others increased both simultaneously. These individual differences highlight the importance of personalizing the current intervention methods.

Individual preferences in communication (i.e. predominantly gestures or gestures and words) should be incorporated in speech-language pathology diagnostics and interventions. If a child's vocabulary mainly consists of gestures, then gestures should be utilized in communication and playtime. Parents of children with DS should also be educated in ways to encourage and facilitate vocabulary development by pairing words and gestures in daily interactions. Additionally, periodic assessments should be administered in the early stages of vocabulary acquisition to acknowledge individual differences that may arise as development progresses.

Enhance Your Child's Vocab Through Gestures!

If you are a parent or therapist of a child who uses gestures more than spoken words, these are a few of the ways to facilitate their learning style:

1. **Reading**: when reading storybooks to your child, *point* to specific characters or objects as you read them. This not only helps in object-word association, but with attentive skills as well!
2. **Everyday Activities**: when your child gestures, you should engage with them through *speech*. For example, if they point at an apple, you should say something like: "Apple! Do you want an apple?" etc. This can promote spoken word learning!
3. **Gesture with them:** As seen in the recent research, some children increase their vocabulary as they increase gestures. Children love to mimic, so if you gesture more, they will too!

Marina Jarenova

Conduct Disorder (CD) and oppositional Defiant Disorder (ODD) are two disorders that start appearing in early childhood, and often confused with impulsivity and immaturity. When should parents start being concerned? If children enter middle childhood and problematic behaviours continue and start interfering with school and interactions with peers, it may be enough to start to worry. CD and ODD may affect many important brain functions in child's developing brain. One of them is short-term memory.

Short-term memory regulates many functions in our brain, such as learning, judging, reading, and language understanding. Most of the time, memory suffers the most in children with Conduct Disorder (CD) and Oppositional Defiant Disorder (ODD). CD and ODD cause significant problems in basic intellectual functions, such as attention and control of impulses.

Picture: Perspectives Of Troy, Detroit, April 2018/ https://perspectivesoftroy.com/child-counseling

In the past it was found that short-term memory is especially affected in children with CD/ODD. When the child starts school, short-term memory affects school achievement. The researchers suggested that children with such diagnoses will show lower performance on memory tasks than children without a diagnosis. 7 – 12 year old kids completed a task to remember the location of a square on a screen. It was found that diagnosis significantly reduces children's performance on tests that involve short-term memory.

Sometimes atypical behaviour of children can cover up some more serious reasons behind it. It is important for parents to pay close attention to their child's anger, sensitivity, emotionality, and behaviour towards his/her friends. It is best when problems are noticed as early as possible to avoid future issues. Problems may include school maladjustment, difficulty making friends, obtaining steady employment, aggressive, destructive, and even criminal behaviour.

At first, the results of the study may seem to make sense. However, just making sense is not enough. Scientific evidence may provide a solid base for educating teachers, support workers and of course, parents. For example: providing services at school when incidents of problematic behaviour occur. This may benefit teachers, parents and especially children in many ways. Trained specialists will help the child to regulate his/her behaviour. Moreover, informed teachers may interact with such children differently and be more patient with children who suffer from CD and ODD to avoid additional distress. This will help parents to feel calm about their child being at school.

As for the child, it may be very difficult for them to regulate their behaviour and focus at school. Thus, they may need assistance from professionals. Also, children might not realize the consequences of their actions, but constant assistance and support may change their understanding, decrease disruptive behaviour and help to perform well at school. Early assistance is best, as late assistance may not be as effective.

Children are our future. Taking good care of children requires providing services for children who need it. Helping children, supporting them and always being there for them will give them a better chance to live a happy and fulfilling life.

Considering Cochlear Implants for your Child?

Hayley McDonald

In 2015, the Canadian Association of the Deaf found roughly 3.57 million Canadians to have some kind of hearing loss. Hearing loss ranges from mild hearing loss, which makes it hard to follow a conversation in a noisy room, to profound hearing loss, which makes it nearly impossible to communicate without reading lips and using sign language. Most Deaf individuals rely on either hearing aids, which are small electronic devices that sit behind the ear and work to make sounds louder for the wearer, or cochlear implants, which are small devices that are surgically placed in the back of the head that work by sending sound vibrations to the brain of the hearer. Both of these devices were designed to make communication easier between Deaf individuals and the hearing world around them.

Until recently it was unknown whether the age of the child receiving a cochlear implant (CI) affected their future language abilities. Research has found that in order for deaf children to communicate similarly to hearing children of the same age, deaf children need to receive a cochlear implant before the age of 2. Every year after the age of 2 that a deaf child does not receive a cochlear implant, their potential of living a life in which they can easily communicate with others decreases.

Therefore, it is very important that infants be tested for hearing loss before their 2nd birthday to allow parents and doctors time to decide if the child is in need of a cochlear implant. Implantation before the age of 2 makes such a big difference because in the first two years of life children's language abilities grow so quickly that if we miss this critical period of language growth we cannot get it back and the child will likely always be falling behind in regard to language.

If your is child displaying possible symptoms of hearing loss it is important that you get their hearing checked as soon as possible, because with hearing loss, the earlier you know about it the more you can do to help your child. For more information on hearing loss and to find resources in your area, visit Deaf and Hear Alberta online at www.deafandhearalberta.ca or call 1-866-471-2805.

MOTHER CHILD ATTACHMENT AND CHILDREN'S COGNITIVE DEVELOPMENT

Kaitlyn Butt

The topic of mother child attachment and its relation to healthy cognitive development in early childhood is popular in the field of child psychology. Recent research has focused on finding out how a mother's feelings toward her unborn baby during pregnancy as well as her attachment to the baby after the birth could effect the baby's cognitive development in early childhood. This type of research will benefit young first time mothers. By knowing that mothers with lower levels of attachment to their babies during pregnancy can develop unattached relationships to their babies after birth, we can look into funding programs offering young pregnant women a support system leading up to the birth of their babies.

These young pregnant women could come together to learn ways to cope with being first time moms, as well as learn essential parenting skills that promote a healthy relationship with their baby. Being surrounded by other women in the same situation could make moms feel confident in their ability to be a mom, in turn leading to positive feelings toward their unborn babies and therefore normal patterns of development in early childhood.

Jasmyne, a 23 year old mother of 3 year old daughter Rowan provided some insight on the topic:

Q: During your pregnancy how would you describe your feelings toward your baby?
A: I didn't feel a particular bond to my unborn daughter during pregnancy but instead felt unattached.
Q: Do you feel that you have developed a secure attachment to your daughter since she's been born?
A: Yes. Being able to see her emotional reactions as well as her feelings made it a lot easier to build a strong connection with her than when I was pregnant.
Q: Do you feel that your lack of bond during pregnancy has affected your relationship with her at all?
A: When she was first born I did have feelings of resentment, but those feelings went away quickly and I feel that I was able to develop a positive and secure relationship with her despite feeling unattached during my pregnancy.
Q: Do you feel that the positive relationship that you have with her has benefitted her cognitive development?
A: Absolutely. When you have a positive bond and are attentive to your child they are more attentive and more interested in what you are teaching them. My daughter has been speaking full sentences since she was 24 months old and I believe that my level of attentiveness and responsiveness to her was crucial to this.
Q: Do you think that young mothers expecting their first child could benefit from programs that offer peer support and promote healthy relationships with their babies pre-birth?
A: Yes. A lot of young mothers either feel alone or don't feel like they can turn to their friends or family regarding their pregnancy due to judgment from others. Most young mothers are also still trying to figure out who they are and throwing a baby into the mix can be really tough.

Jasmyne (23), with Rowan (3).

Prenatal Maternal Speech Influences Newborns' Speech perception

Abigail Igba

A fetus in the 3rd-trimnester of pregnancy can hear and is responsive to sound. Studies have shown that, when a mother speaks the fetus is more responsive to her voice. A newborn will prefer the sound of their mothers' voice to their father's voice or to the voice of another woman, regardless of what she is saying because of familiarity with the voice. A study conducted by DeCasper & Spence (1986), found that a newborn will prefer specific properties of a story if their mother read the story while they were pregnant. The results obtained from this experiment add to the evidence that maternal voice preference originated in utero. For newborns to be able to identify specific acoustic cues from the passage read to them, they must have also registered specific acoustic cues from their mother's voice. An implication of this study is that it can help mothers understand that they need to communicate with their babies while the baby is still in the womb to establish a bond. When the babies are born, this bond is already formed and can be used to soothe the baby in times of distress because of the familiar voice. Another implication is that exposing the infant to their mother's voice in utero will also enhance the infant's reaction to some linguistic sounds. Hearing the mothers voice could promote language specific perceptual narrowing before birth, the infants hearing their mothers voice will be more tuned to their mother-tongue.

Mothers should read stories to their babies frequently and also sing to them, this will familiarize the baby with their mother's voice and make them accustomed to the comforting sound of her voice. An interview I conducted with new mother Anita Joseph backs up the research presented in the article. According to Anita, when she was still pregnant she spoke to her baby all the time and after he was born she noticed that he was more attached to her than his father even though, he also spoke to the baby while he was in the womb. Her voice alone was able to calm him down when he was upset, just because he had heard it repeatedly while in the womb. So even though it might seem like talking to a fetus in the womb does not add anything substantial, research has proven that it absolutely does!

To breed or not to breed?

Rebecca Willms

More and more young couples are choosing their career development over having children and as a result, family sizes are getting smaller. According to *Statistics Canada*, 43% of Canadian families had only one child in 2011. This transition to smaller families lends itself to the investigation of how fewer or no siblings may impact social skills in childhood. There are two conflicting theories regarding siblings and individual development. The **Resource Dilution** model suggests that the quality of children decreases as the quantity increases due to the dilution of parental resources. On the other hand, the **Siblings As Resources** model argues that siblings may offer a positive influence on development. A longitudinal study published in the *Journal of Family Issues* followed more than 10,000 American students from kindergarten to grade five to address these questions. Teachers rated each student on their self-control, interpersonal skills, and problem behaviours at both age intervals. The researchers found that, for both age groups children with one or more siblings have better social skills, self-control and less problem behaviours than their only child counterparts. This suggests that family relationships may be more important for the development of a child's social skills and self-control than the peer interactions they experience at school.

Why does this matter? Because it shows that children without siblings struggle with their social skills throughout elementary school and have not caught up to their peers with siblings by Grade 5. As an educator, these in-class interactions and can often determine which students need to work on their social skill development. In the classroom, teachers can help develop these skills by encouraging group work, playing games that promote self-control, and reconsidering how to punish disagreements in order to decrease problem behaviours. Also, by communicating these social difficulties to parents, teachers can encourage them to involve their child in extracurricular activities, and thus more social interaction, from an earlier age. Parents of an only child, can try to teach more positive coping strategies in order to combat problem behaviours and encourage self-control development in the home environment. That being said, every child is different and it is important to foster their strengths and understand their weaknesses in order to help them grow and develop.

Worried? Don't be. Here are some games you can play at home to develop your child's self-control:
1) *Red Light/Green light* → green means go (child moves), red means stop (child stops where they are)
2) *The Freeze Game* → children dance when the music is playing and stop when the music stops, with fast music children danced faster and with slow music children danced slower
3) *Conducting An Orchestra* → children play an instrument (drum or bells) when the adult waves the conducting baton and stop when the baton is put down
In order to further develop inhibitory control, you can change all above instructions to the opposite cues. (Example: red means go, green means stop).

Should I Have More Kids? How Your Child Can Benefit From Having Siblings

By: Ore Oyewole

If your initial thought on having children was “one and done” you might want to reconsider.

Growing up with an older sister was probably one of the most bittersweet experiences I’ve ever encountered. When something suddenly broke, I was guilty before proven innocent. Whenever we were watching TV, she had monopoly over the remote and when the words, “Can I borrow…” somehow managed to escape my mouth, they were quickly met with a loud “NO!” Boy, did she ever know how to push my buttons.

Upon informing her that I was writing an article based on mother-child interactions, she insisted I give her credit for a catalogue-sized list of things she taught me how to do that my mother simply could not. One thing she said stood out to me, “I taught you how to act.” I began thinking if what she had said was true. Did she really play a role in the way I interacted and socialized with others?

Siblings are characterized as an invaluable component in early childhood socialization and according to research conducted by Dr. Howe and Dr. Recchia at Concordia University, there are three main attributes acquired in early childhood through sibling interaction:

1) **Conflict Resolution:** Recreational interactions or play time with siblings provide an early context in which a child can begin to explore and understand a person’s mind that is not their own. This includes the feelings, intentions and point of view of others. During such occurrences, your child learns a wide variety of how to act and react to certain situation and how it affects their counterpart. This, in turn, provides effective strategies when it comes to conflict resolution which is an important attribute to develop before primary school.
2) **Leadership:** Older siblings naturally take it upon themselves to engage in leader-like behaviour since their younger siblings view them as such. During short time periods when a caregiver is not present, younger siblings have a tendency to look onto their sibling for comfort and support and in exchange, the older sibling assumes that position. Additionally, as they spend time together, siblings acquire effective teamwork skills as they are more often than not required to share things with one another and work towards common goals.
3) **Language Development**: By engaging in frequent communication with their older sibling, younger ones quickly learn how to associate a variety words with objects and actions involved in their everyday interactions. Moreover, as older children tend to have a larger vocabularies, younger siblings are exposed at earlier ages to more complex terms and expressions which provides them with enhanced levels of communicational skills.

After learning all this exciting information you may ask yourself: how can I facilitate sibling interactions that result in these attributes?

As a parent or caregiver, it is imperative to provide new and stimulating social contexts for your children so they can readily apply them in a varieties of settings and condition. Ideally a variation of activities they both enjoy that require a certain level of communication, for example a new board game or set of puzzles they must solve together.

If all this research has nott convinced you, I can tell you one thing: I consider myself lucky to have grown up with my big sister. Now as adults, just like in childhood, she has become my partner in crime, the one I look up to and most important, my lifelong best friend.

INNATE TOY-PLAY BEHAVIOUR

In the 2008 article, Hassett, Siebert, & Wallen found that rhesus monkeys' toy playing behaviour mirrors patterns found in children. Male monkeys, like young boys, spent more time interacting with wheeled toys over plush toys and returned back to them more frequently. In contrast, female monkeys showed no statistically significant preference to either toy. Girls show similar results in toy-play studies.

These findings suggest that gender-typical behaviour may have an innate component and is not purely the product of social and cognitive influences. It also suggests that gender identity is established before age three, which is the commonly held belief of development. This is relevant to transgender research as it may provide insight into the causes of gender dysphoria and the path of gender development in transgender individuals.

COGNITIVE EFFECTS OF GENDER IDENTITY

Previous research has shown that attaining gender identity effects:

- Knowledge about gender norms and behaviours
- Feelings of gender shaping a part of oneself (centrality)
- Feelings of pride being a part of one's gender (evaluation)
- Adherence to gender roles in oneself and others
- Peer and parent rigidity in adherence to gender roles

HOW CAN WE HELP?

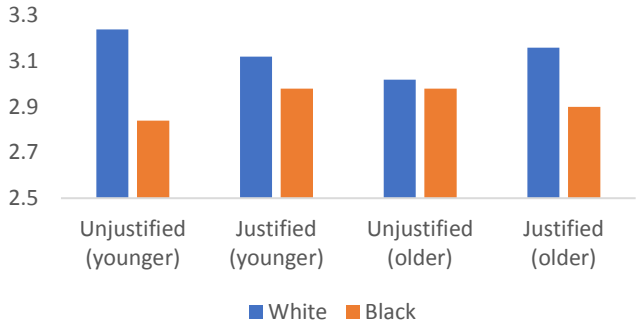
- Understand how transgender individuals differ from cisgendered individuals in gender development
- Provide intervention to aid in development of cognitive areas related to gender development
- Create a new model of gender development which incorporates transgender individuals
- Educate friends and family to provide support during transition

Implicit racism in children: When, how, and what can we do about it?

Min Yu Teo

Where does racism come from? In a recent paper published in 2013, researchers from the Federal University of Sergipe, Brazil investigated the conditions for which children express ethnic prejudices. The researchers looked at White, middle-class 5 to 10-year old children from public and private elementary schools. The children were asked to imagine they wanted to build a playhouse and 2 other children will help them carry the bricks in exchange for candy. In the justifiable condition, the child was asked to allocate candy once with a White helper carrying more bricks than a Black helper; and once with the Black helper carrying more bricks than the White helper. In the unjustifiable condition, the child was asked to allocate candy to both helpers who were each carrying the same number of bricks. How did the children rewarded other children? Did it depend on the ethnicity or the amount of help offered?

Based on the findings, White children were found to express racial biases. When children shared the job equally, younger children rewarded Whites more than Blacks, but older children did not differentiate their rewards based on ethnicity. When the workload was divided unequally, older children rewarded Whites more than Blacks, but younger children did not preferentially reward either ethnicity. Surprisingly, what this means is that older children were not any less racially prejudiced than younger children! Instead, they used ideas about equality in workload contribution – a "neutral" rationale – to justify their prejudiced behaviour. Here, the older children demonstrate their ability to suppress explicitly expressing their ethnic prejudices, whereas the ability is not yet developed in younger children. According to the researchers, this might reflect how as children grow and interact more socially, they develop the skills needed to mange their behaviours in different social situations.



Overall, this research suggest two things. First, the skills we need in order to use contextual information to manage how we present ourselves in social situations develop between ages 5 to 10. Second, prejudices do not disappear as we grow older, but rather, we learn how to manage them and present ourselves as politely as possible. Importantly, the period between ages 5 to 8 is also when most children begin attending elementary school and get to interact with peers of different ethnicities. It is of utmost importance that caregivers and educators capitalise on this critical period to teach children to be aware of their prejudices and learn to manage them. For example, preschool and elementary school teachers could assign children of different ethnicities to work with each other in the same group. Parents could also read picture books featuring individuals of various ethnicities to their children. On the other hand, local education boards could mandate schools to enrol a minimum percentage of students from each ethnic minority group. Additionally, training courses could be conducted for educators to be aware of the possibility of being ethnically biased in how they treat the students.

Improving Children's Working Memory

Gabrielle Rivera

Working memory enables you to transform and put together verbal and visual information necessary for various activities in a person's day-to-day life. With working memory, you are able to remember instructions, carry out a conversation, and even remembering the part of the page you are reading. It is the type of memory that allows you to mentally retain information for a short time (2-3 secs) for later use. Studies has shown that working memory has been found to begin in childhood. Children as young as five-years-old were able to exhibit working memory in simple tasks such as being able to follow instructions with multiple steps and remember a sequence of numbers or objects. Working memory has been implied in different aspects of human life such as attention, social skills and intelligence.

The period from birth to age six, serves an important part in brain development wherein children start developing their social skills, perspective taking, and emotional control. These domains highly involve working memory which are building blocks for their life achievements in later life. General intelligence rapidly develops in childhood which can predict children's performance in school and other life achievements. Early experiences and environments are important since it impacts the development of the child's working memory. Exposure to different activities such as play dates with another child, book reading or games can positively impact the development of working memory.

According to research, children with better working memory display better a generalized intelligence as reflected in their IQ scores. Working memory can be observed in their performance in school, sports and even in creating social relationships. Training working memory at an early age, improves performance resulting in better focus and attention, language and comprehension, problem solving and reasoning skills; and IQ scores of children. In a recent study, children as early as the age of four who has undergone working memory training, showed an increase in their working memory performance and in their IQ scores. Particularly, those who underwent a computerized n-back training program had the greatest improvements immediately after the training and even after twelve months.

Working memory helps to retain visual information. For example, the children were shown a yellow square, and had to recognize the square when it was presented in the future. N'back training was found to help this skill to develop. This technique in applications which are downloadable to smartphones and tablets. The N'back color, N'Back butterfly are apps that are appropriate for children age 4 and up. These applications follow the framework of n-back training used in researches, and are customizable to fit the child's capacity to perform tasks. As it is accessible, children can play it anywhere to keep them occupied. Although it is computerized, its concept can also be adapted into games such as puzzles that can be played in daycares, or even in a family get together.

References Cited

Alhusen, J.L., Hayat, M.J., & Gross, D. (2013). A longitudinal study of maternal attachment and infant developmental outcomes. *Archives of Women's Mental Health*, 16(6), 521-529.

Beck, S. J., Hanson, C. A., Puffenberger, S. S., Benninger, K. L., & Benninger, W. B. (2010). A controlled trial of working memory training for children and adolescents with ADHD. *Journal of Clinical Child & Adolescent Psychology*, 39(6), 825-836.

Bedford, R., Pickles, A., & Lord, C. (2016). Early gross motor skills predict the subsequent development of language in children with autism spectrum disorder. *Autism Research*, 9(9), 993-1001.

Berenbaum, S. A., & Hines, M. (1992) Early androgens are related to childhood sex-typed toy preferences. *Psychological Science*, 3(3), pp. 203-206.

Cascio, C. J., Foss-Feig, J. H., Heacock, J., Schauder, K. B., Loring, W. A., Rogers, B. P., … Bolton, S. (2014). Affective neural response to restricted interests in autism spectrum disorders. *Journal of Child Psychology and Psychiatry*, 55, 162-171.

Caruana, C. M. (2017). Students gain more foreign-language learning in schools. Retrieved February 25, 2018, from https://www.usatoday.com/story/news/2017/07/22/schools-expand-foreign-language-offerings/103584518/

DeCasper, A. & Spence, M. (1986). Prenatal maternal speech influences newborns' perception of speech sounds. *Infant Behavior and Development*, 9(2), pp.133-150.

Downey, D.B., Condron, D.J., & Yucel, D. (2015). Number of siblings and social skills revisited among american fifth graders. *Journal of Family Issues*, 36, 273-296.

Ding, X. P., Wellman, H. M., Wang, Y., Fu, G., & Lee, K. (2015). Theory-of-Mind Training Causes Honest Young Children to Lie. *Psychological Science*, 26(11), 1812-1821.

Fan, S.P., Liberman, Z., Keysar, B., & Kinzler, K.D (2015). The exposure advantage: Early exposure to a multilingual environment promotes effective communication. *Psychological Science*, 26(7), 1090-1097.

de Franca, D. X., & Monteiro, M. B. (2013). Social norms and the expression of prejudice: The development of aversive racism in childhood. *European Journal of Social Psychology*, 43, 263-271.

Golimstok, A., Rojas, J. I., Romano, M., Zurru, M. C., Doctorovich, D., & Cristiano, E. (2011). Previous adult attention-deficit and hyperactivity disorder symptoms and risk of dementia with Lewy bodies: A case-control study. *European Journal of Neurology*, 18(1), 78–84.

Hassett, J. M., Siebert, E. R., & Wallen, K. (2008) Sex differences in rhesus monkey toy preferences parallel those of children. *Hormone Behaviour*, 54(3), pp. 359-36.

Iarocci, G., Hutchison, S. M., & O'Toole, G. (2017). Second language exposure, functional communication, and executive function in children with and without autism spectrum disorder (ASD). *Journal of Autism and Developmental Disorders*, 47(6).

te Kaat-van den Os, D., Volman, C., Jongmans, M., Lauteslager, P. (2017). Expressive vocabulary development in children with Down syndrome: a longitudinal study. *Journal of Policy and Practice in Intellectual Disabilities*, 14, 311-318.

Kempert, S., & Hardy, I. (2015). Children's scientific reasoning in the context of bilingualism. *International Journal of Bilingualism*, 19(6).

Martin, C. L., & Halverson, C. F. (1981). A schematic processing model of sex typing and stereotyping in children. *Child Development*, 52(4), pp. 1119-1134.

O'Bannon, R. (n.d.). U.S. Senate designates music as a core subject, what does that mean? Retrieved February 25, 2018, from https://www.bsomusic.org/stories/us-senate-designates-music-as-a-core-subject-what-does-that-mean.aspx

Pellicano, E. (2010). The development of core cognitive skills in autism: A 3-year prospective study. *Child Development*, 81(5), 1400-1416.

Peng, J., Mo, L., Huang, P., & Zhou, Y. (2017). The effects of working memory training on improving fluid intelligence of children during early childhood. *Cognitive Development*, 43, 224-234.

Pino, M. C., Mazza, M., Mariano, M., Peretti, S., Dimitriou, D., Masedu, F., Franco, F. (2017). Simple mindreading abilities predict complex theory of mind: Developmental delay in autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 47(9), 2743-2756.

Recchia, H. E. and Howe, N. (2009), Associations Between Social Understanding, Sibling Relationship Quality, and Siblings' Conflict Strategies and Outcomes. *Child Development*, 80: 1564-1578.

Saarinen, S., Fontell, T., Vuontela, V., Carlson, S. and Aronen, E. (2014). Visuospatial Working Memory in 7- to 12-Year-Old Children with Disruptive Behavior Disorders. *Child Psychiatry & Human Development*, 46(1), pp.34-43.

Sanders, M. R., Dadds, M. R., Johnston, B. M., & Cash, R. (1992). Childhood depression and conduct disorder: I. Behavioural, affective, and cognitive aspects of family problem solving interactions. *Journal of Abnormal Psychology*, 101(3), 495-50.

Schroeder, S. R., Marian, V., Shook, A., & Bartolotti, J. (2016). Bilingualism and musicianship enhance cognitive control. *Neural Plasticity*, 2016.

Staikova, E., Gomes, H., Tartter, V., Mccabe, A., & Halperin, J. M. (2013). Pragmatic deficits and social impairment in children with ADHD. *Journal of Child Psychology and Psychiatry*, 54(12), 1275-1283.

Statistics on Deaf Canadians. (n.d.). Retrieved February 18, 2018, from http://cad.ca/issues-positions/statistics-on-deaf-canadians/

Svirsky, M. A., Teoh, S. W., & Neuburger, H. (2004). Development of language and speech perception in congenitally, profoundly deaf children as a function of age at cochlear implantation. *Audiology and Neurotology*, 9(4), 224-233

Tzeng, N.-S., Chung, C.-H., Lin, F.-H., Yeh, C.-B., Huang, S.-Y., Lu, R.-B., … Chien, W.-C. (2017). Risk of dementia in adults with ADHD: A nationwide, population-based cohort study in Taiwan. *Journal of Attention Disorders*.

Vally, Z., Murray, L., Tomlinson, M., & Cooper, P. J. (2015). The impact of dialogic book-sharing training on infant language and attention: a randomized controlled trial in a deprived South African community. *Journal of Child Psychology and Psychiatry*, and Allied Disciplines, 56(8), 865–873.

Williams, S., Leduc, K., Crossman, A., & Talwar, V. (2017). Young deceivers: Executive functioning and antisocial lie-telling in preschool aged children. *Infant and Child Development*, 26(1), 1-17.

Wolters, C. A., & Hussain, M. (2014). Investigating grit and its relations with college students' self-regulated learning and academic achievement. *Metacognition and Learning*, 10(3), 293-311.

Zimmermann, L., Moser, A., Lee, H., Gerhardstein, P., & Barr, R. (2017). The ghost in the touchscreen: Social scaffolds promote learning by toddlers. *Child development*, 88(6), 2013-2025.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