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Full Document: ADHD Explanation 1-5

Patient Explanation: Helping Patients, Parents and Professionals understand about ADHD.

THE UNIVERSITY OF SYDNEY

ADHD Explanation 1: What is ADHD?

What is ADHD?

ADHD is a neurodevelopmental disorder. This means that a person's brain functions slightly differently. The differences are sometimes subtle but persist for life. ADHD stands for attention-deficit/hyperactivity disorder. This is confusing because not all people with ADHD are hyperactive. Sometimes those without hyperactivity are said to have ADD – attention deficit disorder – but it is technically more correct to call this primary inattentive ADHD. Those with the full disorder, including hyperactivity as well as difficulty with attention, have ADHD combined-type.

ADHD is a common condition affecting at least 1 in 20 children. Boys are more often diagnosed than girls, although more girls with ADHD are now being recognised. ADHD is also common in adults. Some adults with ADHD have already been treated as children, but there are some adults whose ADHD was missed, or did not cause them serious problems until they became adults.

People with ADHD have difficulties in carrying out their daily lives due to problems caused by their ADHD. These are generally due to difficulties with concentrating adequately or difficulties with controlling impulsive behaviour. People with ADHD are often hyperactive - they feel restless and want to be active and moving. People whose ADHD includes hyperactivity are often easier to recognise than the quiet underachievers.

Does ADHD really exist?

There is evidence from brain scans that people with ADHD have delayed maturation of the prefrontal cortex, which is the part of the brain most involved in executive functioning – the 'thinking' part of the brain. Executive functions include working memory, reasoning, planning and resisting distractions. Studies of people with and without ADHD have also shown differences in the parts of the brain associated with experiencing emotion, motivation and reward. Although certain structures are slightly smaller in people with ADHD, this does not help with diagnosis. For example, even though boys tend to be slightly taller than girls, you could never be confident that a child who was taller than average was a boy because girls can also be tall. In the same way, you would not expect that a person whose nucleus accumbens is slightly smaller than average would have ADHD. However, the fact that these brain differences exist, even though they are small, supports that this is a valid diagnosis. Boys and girls are different and ADHD is real.

ADHD Explanation 1: What is ADHD?

How is ADHD diagnosed?

ADHD is a clinical diagnosis - it depends on a person meeting diagnostic criteria by showing the characteristic behaviour to a greater extent than would be expected for a person of their age or developmental level. This behaviour must also be causing problems in their daily functioning.

There are 3 main types of symptoms or behavioural characteristics that make up the diagnostic criteria for ADHD.

Inattention

People with ADHD have more difficulty for tasks that involve sustained concentration, particularly if the task is mentally demanding. If a person with ADHD is going to complete a task, that task should either be short and easy or be sufficiently interesting, enjoyable or rewarding to keep them engaged. People with ADHD may be able to concentrate for a long time on electronic games. These typically do not involve much independent or creative thought and also provide constant stimulation that catches and keeps the attention.

Hyperactivity

Hyperactivity is common in ADHD and is the most easily recognised feature, as the child moves rapidly from one distraction to another. This restless energy may make it difficult for a child to remain seated to long enough to concentrate on schoolwork. Hyperactivity may also make a person excessively talkative, even appearing to talk just for the sake of talking and may lack the patience to stop talking and listen. Hyperactivity tends to lessen with age. Even though some adults with ADHD are still hyperactive, some hyperactive children develop into underactive and unmotivated teenagers.

Impulsivity

People with ADHD often have quick reactions that occur without having time to stop, think and make a decision. Therefore someone with ADHD may say or do something hurtful, or repeatedly get into trouble for impulsively calling out in class. A person with ADHD may deny responsibility and consider such actions accidental because they are unintended. This lack of impulse control can lead to anxiety and low self-esteem as the person may suddenly be in trouble without any prior warning or intent.

ADHD Explanation 1: What is ADHD?

How does ADHD affect someone's functioning?

Some people think that because they know one person with ADHD, all other people with ADHD will be similar. This is not necessarily true. People have different personalities, interests and skills; ADHD just adds a further source of variability. In particular, a person's intellectual ability will have a major impact on the way they cope with their ADHD.

One characteristic of people with ADHD is that they are easily distracted. This may occur while they are talking and may lead to forgetting what they were going to say or losing the point while telling a story. Alternatively, becoming distracted during a task and then forgetting to go back and get it finished can lead to a person being inefficient and disorganised. People with ADHD often have difficulty ignoring distractions and this may make them particularly intolerant to background noise while trying to concentrate. This could be because the noise masks their 'inner speech' – their internal dialogue of thoughts. This might lead to the complaint: 'I can't hear myself think!' or to compensation by saying their thoughts out loud. If a person speaks their thoughts, actually hearing the words may be a more effective reminder of what they are trying to do. This strategy could also make a person with ADHD appear excessively talkative.

Losing focus on schoolwork may lead to disruptive behaviour in class. A child who is not able to listen or concentrate on their work may get very bored and start talking and distracting others, or find other more entertaining activities that disrupt the class. A quieter child may cope with their ADHD by working very slowly, perhaps concentrating excessively on neatness. A child may also disguise lapses in concentration by making sure that they continue looking at the teacher or at their work, rather than looking out of the window.

A child with ADHD may have difficulty with age appropriate play. They may easily become bored of a game and have difficulty listening to other children's ideas, wanting to direct or change the game and therefore appearing bossy.

ADHD is more disabling in people who have learning difficulties. This is because they have to concentrate longer and harder to acquire the same skills. The more difficult the task is for them, the more quickly they will fatigue mentally and give up. Conversely an able child with ADHD may have no difficulty achieving at school during the early years. However, as the work becomes more demanding in high school, intellectual ability by itself may no longer be sufficient and if they are unable to concentrate adequately in class and study consistently their grades may decline. In people who are high academic achievers, their ADHD may not hold them back until they reach university. However, once a person leaves school they usually have more opportunity to choose a career that matches their

ADHD Explanation 1: What is ADHD?

interests and strengths. ADHD may therefore become less of a problem, although lack of attention in the workplace predisposes to missing instructions and making careless mistakes.

For some people with ADHD, their lack of organisational ability may become more disabling with the complexities of functioning in society as an adult. This can be a particular problem for a young mother who has to cope with running a family and household, managing the children's commitments and sometimes also having a job.

The features of ADHD are not specific as they also occur in people without ADHD. The difference is that people with ADHD show this behaviour more consistently and it causes significant problems in their daily functioning.

Functional impairment in ADHD

The key to diagnosis of ADHD is not simply a matter of expressing the symptoms but, more importantly, it relates to the consequent impairment in functioning. When assessing the extent of functional impairment it is useful to consider the the following:

- academic or occupational achievement in relation to ability
- peer relationships
- ability to function at home without generating unreasonable levels of stress or disruption
- ability to function at school or at work without generating unreasonable levels of stress or disruption
- level of self-esteem, with low self-esteem associated with increased susceptibility to anxiety and depression

Less efficient thought processes in ADHD – taking 'mental short-cuts'

In ADHD mental processes (executive functions) are less efficient. This means that mental tasks that involve thinking require more mental effort. This is like a runner who has to run uphill. It is not that running is too difficult for him, but he will tire more quickly than others who are running along level ground. He will either keep going but run more slowly, or he will try and run as fast as the others and then have to stop to rest. It is like this for mental tasks for people with ADHD. The mental fatigue is genuine and may affect school work, socialising with other people and managing the daily routine at home. Children with ADHD often develop ways of disguising or adapting to the inefficiency of the way their brain works. Some of these could be considered as 'taking mental short-cuts'.

ADHD Explanation 1: What is ADHD?

In ADHD school work is like running uphill. The child with will get tired more quickly and will either slow down or stop and rest.

Schoolwork

A child with ADHD may rush to get work finished within a time span for which he can concentrate. Alternatively he may work for a bit and then stop working and appear to daydream, as if his mind is going blank like a computer on standby. Some people just limit their rate of work to a manageable level by working slowly. This may be disguised by giving too much attention to neatness and therefore doing very little of the more mentally demanding aspects of the work. Creating a distraction may also be an effective work avoidance strategy. An example is the little girl who developed a pattern of turning around and giving her mother a cuddle whenever she felt under too much pressure to do her homework. Other more common avoidance strategies include changing the subject or asking an irrelevant question.

The brain in ADHD is like a computer that's running out of charge.

If it runs low level programs like playing games it can keep going.

If it tries to run a high level program like doing homework it quickly flicks onto standby.

ADHD Explanation 1: What is ADHD?

Social interactions

Conversation takes an effort for listening, and additional effort for thinking of a response and making the response into words and sentences. Children with ADHD often use strategies which avoid having to make a mental effort. If a child is asked about who they have played with at school, this involves the effort of thinking back to an earlier part of the day and it may be easier to respond: 'I don't remember'. Even playing with friends may be too difficult to sustain and the child with ADHD may withdraw to a less mentally demanding activity.

As children mature they expect more intense attention from their friends

To be a stimulating playmate he has to
- Listen
- Think of a suitable response
- Put that response into sentences

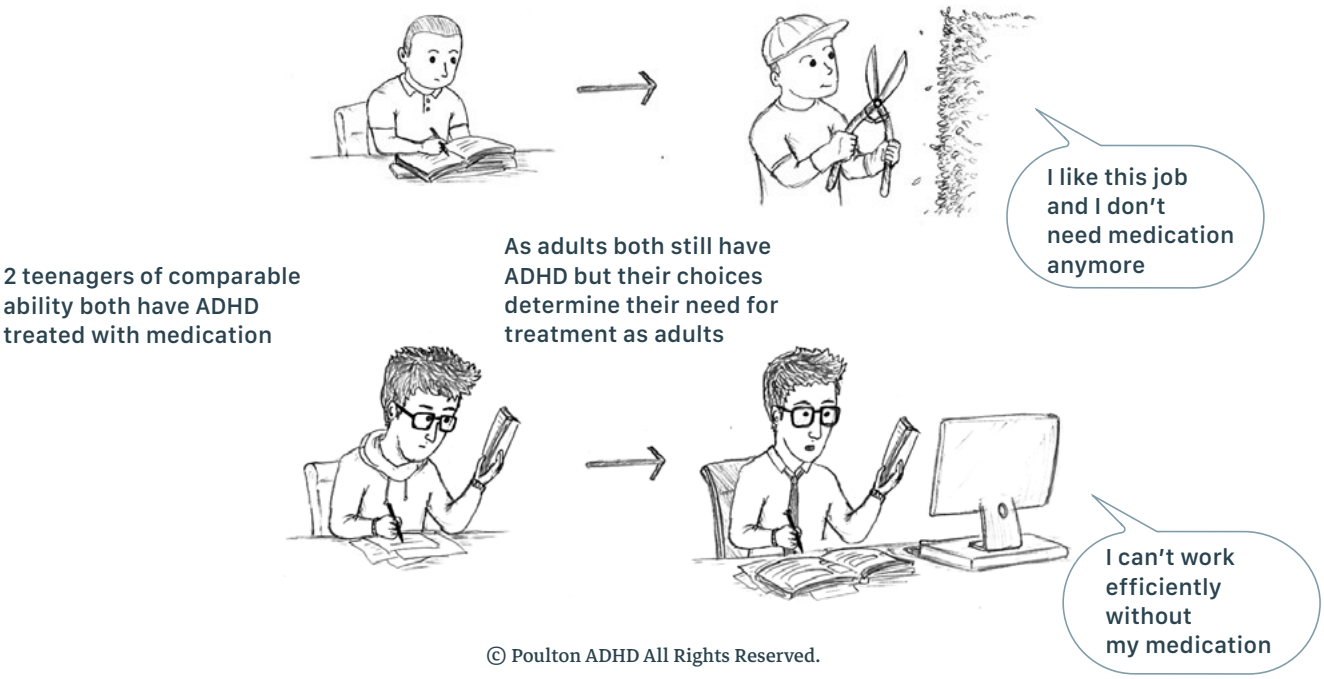
Routine tasks

Children with ADHD often have difficulty carrying out instructions, particularly if given several together. A child may try to look as though he is listening, by keeping his eyes on the speaker, but if not fully concentrating he may be unable to follow an explanation or carry out an instruction. Sometimes a child may only listen to part of a sentence and guess the rest. Remembering several instructions often involves making an effort by repeating them mentally. If a person is not putting in this effort or is distracted by other thoughts, instructions may easily be forgotten.

ADHD Explanation 1: What is ADHD?

Achieving goals in life

If a person is achieving less due to the unsustainable level of effort they have to put in, they will experience less satisfaction. They will also experience more mental fatigue associated with thinking, or with meeting the intense demands expected by their friends. They may be less ready to put further effort into the next task, with a tendency to give up easily. Inefficient mental processes therefore contribute to underachievement in ADHD and consequent low self-esteem. Some people attempt to preserve their self-esteem by reducing their goals in life to a level that they feel is more achievable. This may lead to dropping out of school into unskilled work or state benefits. This may be through preference or it may framed as a deliberate choice when it is actually an adaptation to being unable to achieve at a higher level. It is important to recognise and treat ADHD, so that people with ADHD who are struggling can receive the help they need to achieve their goals in life. A person's goals should determine the level of function that they need from their brain, not vice versa. Therefore the young man in the picture below goes into landscaping because this is what he wants to do, not because his concentration prevented him from getting the marks he needed for studying engineering.



ADHD Explanation 2: Oppositional defiant disorder and MERIM

Oppositional defiant disorder (ODD)

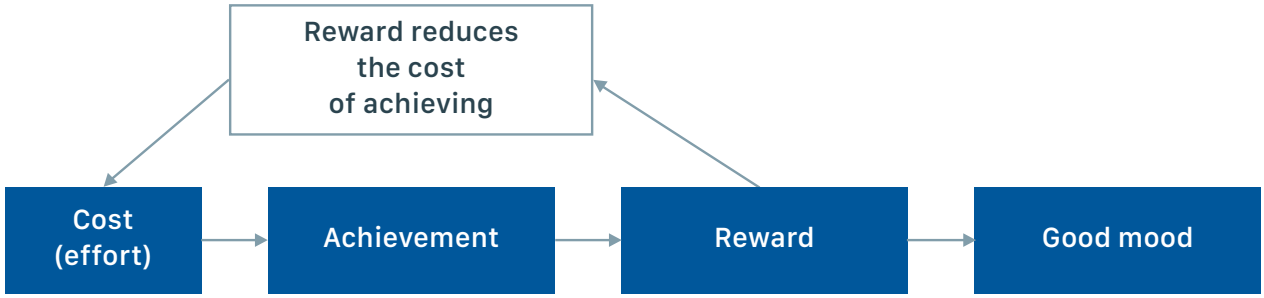
ODD is very frequently associated with ADHD. People with ODD typically overreact with anger in response to minor frustration. The lack of control over impulsive behaviour in ADHD becomes even worse when associated with anger. These children may incorrectly interpret another child's actions as hostile. For example if accidently pushed, a child may automatically react by hitting. This may start a fight and children with ADHD sometimes show no fear, even fighting with children who are much older and stronger. Other children may find this loss of control amusing and may deliberately provoke or bully a child with ODD for a reaction. ODD is also associated with deliberately annoying people and sometimes with planned acts of spite. People with ODD are therefore at risk of bullying, or being bullied. ODD is also associated with a negative attitude and a tendency to blame other people and deny that they are at fault. They may also be argumentative and oppose authority. People with ODD often appear to have a negative mood and a bad attitude.

Why is do people with ADHD so often have ODD as well?

The most fundamental problem in ADHD is the difficulty with concentrating sufficiently to get tasks finished. This can be thought of as mental inefficiency – with everyday tasks requiring a disproportional effort. Getting through the daily routine involves a constant stream of tasks that all require some mental effort. Successfully finishing these tasks gives a series of achievements. Although most achievements are small, they are each associated with the satisfaction of task completion – the feeling of a job done well. These small feelings of success all help to sustain a stable and happy mood. Therefore, for example, you get up in the morning, you put some effort into getting dressed and ready to go. You look presentable in your clothes. You have achieved and you feel good about yourself and ready to put further effort into the next challenge. Achievement therefore involves some level of effort and is associated with a feeling of satisfaction (reward) which contributes to a good mood and a readiness to attempt the next task. Good mood is important for normal functioning. People who are fortunate enough to have a happy disposition tend to have better emotional, psychological and social well-being, which means better physical health and fewer days off work. The cycle of achievement, reward, good mood and further achievement is represented in Figure 1. (Next page)

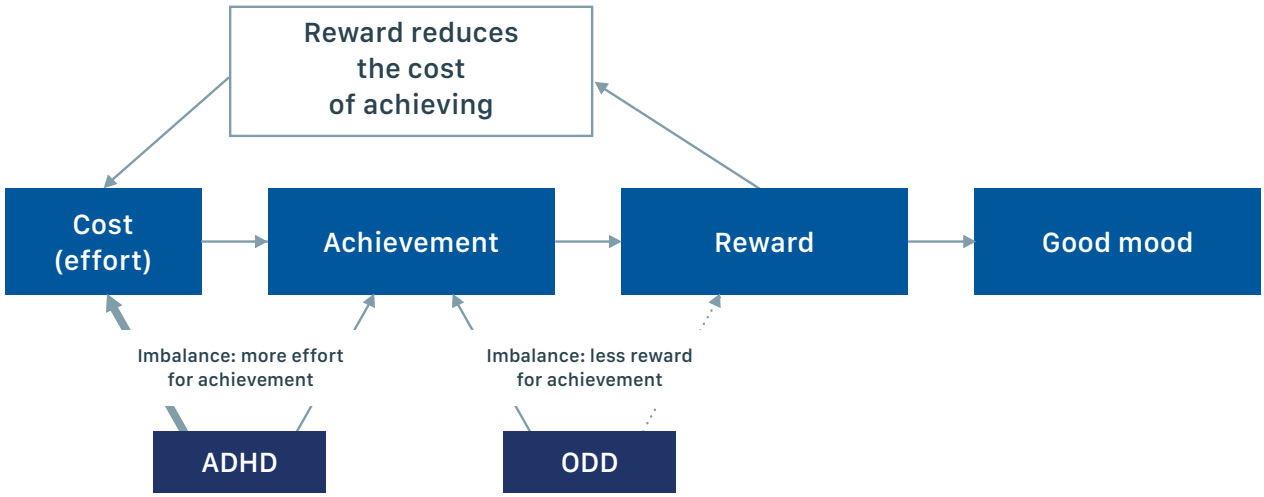
ADHD Explanation 2: Oppositional defiant disorder and MERIM

Figure 1. Achievement and reward sequence



In ADHD the pathway shown in Figure 1 does not work as effectively as it should. There are two places where there can be problems. The first is if the cost or effort of concentrating well enough to achieve is too great, as occurs in ADHD. The second is if a person does not experience enough satisfaction to make the task worthwhile. This is what happens in ODD and explains the lower mood and general dissatisfaction with everyday tasks. If a person has ADHD tasks require more effort due to difficulties with keeping their concentration. If they have ODD as well, they will feel less inclined to make any effort at all, as they do not feel much satisfaction when they get the task finished. Therefore people with a combination of ADHD and ODD find achievement doubly difficult. The lower levels of successful task completion is associated with lower mood. This is shown in Figure 2.

Figure 2: Mental Effort-Reward Imbalances Model (MERIM)



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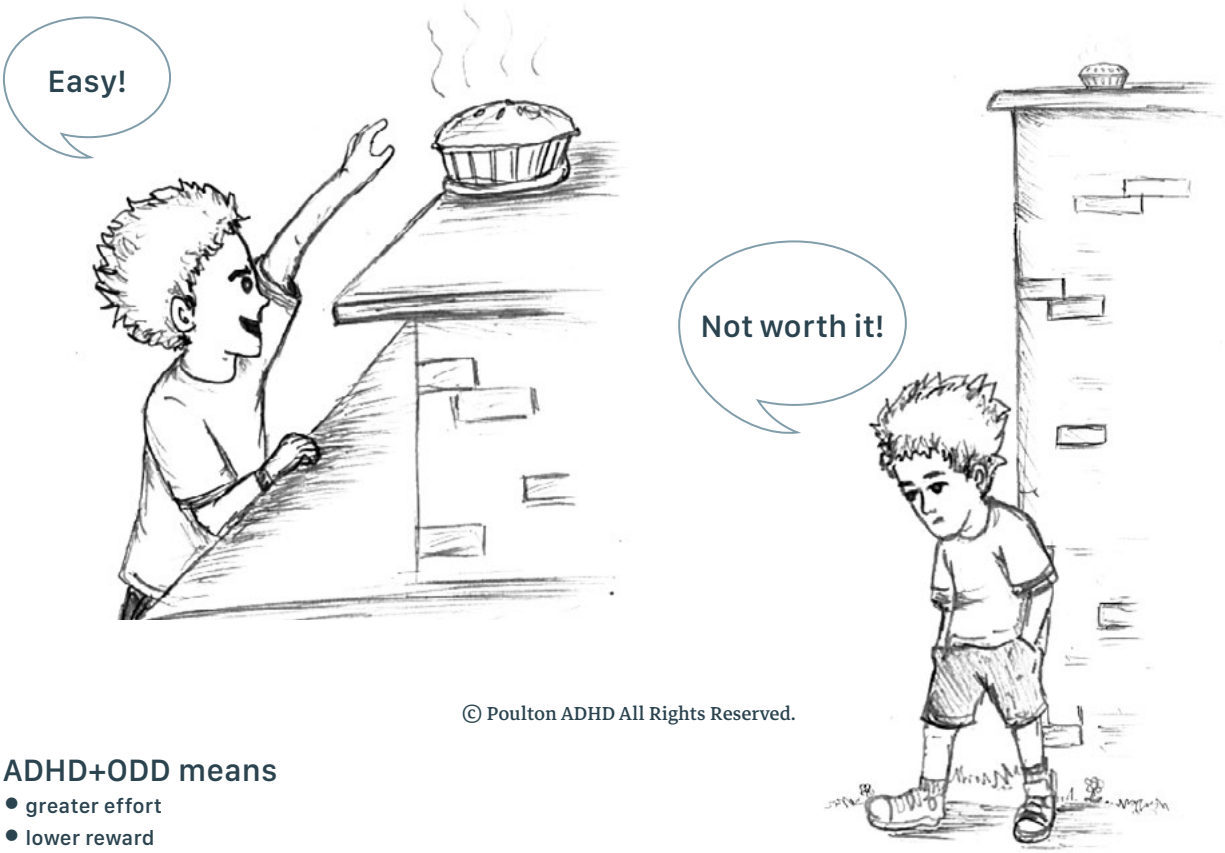
ADHD Explanation 2: Oppositional defiant disorder and MERIM



ADHD+ODD means

- greater effort
- lower reward

Why would inadequate experience of reward lead to symptoms of ODD?

Getting pleasure from the little things in life is important as this helps to maintain a good mood and amicable outlook. However, if the subjective experience of reward is low, a person is likely to feel negative and dissatisfied. This low mood may lead to poor motivation – the feeling that a task is not worth the effort. People who have deficits in their experience of reward may feel miserable and moody – their anger is nearer the surface. They may also compensate by seeking activities that are more highly rewarding or that give reward for less effort. These rewarding activities make them feel happier. In ODD the reward-seeking behaviour is maladaptive.

ADHD Explanation 2: Oppositional defiant disorder and MERIM

When people communicate they have an effect on eachother. In a conversation, you would feel you had communicated successfully if the other person appeared interested. This might make you feel good about yourself. Making a person feel happy is even more rewarding. But it is not always easy to tell a good joke that makes people laugh, or give someone a pleasant surprise that makes them happy. It is often easier to affect someone's emotions by irritating, hurting or upsetting them. This is what happens in ODD.

People with ODD are often argumentative, may deliberately annoy other people and may be spiteful or vindictive. Although these strategies might not appear to be rewarding or enjoyable, it is difficult to imagine a person being deliberately spiteful if this were not pleasurable in some way. A playground bully would not be a bully if he or she did not enjoy bullying.

The big rewards are the social rewards

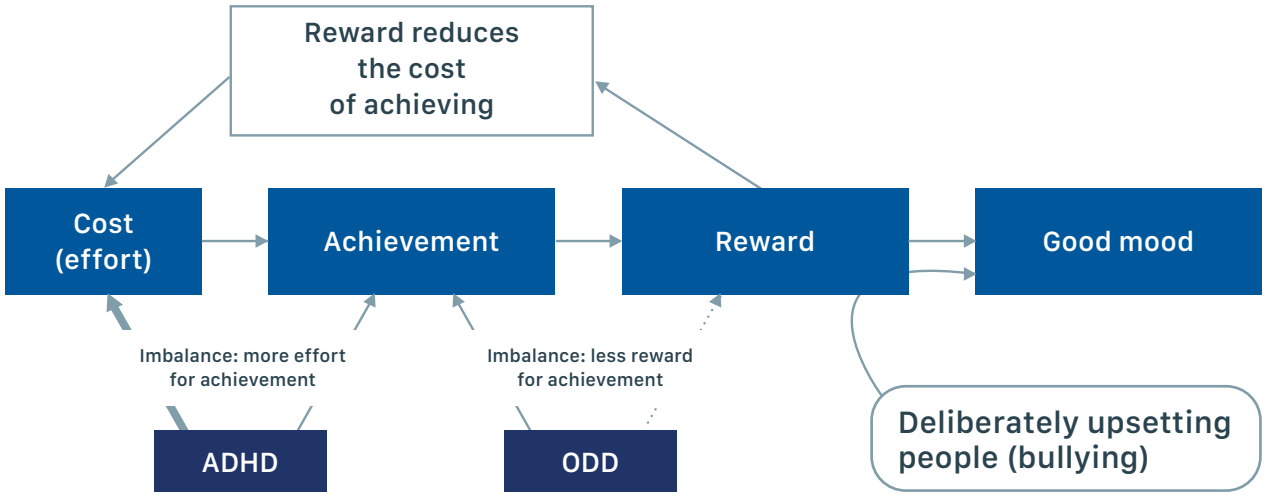
If you make someone happy you feel really good.

But it's often easier and more reliable to make someone angry or unhappy. This is what happens in ODD.

ADHD Explanation 2: Oppositional defiant disorder and MERIM

Eliciting a negative social response by being deliberately difficult may therefore be an effective strategy that compensates for deficits in the subjective experience of reward. The positive impact of bullying on mood is shown in Figure 3.

Figure 3: Oppositional behaviour compensates for lack of reward



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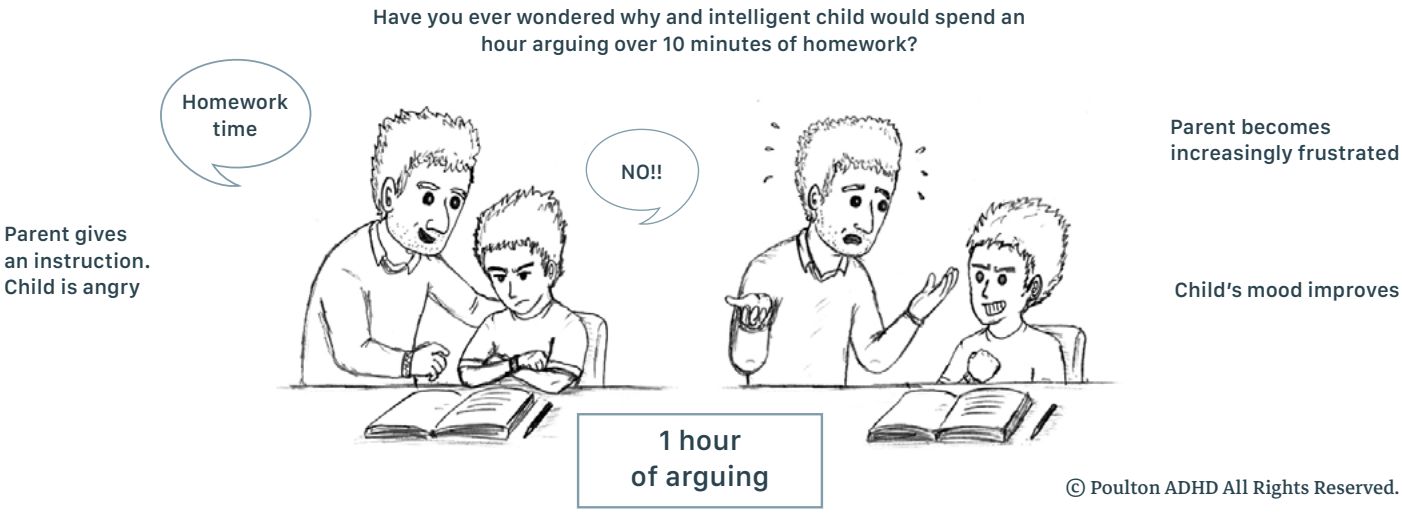
Parents sometimes say that their child with ADHD/ODD will argue that black is white. This implies that arguing may not be a rational debate but rather an end in itself. Sometimes parents may notice that their child starts out in an angry mood but as the argument goes on and the parent becomes increasingly frustrated, the child's mood may improve. Therefore this strategy works for the child, but clearly not for the parent.



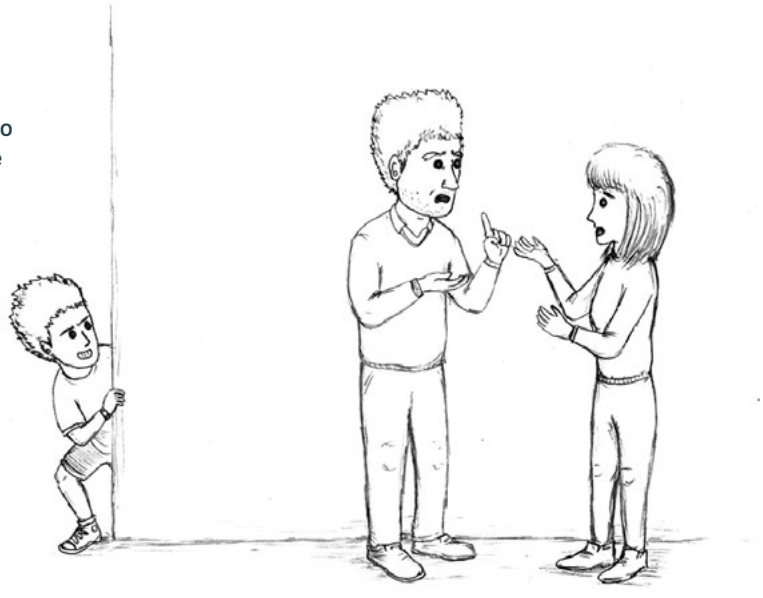
ADHD Explanation 2: Oppositional defiant disorder and MERIM

Winning is also a rewarding experience. People with ODD may be intensely competitive and may not be able to tolerate losing a game or an argument. Therefore the child who argues for an hour until the parent gives up, may gain more satisfaction from winning the argument than from getting out of doing the homework. Teenagers or adults may actively look for opportunities for starting an argument that they think they can win. Alternatively, children may become skilled at annoying or upsetting other family members, or playing one parent off against the other, and then quietly smiling at the resulting chaos. Children with less sophistication may simply resort to unprovoked physical violence when they feel irritable.

Lack of remorse in ODD

Some children with ODD may realise the social consequence and regret their behaviour after an act of spite. For example, a child who is both irritable and impulsive due to their ADHD, may quickly respond with aggression to a push or a shove, without considering that it might have been accidental. However, when spitefulness is planned or deliberate, then the hurt to the victim would be intended and would lead to satisfaction rather than remorse.

This child has gone to some effort to cause chaos and is quietly enjoying the result

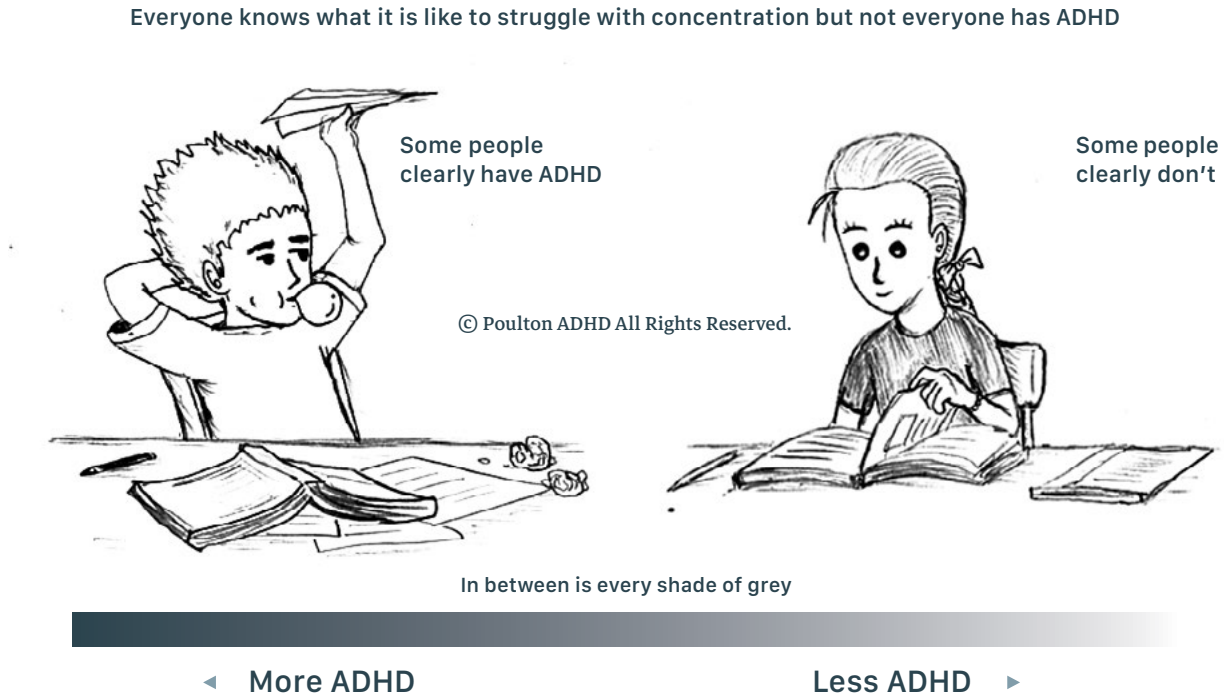


Parents fighting

ADHD Explanation 3: ADHD as a continuum

ADHD as a continuum

The features of ADHD are often said to be continuously distributed throughout the population. This means that while some people clearly do have ADHD and others clearly do not, there are all different shades of grey between the extremes of black and white.

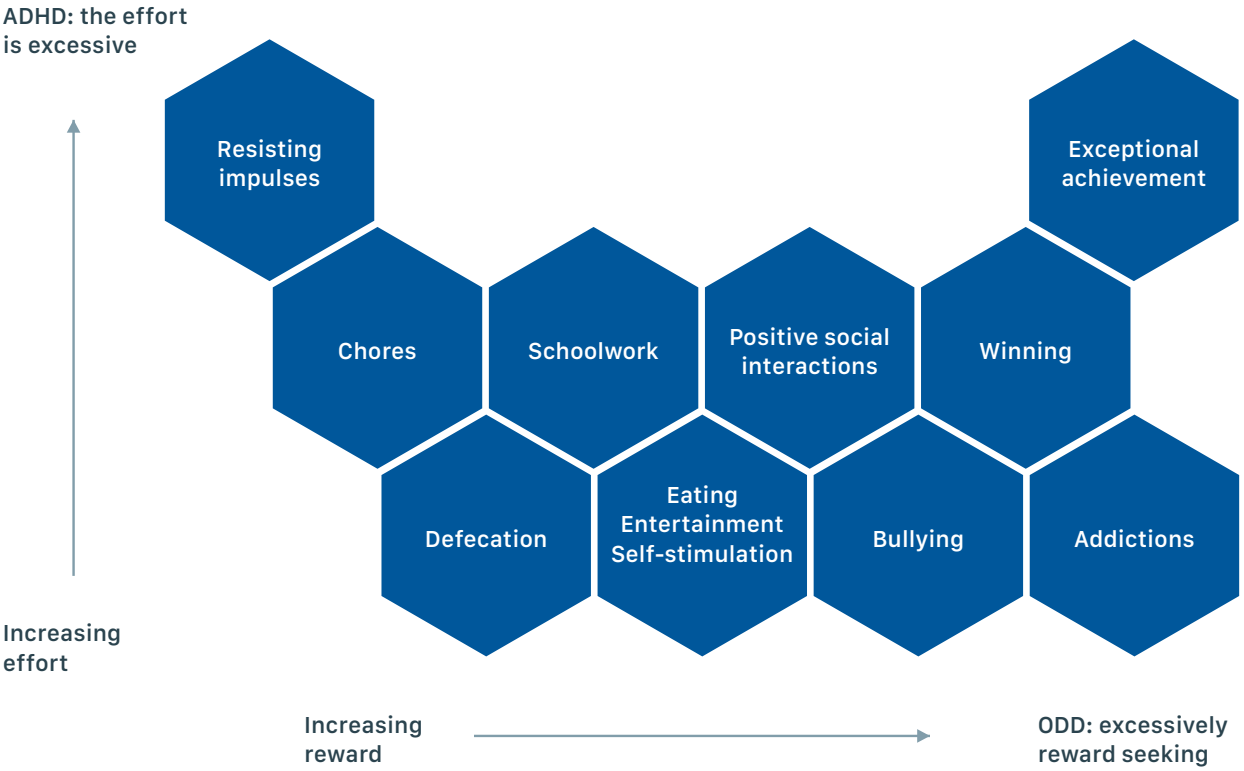


This creates a challenge for diagnosing ADHD, because there is no precise cut-off between those who do and those who do not have ADHD. The same goes for oppositional defiant disorder (ODD). But the positive side of this is that everyone can understand what it feels like to have difficulty concentrating or to find that a task is just too much effort. It also means that having an understanding of ADHD and ODD also helps for understanding people in general. Just as people with ODD may be striving to make their lives feel more rewarding, everyone wants to achieve adequate reward with a manageable level of effort.

Figure 1 (next page) shows a range of activities that vary in the amount of effort they require and the level of reward experienced. People with ADHD find it difficult to put in the mental effort. People with ODD who experience little satisfaction from the everyday activities of life would tend to seek tasks that are high in reward. If someone has both ADHD and ODD, for an activity to be worthwhile the level of reward has to be particularly high for the level of effort. However, if the reward is great enough they may be able to make considerable effort.

ADHD Explanation 3: ADHD as a continuum

Everyone wants adequate reward with manageable effort



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Most people would expect to get most of their reward from their routine everyday tasks, such as their work, talking with their friends and family (positive social interactions), entertainment and bodily functions such as eating. Within the broad categories of chores, schoolwork and social interactions, different activities will vary in their level of interest and difficulty for the individual, with some chores and schoolwork being experienced as more rewarding and less arduous than others.

Some children use competition to increase their motivation, making every activity into a win-lose situation. Such children may be unable to tolerate losing. However, being competitive may be used

ADHD Explanation 3: ADHD as a continuum

adaptively to enhance the reward associated with routine tasks or chores, for example a child trying to break their record for how quickly they can get dressed.

The level of effort required for social interaction is often underestimated. Children generally demand a high level of attention from their friends and even though play and conversation are rewarding, a child with ADHD may find the intensity of the mental effort unsustainable. The child may consequently withdraw to a less demanding pastime, perhaps playing alongside their friend. A child may find relaxation from a low-level, repetitive activity, which can lead to an incorrect diagnostic label of autism spectrum disorder. Alternatively, a child with ADHD may be more comfortable playing with a younger or less intellectually demanding child, or an older child who can make allowances or entertain.

If a person's experience reward is inadequate, they will tend to feel low and dissatisfied, with their anger easily triggered by minor frustrations. They may also be striving for the higher rewards. Some people with reward deficit may be intensely competitive. Those who are intellectually able may strive for exceptional achievement. If they fail, this may lead to hostility towards those who succeed. Alternatively, they may feel better after they find someone to bully, as happens in ODD.

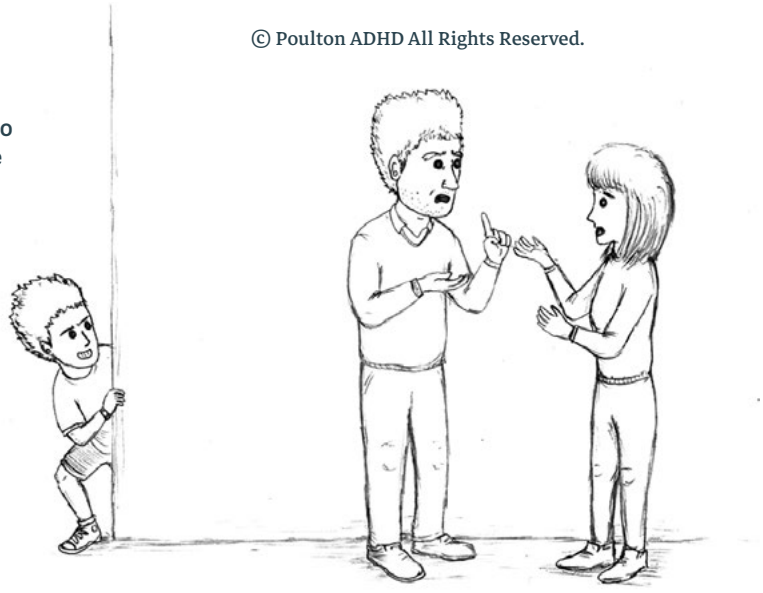
People with ADHD and ODD sometimes find that going to the toilet for defecation is not sufficiently rewarding to be worth the effort, particularly if they also have intellectual disability. Such people may indulge in self-stimulation as this provides reward and is not mentally demanding. Eating is also easy and rewarding, which may explain the recognised association of ODD with obesity. People with ODD are particularly susceptible to addictions to substances such as nicotine or illicit drugs. Conversely, resisting impulses requires substantial effort and is not particularly rewarding. An aggressive and irritable child may therefore have no inclination to resist the impulse to hit a sibling.

ADHD Explanation 3: ADHD as a continuum

With the exception of addiction, the higher rewards depend for their value on social recognition, or an emotional response from one or more other people. Exceptional achievement has more emotional value when it is recognised by other people. However, high achievement generally requires effort and ability. Negative behaviour such as bullying may be easier for those who are less able. Rewards associated with low levels of effort and achievement may be associated with low self-esteem. This could negate some of the reward experienced from activities such as bullying. Attributing blame to the victim may reduce the negative effect on the bully's self-esteem.

- Most people get most of their reward from positive social interactions, task completion, entertainment and positive bodily functions.
- For people with reward deficiency/ODD, greater rewards are needed to rectify their low mood. The strategies they use for compensating will depend on other personal attributes – for example exceptional achievement is only possible for those with ability.
- Gaining an emotional response from other people is highly rewarding, but negative responses (from bullying) may be easier to organise than positive responses.
- People with severe ADHD/ODD and low ability may find the effort of going to the toilet for defecation is not worthwhile – ADHD has a recognised association with soiling.
- A person's mood is a measure of the success of their strategies – a child with ODD may appear happy or satisfied after generating emotional chaos

This child has gone to some effort to cause chaos and is quietly enjoying the result



Parents fighting

ADHD Explanation 4: Behaviour strategies for ADHD

Behaviour strategies for ADHD

Management of ADHD may involve medication, non-medical treatment or a combination of both. Medications used in ADHD are in Explanation 5 – this Explanation (Explanation 4) only deals with non-medical treatment.

Behaviour strategies for ADHD usually focus on the areas of functioning where the child is having the most problems. This may involve additional learning support or other assistance related to the executive functioning deficits (less efficient thought processes), such as help with organisation. However, the main emphasis is usually on behaviour management strategies. The conventional behavioural strategies are not specific for children with ADHD but can be thought of as more and better good parenting and more and better good classroom management. This means that the same strategies may be useful for the whole family or even the whole class or school. Some of the strategies can also be helpful for interactions between adults or couples. At an individual level, emotional self-regulation may be valuable as a means of promoting and maintaining a positive mood and co-operative outlook. It may also involve managing anger and frustration.

Helping a child to achieve despite inefficient mental processes

Additional learning support

A child with ADHD is likely to have more difficulty concentrating in class than other children. A child whose brain 'switches off' at intervals, or who only attends to the first part of the lesson, is likely to be missing out. The effort required for concentrating may be greater, making schoolwork more laborious so that the child is inclined to give up (see Explanation 1).

Reading is one of the most important skills that a child has to learn at primary school. Reading is a complex activity which and involves several different components. The child first has to recognise the letters and relate them to their sounds. The letter sounds are then blended together to make the words. Although the words are read individually, their meaning depends on the other words in the sentence. The sentences have to be understood and their meaning remembered long enough to make sense of the passage. The main reward of the task is in the interest from the information contained in the passage. The early stages of learning to read can be slow and laborious and the reward from the information may be lost unless the sentences are very simple. With practice the child starts to recognise common words without having to sound out each one individually and reading becomes easier and more fluent. This allows more attention to be focussed on the meaning. The information is received at a faster rate and the balance of effort to reward improves. As reading becomes more rewarding, the child may start to read books for pleasure and thereby further practice and develop their skills.

Children vary in their strengths and weaknesses.

ADHD Explanation 4: Behaviour strategies for ADHD

Some children pick up their reading skills easily. Others find reading more difficult. ADHD tends to cause more problems for a child in learning skills that he or she finds more difficult. A child who naturally finds reading difficult will have to concentrate longer and harder than other children in order to make progress. Therefore minor degrees of ADHD become more significant in children with learning difficulties or intellectual disability.

When reading, a child with ADHD may have difficulty attending to the meaning of a sentence while concentrating on deciphering the individual words. This is likely to reduce the level interest for the child. At this stage, additional one to one teaching may help the child develop fluency for reading. As reading is a necessary part of almost every area of schooling, good skills that enable a child to read without putting all their attention and effort into sounding out the words will be highly beneficial.

Modifying the tasks and expectations

A child with ADHD is likely to need a higher level of parent or teacher attention. The tasks may also need to be modified to make them achievable for a child with a limited attention span. This may include keeping tasks short and varied and moving on to a new topic before the child gets bored. Instructions need to be easily understood and repeated if necessary, perhaps with a written task list. A child with ADHD may need to be reminded to remain on task. Breaks may be factored in, such as sending the child out on an errand.

Teaching organisational strategies

Organisational skills can also be taught. These can include strategies to keep track of homework, including structuring the tasks, using checklists and long-term planning of tasks with their completion dates.

Increasing motivation by making tasks more rewarding

Behaviour management strategies are designed to make positive behaviour more rewarding and negative behaviour less rewarding for the child. These strategies usually involve a combination of rewards for good behaviour and negative consequences for behaviour that is being discouraged. For such strategies to be effective the child has to be able to consider the consequences of their behaviour when making a decision. The behaviour strategies have to be carefully thought out according to the points listed below, with achievable goals and meaningful rewards and consequences.

1. The child must be capable of carrying out the required behaviour.

The chosen goals should be realistic. Targeting small, manageable tasks is often the more effective approach because if the goals are too difficult the child is likely to give up. In children with a lot of problem behaviour, the goals should be prioritised. For example, if a child regularly refuses to do any homework, rewarding the child for concentrating for 5 minutes and writing a single sentence and gradually working up to

ADHD Explanation 4: Behaviour strategies for ADHD

completing their entire half hour of homework may be more successful than choosing homework completion as the initial goal.

2. The child must understand the rewards and consequences and be able to relate these to their behaviour.

The child needs to understand that there will be consequences for their behaviour and to make an emotional connection with the consequences. Children with ADHD often appear to live for the present and not care about the future. The child might be well aware of the rules but at the moment of making a decision, the punishment may appear to have no meaning for the child. Afterwards the child may show no interest in the reason for their punishment, experiencing it only as a frustration. This tendency to care only about the present can make behaviour management difficult in ADHD.

3. The rewards and consequences need to be meaningful and appropriate.

Rewards and consequences should be chosen carefully. A child might be rewarded with time to play on a computer; a meaningful punishment might be taking away the child's favourite toy or game. Rewards and punishments that are small and repeatable are often more effective than larger ones. For example if a parent is very angry with a child, there may be a temptation to extend the duration of the punishment, perhaps taking away the favourite toy or game for a week. Returning the item may be made dependent on unrealistically good behaviour for the week. To a child with ADHD a week may be such a long time that they consider the item lost forever. Furthermore, if the child misbehaves again during that week, the parent has already used their most valuable option for punishment. A better alternative may be to make the punishment milder. For example, if the child can earn the game back by being good for only five or ten minutes, the same punishment can be repeated again as often as necessary.

4. The strategies should be applied consistently.

Effective behaviour management requires consistent effort from the parent or teacher. If there is any leeway a child may become skilful in picking the time when they can get away with breaking a rule.

5. The child must choose to co-operate.

Co-operation is likely to depend on the child's own assessment of the balance of effort to reward (see Explanation 2, pages 9-11). If the child's ADHD means that the task requires a super-human level of effort, the child may try to insist on a reward that appears similarly outrageously high. Behaviour management strategies often involve consistent, small rewards, such as adding a sticker to a chart for every task completed. Such strategies often work better for children who do not have ADHD. A child with ADHD may discover within the first few days that the

ADHD Explanation 4: Behaviour strategies for ADHD

stickers are not worth the effort. At that stage, in order for the behaviour management to continue to be effective, a higher reward may be negotiated. This cycle may continue until the child will not even consider doing any homework unless rewarded with a very substantial sum of money. Alternatively the child may perceive that he or she will experience greater satisfaction through non-co-operation. Figure 1 of Explanation 3 (page 16) categorises bullying – behaviour designed to upset of hurt another person – as being one of the more highly rewarding activities for people with oppositional tendencies. If the child perceives that the parent or teacher is emotionally committed and genuinely wants to see the child carry out the task, this may provide an opportunity for bullying. This might take the form of deliberate and blatant non-co-operation. For example a child may deliberately destroy their work, perhaps by scribbling on the page. Observing the resultant surprise, anger or frustration may be immensely satisfying for the child. Another very common strategy for non-co-operation is arguing. This may be a delaying tactic and a parent may be baffled that their child may spend twenty minutes and considerable effort arguing over ten minutes of homework, which ultimately still has to be done. To the child arguing may serve several purposes. Firstly, time spent arguing may be considered time well-spent because the homework is not actually being done. Secondly the child may be negotiating a better deal, such as a higher reward or a reward for the task. Winning such a concession would also be rewarding in itself. Thirdly the child may be bullying the parent, enjoying the effect of the argument on their parent's emotions, for example observing an increasing level of frustration or anger.

It is important for adults to understand the value that a child may place on observing an emotional response. Withdrawing attention from a child who has misbehaved is often effective, but is even more important if the parent is becoming upset or angry. Being separated from the child in a different room gives the parent an opportunity to calm down while out of sight.

Emotional self-regulation for improving the mood

Conventional behaviour management has the drawbacks that because the rewards and consequences are external and often tied to particular tasks and situations, they may not carry over to other tasks and settings. Conventional behavioural strategies often use emotional rewards, with the parent or teacher praising the child and showing delight if the child has achieved or put considerable effort into the task. The child may respond by trying harder in order to gain the satisfaction of making another person happy. Therefore a child will work better for a teacher who cares and may work less well following a change of teacher. However, the long-term aim of behaviour management is that the favourable behaviour becomes increasingly established as the child matures, so that the rewards may be provided internally by the sense of satisfaction generated.

ADHD Explanation 4: Behaviour strategies for ADHD

People with ADHD may have their baseline mood set at a lower level than normal, making them feel somewhat irritable for much of the time (see Explanation 2: Mental Effort-Reward Imbalances Model (MERIM)). Therefore it would make sense to develop strategies for improving the mood. This means that strategies would not simply focus on task completion, but would also aim for satisfaction. Therefore, for example, if a child completes homework with the sole aim of gaining a reward or bribe, this might be considered an acceptable outcome as the work is done. However, if the attitude towards the work is poor, it is likely that the child will complete it to the lowest acceptable standard. Therefore an important additional aim would be to teach the child to value their work and gain the internal reward of the satisfaction of a job done well. In other words, the positive aspects of the task would be emphasised. If an achievement is valued and leads to a feeling of satisfaction, this will help to promote a happier mood and a readiness to take on the next challenge to achieve.

Unlike conventional behaviour management which relies on external rewards, emotional self-regulation aiming to promote positive emotions has a theoretical advantage that its techniques may directly address the underlying reward deficit. Furthermore it can be applied to all aspects of daily life. Once taught and adopted, individuals can evaluate and provide their own reinforcement for their positive behaviour, leading to a better mood and self-esteem.

Positive rumination

Rumination involves repetitive thoughts that can influence an individual's emotional state. Rumination is conventionally considered to be negative as the repetitive thoughts are distressing and can lead to a range of mental health problems mental including depression and anxiety. However, positive rumination involving spending time reflecting on a positive achievement could increase the level of enjoyment or satisfaction obtained. Positive rumination is a strategy that may help happy people to sustain their positive mood and amicable outlook. However, as it is a cognitive process that would involve some mental effort, it may come less easily to individuals with ADHD. For positive rumination to be practiced effectively, a person needs to be able to recognise their emotions. This may also be a problem in ADHD. Therefore positive rumination may need to be specifically taught and practised in order for a person with ADHD to be able to use it effectively and understand and recognise its value.

An example of positive rumination would be for a person to spend a bit of time admiring the good points about a piece of work that they have done and then reflecting on the sense of satisfaction that this generates. Initially the positive attributes may be pointed out by the parent or teacher but ultimately the individual would be encouraged to identify for themselves the value in their work. Times of positive reflection may also be built into the daily routine, for example at bedtime thinking of the positive and enjoyable experiences and achievements of the day. These might include being helpful, playing, learning

ADHD Explanation 4: Behaviour strategies for ADHD

or doing sport or exercise. In positive rumination the individual needs to pause and reflect and have awareness of their mood, together with mood changes following on from their positive reflection.

Positive re-appraisal

Positive re-appraisal involves redefining an adverse event in terms of any possible positive aspects. For example, when a child is in trouble, if his or her mood and self-esteem can be preserved, the child may be less tempted to resort to bullying in order to feel better. This might be by the teacher expressing confidence in the child being able to do better in future. Initially the parent or teacher would need to assist the child, perhaps with a response such as: 'Although you lost your temper, you only hit him once, you calmed down quickly and you've learned that you should avoid him in future'. With time the child may learn to practise positive reappraisal by actively looking to benefit from experience.

Anger management

Anger is often a significant problem for people with ADHD and ODD (see Explanation 2, pages 9-11). Anger may consist of a low or irritable baseline mood, or it may involve acute episodes of rage. Anger makes it far more difficult for a person to behave rationally. It is as if the anger takes over the decision-making process so that the brain cannot function properly.

During a rage attack a person may lose all control, perhaps afterwards having cause to deeply regret their actions, particularly if they have injured someone. If this loss of control is to be avoided, the person needs to recognise that they are getting angry so that they can move away to a safe place to calm down. Being aware of feeling hot and having a pounding heart may help with anger recognition. Calming strategies may include concentrating on controlled breathing, taking deep breaths with self-instructions such as 'calm down' or 'relax' while breathing out. Imagining reducing the body temperature and heartbeat may also help. Sometimes releasing the energy in a harmless way may help, such as going for a run or screaming and hitting a punching bag.

Some people with ODD may have a low baseline mood and may easily be triggered to anger. If this is associated with impulsiveness, the potential for conflict may be substantial. Such a person may misinterpret other people's actions as hostile and therefore easily become angry if another person's motive is unclear. An example might be impulsively retaliating with violence to an accidental push or shove. If questioned afterwards he or she may try to justify the aggression by blaming the other person. As people mature they often realise that they make better choices if they delay making any impulsive response while they are feeling angry. Therapy may emphasise thinking of non-personal reasons to explain another's behaviour instead of taking offense (for example: 'she must have been having a bad day').

Emotional self-regulation with the dual aims of promoting a good mood and also recognising the signs of anger so that loss of control can be prevented, appears logical and sensible. If strategies can be used effectively by people with ADHD, they could lead to improvements in mood, functioning and self-esteem which would not be linked to specific tasks and situations.

ADHD Explanation 5: Medications used in ADHD

- The aim of treatment is efficient functioning and achieving goals in life
- It is most important to find the dose of medications that works best
- As children grow they may need a dose increase
- The medication is continued for as long as necessary
- Rating scales are useful for documenting how effectively the medication is working.

ADHD Explanation 5: Medications used in ADHD

The aim of treatment: achieving and being able to function

The aim of treatment in ADHD is to enable a person to function efficiently and achieve the goals that are realistic for their level of ability. Children who have significant difficulties in coping with life due to ADHD and oppositional defiant disorder (ODD) are sometimes recognisable as those who do not respond to good, consistent management strategies. These strategies may work much better for the non-ADHD siblings or peers. Behaviour management can be very successful, but sometimes there are still problems associated with the underlying ADHD.

• For a person to learn and remember, they have to be able to attend.
• Control of behaviour may not be readily achievable without control of emotions.

If attention is inconsistent a person with ADHD may have difficulty learning, remembering and organising their tasks, and thinking sufficiently well to make rational choices. They would still experience mental fatigue with tasks that require sustained concentration. The tendency to act quickly and impulsively without the opportunity for adequate decision-making can greatly reduce the efficacy of behavioural management strategies.
Similarly, although a person may become better at understanding their emotions and managing their anger, the effort required may generate stress. In adults even the occasional episode of anger getting out of control can have a devasting effect at home or in the workplace. Furthermore, the low mood that is associated with reward deficit will tend to lead to a negative, unco-operative attitude.
People with ADHD often get better at managing their lives as they mature and develop strategies that work and help them to function. These may include routines, lists and reminders. However, the particular difficulties with efficiency remain. Therefore a person may need additional help from medication to get them functioning at an adequate level of efficiency. Medication is continued for as long as necessary.

Stimulants improve the symptoms of ADHD and oppositional defiant disorder (ODD)

The medications used most frequently in ADHD are the stimulants. They enhance the levels of neurotransmitters, which are the chemicals that enable the different cells in the brain to communicate. This generally results in improvements in the efficiency of the 'thinking' brain. Stimulants also

ADHD Explanation 5: Medications used in ADHD

improve the mood and behaviour, which may be an effect of enhancing the activity of the dopamine reward pathway.

The beneficial effect of stimulants in ADHD was first recognised in the 1930s. Since then numerous trials comparing them with placebo (inactive tablets) have confirmed that the stimulants are effective for treating ADHD. In fact the stimulants are almost certainly the most studied and the most effective drugs used in psychiatry. They work in preschoolers, school aged children, adolescents and adults, reducing the level of hyperactivity and improving the ability for sustained attention. They also suppress the appetite. Although usually combined with behavioural interventions, the stimulants often have a more immediate and more obvious effect than behaviour therapy.

Practical considerations with using the stimulants

Side effects

The most significant side effect of using stimulant medication for treating ADHD in children is usually the effect on appetite and weight. It is as if the stimulant resets the appetite at a lower level. This is a bit like turning down the thermostat when heating a room. The heater goes off and the room cools down until it reaches the temperature where the heater starts up again. Therefore the child loses weight initially, but after some weeks the appetite picks up and the child starts gaining weight and then gains weight normally. After a year of treatment the weight is usually approximately the same as it was at the time that medication was started. In effect this means that there is no net weight gain for a year. Because weight gain is important growth in height, children also grow more slowly. This generally amounts to about 1cm less growth per year for the first three years. After that the growth rate normalises, but there is some evidence that puberty may progress more slowly, with a later growth spurt. Appetite suppression appears to correlate closely with the therapeutic effect. This means that a dose that does not cause any weight loss is likely to be too low to be effective.

Stimulant medication also increases the heart rate and blood pressure and can cause insomnia, irritability and feelings of sadness. The sadness usually improves over the first 2-3 weeks although some people continue to feel lower in their mood while on stimulants.

Stimulants have been associated with tics (habit spasms, such as twitches of the face or eyes, or repeated throat clearing). However, tics are common in school aged children, particularly children with ADHD. Tics tend to come and go, getting worse for a few months and then improving. They

ADHD Explanation 5: Medications used in ADHD

may therefore coincide with starting stimulant medication. Sometimes medication may be ceased, to find out whether this makes the tic resolve. With any side effects, whether documented weight loss or the possibility of tics being caused or worsened by medication, the pragmatic approach is to weigh up the benefits against the possible or likely disadvantages. Treating ADHD with medication is a process of constant reassessment, always looking at the advantages and disadvantages of treating versus not treating. If the benefits of medication in reducing the effect of ADHD on a child's life are sufficiently substantial, some side effects may be tolerated, keeping in mind that no medication is perfect.

Using short acting medications

The stimulant medications dexamphetamine and methylphenidate are short acting, with an effect that lasts around 3-4 hours. (Methylphenidate is the stimulant used in Ritalin and Concerta). In children who have significant hyperactivity or oppositional symptoms the effect is usually obvious within 30 minutes. In children who only have inattention the effect may be more subtle. As the effect wears off there may be rebound, as if the behaviour that is held in check by the medication is released as the medication wears off, leading to irritability and worsening of symptoms.

The beneficial effect may be prolonged by using capsules that release the medication slowly over several hours. Formulations of methylphenidate include short acting Ritalin tablets (duration 3-4 hours) and the longer acting Ritalin LA (6-8 hours) and Concerta (8-10 hours). Dexamphetamine is also available as lisdexamfetamine (Vyvanse), in which the dexamphetamine has been inactivated by combining it with a protein molecule. It is reactivated in the body but this process means that it is retained longer, usually lasting 8-12 hours; it is therefore only taken once daily. Slow release capsules also wear off more slowly, which may reduce the rebound effect. Because the stimulants can cause difficulty with settling off to sleep at night, medication is often targeted to be effective earlier in the day while the child is at school, wearing off into the evening. This also allows the appetite to recover so that the child eats more, making up for the reduced appetite through the day.

Using a short acting medication can be inconvenient because it is regularly wearing off. It also means that the child wakes up unmedicated until the first dose of the day takes effect. However, there are also advantages. Firstly there is always the opportunity to compare the child's functioning on and off medication. This is important because children change as they mature. They usually become better at understanding and controlling their behaviour, so they may not need to be so consistently medicated, perhaps only taking medication for school and for tasks that require more intense and sustained concentration. It is also useful for teenagers to become increasingly responsible in making decisions about when they do and do not need to take medication.

ADHD Explanation 5: Medications used in ADHD

Choosing the right stimulant and establishing the dose

The stimulants dexamphetamine and methylphenidate are similar in their beneficial effects and their side effects. Most people with ADHD will have a good response to both medications but some people definitely do better on one or the other. One of the most important aspect of these medications is to find the dose that works best for the individual. This is usually done by starting at a low dose and gradually increasing the dose while observing the changes in functioning. Behavioural rating scales may assist with comparing effects of different doses of medication. Careful dose titration while monitoring the changes concentration and behaviour on medication and adjusting the dose to target those symptoms that are the most troublesome can be very effective.

As the dose is gradually increased, there is usually progressively more improvement in functioning until a level is reached where further increases do not lead to any further improvement. This is the optimal dose. If the optimal dose is exceeded the behaviour may worsen: some people become more angry; others become withdrawn and depressed.

As children grow the stimulant may become less effective, so that they need a dose increase. The behaviour may take longer to settle and the effect wear off sooner. Sometimes the stimulant appears to lose its effect completely - this can happen quite suddenly. There may also be an obvious increase in the appetite and a corresponding weight gain.

Rating scales that score various aspects of behaviour can be very useful for documenting how effective the medication is for controlling the symptoms of ADHD and ODD. It is important that the rating scale includes items relating to concentration and to mood and behaviour. Rating scales can be used to guide dose titration and for ongoing monitoring of the effectiveness of the medication.

Abuse potential

One ongoing concern about using the stimulants is the risk of abuse and diversion. Although chemically similar to cocaine and methamphetamine, the stimulants used in ADHD are far less addictive. This is because they take longer to enter the brain and bind with the dopamine receptors, which makes them less euphoric. This means that people who abuse stimulants are more likely to use them as cognitive enhancers, so that they can work or study for longer. It is reassuring that even though they have been used in ADHD for more than half a century, there is still very little evidence that people treated for ADHD are at risk of becoming addicted to their stimulant.

ADHD Explanation 5: Medications used in ADHD

Other medications used in ADHD

Atomoxetine

Atomoxetine (Strattera) has been developed for treating ADHD. It is not a stimulant and therefore lacks the abuse potential of the stimulants. It is also longer acting than the stimulants, giving a more consistent effect over the course of the day. Because of the longer time that it stays in the body, it is given as a low dose and may take several weeks to build up to give an adequate effect. Although studies have shown that the majority of people with ADHD respond to atomoxetine, the response is more variable than the stimulants. Atomoxetine has been shown to be beneficial for people with ADHD and anxiety.

Clonidine

Clonidine (Catapres) is a medication that can be helpful in ADHD. It can improve the symptoms of ADHD but is usually less effective than the stimulants and may need to be given more frequently to give a consistent effect. Sometimes it is used to prolong the effect of a stimulant or to balance out the side effects, as it causes sleepiness and may increase the appetite. It can also be helpful for anger and aggression. It was developed to treat high blood pressure and it drops the blood pressure and heart rate, which can be a problem in overdose.

Guanfacine

Guanfacine (Intuniv) is similar to clonidine but is longer lasting, requiring only once daily dosing. It is therefore more convenient and also more effective than clonidine.

Risperidone and antipsychotics

Risperidone was developed for treating schizophrenia, but is very useful for treating anger from any cause. Therefore people with ADHD and ODD who experience significant problems with anger despite an adequate dose of stimulant may also be given risperidone or other atypical antipsychotics. Although antipsychotic medication is usually highly effective for reducing the level of anger, these medications have troublesome side effects. The most significant side effect is that hunger is increased and this can lead to obesity or worsen existing obesity. They can also cause increased muscle tone (muscle stiffness) and abnormal, repetitive movements (tardive dyskinesia). They also cause drowsiness, which may be an advantage later in the evening. These are less likely with the newer atypical antipsychotics.