

The Changes that Every Adolescent Will go Through

1. Adolescence – the apprenticeship for adolescence.

The changes in the brain during adolescence are dramatic. They have to be – the transition from childhood to adulthood wouldn't happen without some serious neural remodelling. During adolescence, they will be driven to experiment with the world and their place in it, try new things (important for their new adult roles), let go of the family and seek out peers, form strong social connections and think independently. Every one of these changes is there to fulfil an important developmental role and bridge the vast gap they will travel between childhood and adulthood. The results will be worth it but like any renovation, things will get messy for a while.

2. Adolescence lasts until early to mid 20s.

Adolescence would be a breeze if all that our kids needed to be healthy, well-adjusted adults was the adult hardware. Humans are complicated and making the fully developed versions takes a lot of experiencing, experimenting and learning. And time. It takes a lot of time. Our kids will be under the influence of an adolescent brain until they are about 24. Best save your exhale for then.

3. The brain develops from the back (primal, instinctive) to the front (measured, rational).

The brain develops slowly from the back to the front. The first to develop is the limbic area, the part responsible for instincts and emotions. The last part of the brain to develop is the prefrontal cortex, the part of the brain that considers consequences, plans, controls impulses and is able to think logically and rationally. For adolescents, this is a double hit – the emotional, impulsive limbic system will be driving their behaviour and their decisions, but the sensible, rational pre-frontal cortex isn't around to calm things down. It is as though our adolescents are at the wheel of a high-performance car, but without the brakes. Given the pull away from their parents, they are also without a reliable GPS. It would be easy to roll your eyes at evolution and wonder what it was thinking, giving our adolescents all that power minus the sensibility. Remember it is all to get them ready for adulthood. They need to be able to jump into the unfamiliar world pre-adulthood and try things out. There are so many important 'firsts' that happen during adolescence that would be much more difficult if they were able to talk themselves out of it.

4. Impulse control. Impulse what?

With the prefrontal cortex still on its way, adolescents will often think it or feel it, then say it or do it. Though they may not always be biologically able to keep a hold of their impulses, they need to know when they've gone too far. The repetitive reminder of what's expected will get tiring – massively so – but it will eventually lead them to internalise the rules and respond to the world (and their parents!) as an emotionally balanced, emotionally responsible adult. Yes. Bring that on.

5. The adolescent brain interprets emotion differently to an adult brain.

Research has shown that teens and adults each use a different part of the brain to help them interpret emotions. Adults use the rational prefrontal cortex to interpret facial expressions. Teens on the other hand use the amygdala, which is primed to interpret emotions as a threat or hostile attack. The amygdala runs on impulse and gut reaction, so you can see how that's going to end up. Teens will **often read anger or aggression** when there was none.

6. Sometimes they'll need to 'borrow' your pre-frontal cortex.

As the parent who is often on the end of the misinterpretation, (you, innocently: 'So who else is going to the party?' them, 'What! Don't you trust me or something! I can't believe you don't trust me!'), know that it comes with the territory of adolescence. With the 'calm down, think about it' part of their brains still under construction, they'll need to borrow yours sometimes. When you are faced with a flare-up, try to breathe and let the wave wash over you. It will pass in a minute or two provided that nothing happens to give it oxygen, like, you know, if you breathe too loudly/too softly/at all. When things have settled down, bring your calm and sensibility to the table. Speak as though you are the person you want them to be. This isn't easy and it doesn't mean you don't have boundaries around behaviour. Don't worry if you get drawn in to the argument sometimes. It won't hurt them to see that you're human.

7. They can learn things really quickly. But only if they want to.

The brain of an adolescent has an oversupply of neurons (brain cells) and an undersupply of connections between the neurons. The neurons are responsible for processing information, so the more neurons there are, the more potential there is to learn and process information – but only if the connections between the neurons are strong and plentiful. It is both the number of neurons and the complexity and strength of the connections between the neurons that determine how effective the brain is. Think of their brains like baby foals – bouncing with energy and enthusiasm, but waiting for direction. The direction comes as the connections between neurons strengthen.

The neuroscientists have a saying that they bring out at neuroscientist dinners and poetry nights – 'the neurons that fire together, wire together'. What this means is that the more the neurons in the adolescent brain fire, the more they will strengthen and build connections between them. Firing happens through experience, learning and repetition. Every time they do something, the neurons fire and form connections with other neurons. The more they fire, the stronger the connections. The stronger the connections, the stronger the pathways in the brain. The more relevant experiences our adolescents have, the more their brains will wire in a way will support their rich transition into adulthood.

8. Whatever they do a lot of, they will get good at.

The adolescent brain is spectacularly ripe for learning and whatever the brain does a lot of during adolescence, it will become really good at. Sport, drama, art, texting, video games, lying on the couch, arguing, chemistry, music – anything.

9. Use it or lose it.

The neuroscientists clearly know their way around a rhyming word. 'Use it or lose it' is another fave and refers to the withering away of neurons that aren't needed. The neurons that are being used fire and strengthen. The ones that aren't wither away. This is an important part of the brain perfecting itself to be the most efficient brain it can be. During the course of adolescence, experience and learning will shape the brain into the best and most efficient brain for each individual person. There is only a limited amount of space in your head – you can't grow your skull – so the brain will keep the neurons it uses the most and get rid of the ones it doesn't. This will allow the brain to use the space and energy to strengthen the neural pathways that are relevant to the skills that are used the most. It's evolution's way of customising and building brains to suit. Nice to have a limited edition.

For example, if your teen plays music, the 'playing music' neurons will strengthen and the skill will develop quicker and stronger than it would if music was taken up for the first time during adulthood. If your teen doesn't play music, the brain will think there is no need for these neurons, at least for the moment, and they will fade away. It doesn't mean that the ability to play music is lost, it just means that the capacity to learn won't be as rich as it is in adolescence.

10. They are just as capable as adults when it comes to making decisions but

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With a billion new neurons for added firepower, the adolescent brain is a very capable one. Adolescents will start to have the same decision-making and processing skills of an adult. They have an extraordinary capacity to take in information, analyse it and come up with creative solutions. The problem is that this process often gets hijacked by emotions, resulting in emotional, impulsive decisions that aren't always great ones. Again, this is the work of a highly developed limbic system and an underdeveloped pre-frontal cortex. Even though they have the processing power and the intelligence to make good decisions, their emotional brains will often get in the way of doing that.

Whenever you can, slow things down and encourage them to talk to you about the pros and cons of their decisions. Let them know that you're not trying to talk them out of anything (even if you are, it will be more likely to happen if they get there themselves), but that you want to understand the issues. It will give their pre-frontal cortex an opportunity to get involved and bring some sensibility to the situation.

11. When making decisions, they'll maximise the positive and minimise the negative.

Adolescents will evaluate the pros and cons of things differently to kids and adults and again, it's because of the changes in the limbic area of their brains. Their focus will be drawn to the positive, feel-good, fun potential of a decision, but the pre-frontal cortex isn't fully available to pay attention to the negatives. They are also less likely to learn from their mistakes or misadventure.

Because of this, they can be wonderfully bold, daring and courageous, but they can also tend towards risky, dangerous behaviour, something that is given extra life by peer pressure. Fill their heads with the stories you hear about things going wrong so they can be exposed to the potential for risk. They might not hold on to the information enough for it to influence their decisions, which is why you'll need to push through the adolescent eye-rolls and remind them often.

12. They will be hungry for new experiences.

Dopamine is responsible for the feel-good rush we get when we get something we want. It is released when we do something brave and bold, eat the food we want, fall in love, connect, exercise, have sex. It is also triggered by taking risks and trying new things. Dopamine is there to reinforce the behaviours that are good for us and to ensure our survival, but it can also reinforce dangerous behaviour, or healthy behaviour in unhealthy ways.

In adolescents, the baseline level of dopamine is lower than it is for adults, but when it is triggered it is released at a higher rate. Adolescents get more of a rush than adults do. When dopamine drops, adolescents feel bored and indifferent. They are driven to seek out novelty and the dopamine high that comes with it. You know where this is headed. With the need for a dopamine high and the 'dumb idea – you might not wanna do that' part of their brain underdeveloped, adolescents will be vulnerable to risky behaviour. This might play out in all sorts of ways – **sexual behaviour** (sexting, promiscuity, unsafe sex), drugs, drinking, driving, skateboarding downhills into traffic, sneaking out late at night.

It can also play itself out in safe ways – on the sports field, competition, performing (doing anything on stage), trying new and interesting things, travelling, becoming an activist. This is an important part of their development. Teens feel really good when they try new things, and a healthy move towards independence and adulthood will involve plenty of new things. We want them to have new experiences, be creative, experiment, figure out who they are in the world and where they fit in and to do this, nature has given them a brain that rewards them for novelty.

13. You'll be tempted to put it down to laziness – but ...

With lower baseline levels of dopamine adolescents will seem unmotivated and lazy. They're not, it's just harder for them to find the 'on' switch. This doesn't mean that it's okay for them to opt out of the things they need to do. What it means is that if you have to remind them a few times that something needs to be done, don't take it personally that they're not jumping into it. They're not deliberately trying to be difficult. They all have brilliance in them. Just watch them go when they find something they love doing or something that's important to them.

14. They will be vulnerable to addiction.

Because the adolescent brain is developing, it is wide open to being changed by experiences – good and bad. Think about it like this – when a house is fully built, the rain or bad weather will come and go no problems at all. When that house doesn't have a roof, it's a very different story. The adolescent brain is under construction. Exposing the developing brain to substances that it was never meant to deal with, such as alcohol and **drugs**, can have long-term effects and be more damaging than it might be during adulthood.

15. Stress. They need it just like Goldilocks would have it.

Stress has to be not too much, not too little, but just right. Too much stress (such as constant fighting between parents, bullying) will interrupt the developing brain, causing problems for attention, learning and memory and creating a vulnerability to depression and anxiety. Too little stress, as in the parent who does everything and expects nothing, will steal the opportunities for their adolescents to build their capacity to manage stress, and to strengthen resilience, confidence, perseverance, and self-reliance.

16. They will feel things deeper and more intensely than they ever have before.

The limbic system is involved in memories and emotions and responds to things instinctively, impulsively and emotionally. During adolescence, it's switched to high volume, but the prefrontal cortex isn't able to weigh in to tame things down. Adolescents will experience the giddy highs and devastating lows of emotions – fear, anger, excitement, sexual attraction, joy. At times this will feel scary for them because it will feel as though they have no control over it.

The ability to feel this depth of emotion, though it can feel overwhelming at times, is a healthy part of the developing brain. Emotion is there to evoke a response – to move people into action. For adolescents, it's to move them towards independence, not to disconnect them from you (even though that's how it feels sometimes). Try to give them the space to feel their feelings and to experiment with managing them. Let them know when they've gone too far, but it's important not to punish the intense emotion out of them. We want them to be passionate, to experience deep love and joy and to know when something doesn't feel right. First though, they have to learn how to manage their emotions and turn down the heat when they need to.

They can only learn this through experience. Feeling big, unfamiliar feelings can be scary so they will be more likely to let it all out with the people they feel safest with. That would be the ones who have been there from the beginning and who they know will be there no matter what. That would be you. When you're in the thick of battle, take comfort from the fact that your adolescent, as unadorable as he or she might be right now, is progressing exactly as nature and evolution intended. Or, if that fails, take comfort from something high carb and delicious.

17. Their need for attachment will still be strong, but the target will change.

We humans have a vital need for attachment – to be seen, safe, soothed and secure. As we grow older, the need for attachment doesn't disappear – it never will – but the people who meet it will change. As adolescents pull away from their parents, they will turn towards their peers to meet their needs. This is normal and healthy. Their brains are set up for this. Adulthood is about independence and as teens leave their family tribe, they will be looking to rely on their peer tribe. Sometimes this will be a struggle. With so many adolescent brains doing adolescent things, and needing so much from each other, the time is ripe for peer problems. This will also bring opportunities to will learn how to read people, how to respond, the type of people they want to be with and the ones to stay away from.

Connection to this tribe can feel like life or death. It sounds dramatic and any parent who has stood between an adolescent and their friends would know the angst that comes with that – for them and you – but there is a good reason for this. For mammals throughout history (think cave-people) and in the wild, exclusion from the tribe would mean probable death. That's why it feels so bad for teens when we stop them from connecting with their peer tribe – it feels like death. It doesn't mean you'll let them do everything they want to do to keep up with their peers – you can see around corners that they can't – but understand the intense reaction you might get when you say no. Lucky we're tough enough to cope.

18. The teen brain is getting stronger at thinking abstractly.

During adolescence our kids will start to think about the world in new and interesting ways. They are developing the ability to think abstractly, which will also open up the capacity to see themselves through the eyes of another. This is something new for them, and they'll be wobbly at the wheel to start. They might worry – a lot – about what other people are thinking of them. As they separate from their family tribe, what their peers think of them is so important. Reassure them that as much as they are worried about what their friends and the not-really-friends-but-I-know-them are thinking of them, those people will be worried about the very same thing. They might not believe you, which is why you might need to believe it enough for both of you.

19. They'll be thinking about the person they want to be.

During adolescence there is an increase in the production of receptors for oxytocin, the 'bonding hormone'. This has the potential to ignite feelings of self-consciousness and adolescents will often feel as though the world is watching everything they do. The upside of this is that it encourages them to think about the kind of person they want to be and the kind of world they want to live in. In true adolescent form, they might be very black and white about this until their brain develops enough to open them up to the grey.

20. Their sleep cycle will change.

Adolescent brains are busy brains, and nothing that works that hard can thrive without rest. They will need 9-10 hours of sleep. During adolescence their circadian rhythm shifts by about three hours. This means that they will be likely to stay up three hours later and will want to sleep in three hours later than they used to. Sleep helps with the construction and wiring of the brain to be the best brain it can be for them. **Tired humans are cranky humans.** Whenever you can, let them sleep in.

But they need you more than ever.

During adolescence our children will rethink the way things are done. Their restlessness will inspire change and growth, not just in themselves but in the world. We want them to explore the world, experiment with it, find their independence, feel deeply, love deeply, speak out against that which needs changing, find their passion, embrace that which feels right and walk away from that which doesn't.

There are important jobs they need to do and their brain is changing to give them the firepower to do this. Things will be different for a while. They are trying to find their own independent place in the world. This doesn't mean they don't love you – they do – and they need to know how much you love them. They still need you, more than ever. They won't always show you, but they do.