Handout for carers and adoptive parents

Understanding behaviour:

A child's perspective

- Even when I try to be good, she doesn't think I am.
- Why does it always happen to me? I don't mean it to go wrong. I want a new mummy – a nicer one.
- It's more exciting to be naughty – it's too hard being good all the time.
- If she can say NO to me, I don't have to do what she wants.
- If Daddy shouts at Mummy, why can't I?
- Nobody loves me. They would rather I wasn't born – it's not my fault.
- I'll get my own back for them being so horrible to me.
- Ever since that baby came, no one thinks I'm the best anymore.
- I can look after myself. I don't need Mummy and Daddy.
- Mum loves her more than me.
- Why should I have to say sorry? They started it.
- I want to go to bed please, Mummy, but I'm frightened of the monsters.
- He'll give in in a minute if I keep on screaming.
- I don't want to be naughty, but nobody notices when I'm good.
- Why can't I do this today? Daddy let me yesterday.
- She doesn't stop to listen and understand why I'm doing this.

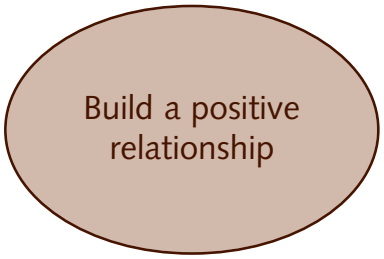
A parent's perspective

- What am I doing wrong? It must be my fault.
- He's so naughty; he keeps throwing the toy out of the pushchair when I'm shopping.
- She screams when I'm on the phone.
- When we are out, other people stare when he has a tantrum. It's so embarrassing.
- Her sister was an easy baby, but she's SUCH hard work!
- I'm so exhausted. I could really do without this right now.
- He's doing it to wind me up.
- I know he's only little, but I just need him to get on with it so I can get on with all these jobs.
- Everyone else is managing. Why do I feel like I'm losing the plot!
- I'm a Dad. I'm meant to be in control. This is just humiliating.
- The house is a mess. I'm a mess. I can't get her to do anything. I feel so out of control!
- Why does it have to take so long for us to leave the house?
- I hate having to repeat myself and then I end up shouting. If only they'd listened the first time. They drive me crazy.
- Sometimes, it's just easier to give her my phone for some peace and quiet.

Handout for carers and adoptive parents

Preventing and managing challenging behaviour

How to help a child develop emotionally and behave well



Building a positive relationship with a child is the best way to help the child develop positive emotional wellbeing. As a carer or adoptive parent you have a central part in helping the child learn how to tolerate frustration, learn to calm down, know how to behave acceptably in society and relate to others in a healthy way.

Showing the child that you are listening to them and that you understand that they are trying to communicate with you is an important part of developing a two-way relationship. You may not always know immediately what they are attempting to tell you but they will feel more secure knowing that you are open to hearing about their feelings.

There may be times when both you and the child might find feelings overwhelming. It is at these times that logical clear thought seems to be most difficult. Finding support for yourself is an extremely important part of your emotional wellbeing. In taking care of your emotions you may feel better able to help a child with his. Regaining a sense of calm may make what you thought was an unmanageable situation seem less difficult.

Carers have often commented that at difficult times it is hard to look past a child's behaviour and think about how the child is feeling. Finding ways to stay calm can not only support you but also help you to look past the behaviour and see the message the child may be giving and why they behaved in that particular way.

Accept angry and frustrated feelings and offer calm or comforting words and actions

Helping a child to calm down so that they will eventually learn what it feels like to calm themselves is an important skill for life. For example staying close to the child and offering words of comfort and an affectionate gentle hug to let them know you are there for them and helping them to cope with their anger and frustration. As children get older, being able to tolerate frustration and cope with strong emotions may positively affect the way they behave towards other people.

Children respond far more positively towards loving, predictable, behaviour and clear boundaries. Avoiding threats and harsh punishment, smacking and excessive shouting will help both you and the child develop a more respectful and positive relationship. Giving children a way of saving face and an opportunity to change their behaviour is important in helping them to learn that relationships are about how both people feel.

Give a child a way to back down without losing face

Lay foundations by praising positive behaviour

Choosing behaviour techniques such as positive praise and encouragement, distraction, time out to calm down, or rewarding good behaviour instead of focusing on difficult behaviour, will help lay the foundations for later negotiations on acceptable limits to behaviour.

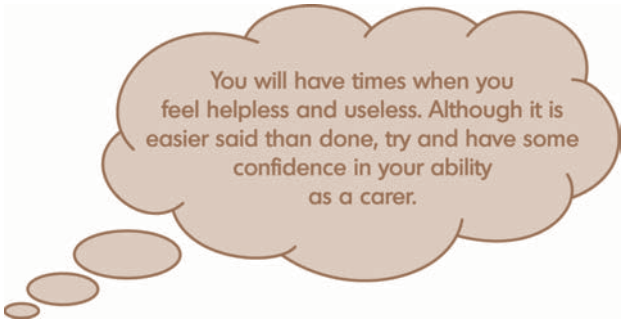
Boundaries and rules are often an important part of family life. They can offer a sense of security and predictability for the child. Boundaries that are most effective are those that are appropriate to the child's age.

Rules and routines help children feel safe…

But be flexible where necessary

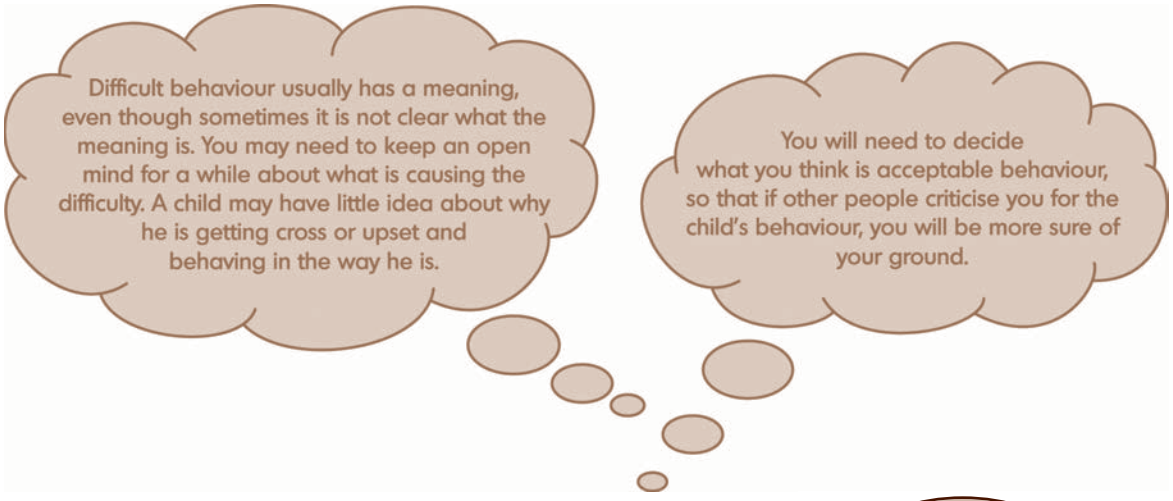
While it is good to be consistent in putting agreed rules and boundaries into place, it is also helpful for a degree of flexibility. There may be occasions when it is appropriate not to stick rigidly to the rule such as when the child is ill.

If boundaries are changed for other reasons it is best to avoiding making decisions at the height of an argument or in anger. The message about new rules may be lost as one or both of you struggle to keep control of your emotions.



Do not make unrealistic rules. Make a few rules and stick to them

As the child grows and develops there will be decisions to be made about changes in boundaries. Talking to the child about why new boundaries are planned will help them co-operate more readily.



Sharing time with the child to help develop a positive relationship is important. Within a family children may have different individual needs. This may include giving different age-appropriate bedtimes.

Share one-to-one time with the child

Think about the things that shape you as a carer

It may be useful to spend sometime thinking about the way you want to care for the child. You may choose to discuss this with your partner and family members. Each carer's experience of being cared for as a child may be different and can raise difficult issues for some couples who may feel they want to care for the children in their care differently. Children can feel confused by receiving different messages from adults in their lives, so it might be really useful to think about how you would like to be as a carer.

Handout for carers and adoptive parents

Preventing and managing challenging behaviour

Before, during and after

Trying to understand a child's difficult behaviour

Why is the child behaving like that? Sometimes it is very hard to understand why a child is suddenly having a temper tantrum. Why is she trying to break things or hurt another child for apparently no reason? Some of the things children do seem to have no relation to what is going on around them. You may be exhausted or feel helpless trying to cope with the child's behaviour.

This leaflet explains one way of trying to understand a child's behaviour. What children do has a meaning behind it, even if it's difficult to see. It is very rare for a temper tantrum to come out of the blue. This approach can help you gather up the clues to what is happening and why it is happening. In turn, this can help you with the situation. You may be able to see a different way of doing things or it may show you that the child is struggling to come to terms with something that you may be able to help her with. This approach looks at what happens before, during and after the tantrum or behaviour.

When the child does 'it' again, take a few moments to think about what happened. Looking at a situation in this way, what happened before, during and after can help in several ways. The 'Before' section can show you what is setting the situation off. This may give you ideas about what to do differently. The 'During' section tells you a bit more about what is happening, which again can give you ideas about what to do differently. The 'After' section shows you if the behaviour of the child is rewarded in any way. This will make it more likely that the behaviour will happen again. For example, if the child knows that if he makes enough fuss at bedtime you will let him stay up longer, this will make it more likely that next time he will complain long and loudly about going to bed. There is a 'Before, During and After' chart (the ABC chart) at the end of this leaflet.

Before

Think about what was happening before 'it' began. What were you doing? What was the child doing? What were other people doing? You may also find it useful to try and think about what you were feeling and thinking at the time and about what the child was thinking and feeling.

During

Think about exactly what you, other people and the child did. Again, it can be useful to remember what you were thinking and feeling at the time and what you imagine the child was thinking and feeling.

After

What happened afterwards? What did you do? What did the child do? What thoughts and feelings did you and the child have?

A more complicated example is the everyday story of brothers Lee and Jordan. Lee was 8 years old and Jordan was 5 years old. Most of the time they got on fairly well, playing all sorts of games, but sometimes Jordan became suddenly very cross as he was playing.

At first his carers thought he was just being selfish, wanting to be the centre of attention as he played, but when Jordan began to throw things, break things and kick and punch Lee they began to get very cross with him and also worried that his behaviour might get worse. There were soon frequent scenes in the house when both boys were upset, something was broken and their carers were telling one or both of them off.

The carers thought that Jordan was a naughty boy who just wanted attention but they decided to try to use the 'Before, During and After' approach to understand a little more about what was going on. They chose a particular event when a game on the computer had ended with Jordan almost breaking one of the controls, pushing Lee and storming out of the room in angry tears.

They described the following things:

Before: Jordan and Lee were playing happily. They seemed excited and cheerful, laughing and giggling. Lee seemed to be concentrating more. Jordan seemed to be becoming increasingly serious. The game was reaching a crucial point. Lee was winning.

During: Jordan became very angry, frowning and complaining. He shouted and screamed and said it wasn't fair. He seemed unable to control himself and seemed to want to break the computer. He punched Lee as if he really wanted to hurt him then ran out of the room. Jordan seemed very cross with Lee.

After: The game was not over but nobody was now going to win. Lee looked shocked and upset. Jordan was upset in another room. His carers were telling Jordan he was a naughty boy, they were cross with him. Lee said 'it wasn't my fault'.

Having noticed these things the carers sat down and talked about what could be going on. Here are some of the questions they found themselves trying to explain:

- What were the boys thinking about as they were playing?
- What was happening in the game as Jordan began to get cross?
- Why was Jordan so cross with Lee?

- Why did Lee have to concentrate so hard?
- What did Jordan think was unfair?
- Who had been going to win the game?
- Why did Jordan leave the room?

After discussing this for a few days they sat down with the boys and talked it through. They asked the boys some of these questions and tried to help both of them to explain what they had been feeling at the time. The conversation got quite heated but eventually the carers had an idea of what had happened in this game and in other games too. It turned out that Jordan was getting very cross because Lee had a way of always winning. Jordan was not skilful enough to beat Lee because he was younger. Lee was very good at making sure that he always beat Jordan. Jordan felt that Lee was deliberately making him cross and this made him even angrier. Jordan then spoilt the game and left it before it was over so that Lee did not actually win. In this way the game did not have an ending and there was no winner or loser.

Now that the carers were thinking about this event like this they were able to try to find ways of dealing with the cross feelings they were all experiencing. Competition is normal between brothers and sisters, but sometimes children (and carers!) need help to manage it.

- They spoke to Jordan about how hard it is to be only 5 years old when Lee is 8 years old and is able to do more than Jordan.
- They spoke to Lee about how they now knew that it wasn't all Jordan's fault and that Lee liked to annoy his brother by beating him and then getting him into trouble by making him angry.
- They tried to arrange for Jordan to play more with children of his own age and ability.
- They encouraged the boys to play some games that didn't have to involve one being a winner and the other a loser.

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Describing Behaviour, the 'Before, During and After' chart (ABC chart).

Name _____

A Before	B During	C After
Where was the child? What seemed to lead up to the behaviour? Were any warnings given prior to the behaviour? What did individuals do or say to the child? How did you feel? How did you think the child was feeling?	What time of day was it? What did the child do exactly?	What happened as a result of the behaviour? How did the episode come to an end?
Date		

Handout for carers and adoptive parents

Preventing and managing challenging behaviour

Guidelines for the use of star charts

A star chart acts as a reward. A child earns gold or coloured stars for the behaviour you are trying to encourage. Star charts also show the child how her behaviour is changing. Children are usually ready to record their successes, so you can encourage the child to record them.

There are various charts available but carers usually like to design their own to suit the child. Instead of using a star chart, you can use a drawing of a child's favourite character, divided into sections. One section is coloured in instead of using stars. So the pathway on the journey to the castle would be coloured in.

It is important to explain to the child exactly what must be done to earn a star/smiley face and that she understands. E.g. 'Sarah you tidied your toys and put them away'. 'Sarah you played quietly while I fed Johnnie'. 'You read Billy a story and gave him a nice gentle hug'. 'You let Amy sit on the horse/go on the trampoline first'.

- Keep the chart in a place it can be easily seen by the child.
- Tell people who see the child regularly about the star chart so that they can also encourage her to earn stars. Success at an early stage is vital to keep her interested.
- If she is not able to earn a star in the early days of trying, then you could make the first step easier to encourage her.
- Always praise her when she earns a star and let her stick it on the chart at once.
- If she is disappointed when she has not earned a star you should sympathise, but encourage her by saying 'you can try again.'
- It is important to remember not to get cross or upset- be positive.
- It is also important not to remove stars for bad behaviour.
- Once a star is earned it should never be removed.
- Use the chart to reward the child. Never use the chart in a negative way.

If the desired result is not being achieved it is important to find a behaviour that can be praised. It does not have to be drastic. Try and catch her doing something that you have asked and say something like 'You did what I asked. I am very pleased.'

Three stars on a chart are rewarded with a small present or an activity/event. This does not have to be expensive and should be appropriate for the child.

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Carers have noted the following have been important for children:

Books/comics, cooking biscuits, small toys/treats, trips to library/park, sweets, extra bedtime story, watching a favourite TV programme, short game, time with carers, water play/swimming.

When to stop using a chart

Wait until the child is regularly earning stars. Then you can either:

Stop giving stars but always continue to praise the child.

Gradually decrease the number of stars you give the child.

You can put the child's favourite picture here or they could draw their own picture to colour in

Monday ◆	Monday ◆	Monday ◆	Monday ◆
Tuesday ◆	Tuesday ◆	Tuesday ◆	Tuesday ◆
Wednesday ◆	Wednesday ◆	Wednesday ◆	Wednesday ◆
Thursday ◆	Thursday ◆	Thursday ◆	Thursday ◆
Friday ◆	Friday ◆	Friday ◆	Friday ◆
Saturday ◆	Saturday ◆	Saturday ◆	Saturday ◆
Sunday ◆	Sunday ◆	Sunday ◆	Sunday ◆

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Journey to the castle

Child's name _____

Understanding Childhood

tempers and tears

in the twos and threes

It's a long way from being a helpless baby to becoming a relatively independent three or four year old, ready to go to playgroup or nursery. It can be an exciting journey of discovery – but it can also seem like a very bumpy ride for both you and your child.

As children move towards their second birthday, they want to take part in what is going on around them – exploring and playing, watching and imitating others, using their first words. They now feel that they are a person in an interesting world of other people and they want to join in.

What it is like to be two or three

Your two year old is discovering all sorts of things that they can't do or mustn't do. They are waging a constant battle with their own passionate wants, hopes and fears.

They have feelings that they can't yet manage by themselves without tempers or tears. They are still struggling to sort out who they are and what they feel about the people who care for them – why they love them one moment and hate them the next. They can't just ask for your help. Instead, they mess you around with contradictory demands because that's how helpless and confused they feel.

Young children react very differently to the triumphs and setbacks of their second and third years so they need different kinds of support from their parents.

Being bossy

Some children can't bear to feel little and helpless. They refuse to accept that there are things they can't yet manage. Being bossy can be a way of covering this up and trying to make others feel small. They can be so convincing that, as parents, we may sometimes come to believe they don't need us or may feel so irritated that we want to cut them down to size.

But bossy two year olds really need someone to offer them love and care even when they don't seem to want it.

Understanding Childhood is a series of leaflets written by experienced child psychotherapists to give insight into the child's feelings and view of the world and help parents, and those who work with children, to make sense of their behaviour.

This leaflet was originally published by the Child Psychotherapy Trust.

Leaflets available from:

www.understandingchildhood.net

email:
info@understandingchildhood.net

Being fussy

Many children of two or three develop all sorts of fads and rituals that they absolutely insist on. From a parent's point of view it can seem silly and tyrannical, but how does it look to a small child?

Everyone is expecting them to give up being a baby and become more independent. But they may feel as if the grown-ups are always interfering and bossing them around. When they insist on wearing something strange, or doing things in a particular order, they may be trying to get you to recognise that they have their own choices and preferences.

Sometimes it's probably helpful to give in gracefully over things that don't really matter. That way they will get the chance to learn how to back down themselves. And, of course, there are going to be plenty of times when they want something impossible or dangerous. So there will still be opportunities for them to learn about 'no' and for you to learn to cope with their tears.

Sometimes fussiness is to do with worries that your child can't name or tell you about. Then their determination to avoid certain objects or situations may be their way of controlling their fears.

What's worrying them may not have any obvious connection with the things they're making a fuss about – but it's easier to control what you let your mum put on your plate than to control anxieties you don't understand.

These sorts of fears tend to come and go, but if your child's behaviour becomes especially difficult it is worth wondering if they are under some particular stress.

Being clingy

Some children seem to be saying 'I'd rather be small'. A child who is clingy and fearful can be very trying to parents in a different way from one who is bossy.

As parents, we need the reassurance of seeing things move in the right general direction. So 'babyish' behaviour is hard to bear because it makes us worry that things are going backwards. It's also very exhausting not knowing if you've got a baby or a big girl or boy on your hands.

When you have the feeling that you can't get it right, the chances are that your child is feeling in a tremendous muddle too.

Being fearful

New situations can be frightening. Children of two or three sometimes feel quite scared about new situations, especially if they think it means being left with other people. It is worth being truthful about new situations – such as the birth of a baby or different childcare arrangements – so that they don't feel taken by surprise or tricked. Allow plenty of time for settling in and a certain amount of fussing. And be prepared to take your child seriously if they really feel they are not ready for a new step forward.

But some of the frightening things are inside them.

It is at this age that children first complain of bad dreams or night terrors. Sometimes the dreams may be connected with worrying events that happened during the day, but quite often they seem to grow from feelings within the child.

You may never really know what's troubling them, but it's very comforting for a child who can't yet understand themselves if they feel that a grown up is trying to do the understanding for them.

Useful Understanding Childhood leaflets
Sibling rivalry
Separation and changes in the early years

Temper tantrums

Your child is coping with strong feelings all day long. If they're managing to keep on a reasonably even keel they're doing well, but there are bound to be times when they can't cope.

When your child throws a temper tantrum they are showing you what it feels like inside them when they can no longer cope. This could simply be because they are exhausted or overwhelmed.

They are not doing it just to get attention. They have a tantrum because they can't tell you in words. They scream and throw

themselves around because they feel their big self has exploded.

They are probably scared, as well as angry, because their rage seems so powerful and dangerous and they have lost their picture of Mummy and Daddy as helpful or friendly.

They don't need you to come up with a solution or to buy them off with treats (though every one has done that at times). They do need to see that you can feel upset and helpless but still keep them safe from hurting themselves, take care of both of you and go on loving them.

Is there a real problem?

Sometimes parents feel that their child's temper tantrums are not just the ordinary sort that they will grow out of.

Perhaps they feel that their child has never really started talking or doesn't enjoy playing or being with other people. They may be restless and destructive as if they can't take pleasure in anything. And – most painful of all – parents in this situation may feel that there is a barrier between themselves and their child.

If you have concerns of this sort, it is important to ask for specialist advice. It is not a good idea to just leave things in the hope that they will sort themselves out.

How can parents cope?

Coping with your child's tantrums doesn't mean trying to stop them being angry – it means coping with how angry they make *you* feel. In the heat of the moment it is easy to become just as angry as your child and to scream back. You are not expected to be perfect parents but you *are* expected to be able to control your own feelings when your child's feelings are out of control.

As parents we feel helpless, embarrassed or exposed if our children have tantrums in public. Even at home there are going to be times when they drive us too far.

Firmness is important, but so are understanding and tolerance. Simply telling a child to behave better doesn't give them the strength to control their feelings. They can only learn slowly how to share with other children and to accept people saying 'no' when they want something.

Children learn by example, so they learn that it is possible to be distressed or angry without throwing a tantrum through seeing us struggling to cope with our own frustration or worry.

Getting to the end of your tether

Sometimes parents feel they are no longer able to keep going. They may become frightened that they will injure their child physically or emotionally.

You may feel you don't have enough help and support. You may have too many worries on your plate. You may feel depressed or unwell.

If you feel this is happening to you, for the sake of your child and yourself, you should seek help to sort out what's wrong.

Useful Understanding Childhood leaflets
Postnatal depression

Some helpful practical tips

- Unless they are doing something dangerous, or could accidentally hurt themselves, count to 10 before doing anything at all.
- Try not to get drawn into an argument about exactly what started it – they really are beyond reasoning with.
- Don't ask more of them than they can manage.
- Try to avoid saying things just to hurt them back – especially threats of leaving home or having them put away. You may not mean it but they don't know that.
- Don't worry about them growing up to be a monster. The temper tantrums of a two and three year old will start to tail off – but only slowly. It may take two or three years.
- Try to remember that through their tempers they're learning important lessons about themselves – and both of you are practising for when they're a teenager!

Further help

In every area there are organisations that provide support and services for children and families. Your GP or health visitor will be able to offer you advice and, if needed, refer you to specialist services. To find out more about local supporting agencies, visit your library, your town or county hall, or contact your local council for voluntary service.

Contacts

Sure Start
There are a number of Sure Start programmes in the UK offering services and information for parents and children under four. To find if there is one in your area contact:
Phone 0870 0002288
Web www.surestart.gov.uk

YoungMinds Parents' Information Service
Information and advice for anyone concerned about the mental health of a child or young person.
Freephone 0800 018 2138
Web www.youngminds.org.uk

Parentline
Help and advice for anyone looking after a child.
Freephone 0808 800 2222
Web www.parentlineplus.org.uk

ChildcareLink
Information about child care and early years services in your local area.
Freephone 0800 096 0296
Web www.childcarelink.gov.uk

Contact a Family
Help for parents and families who care for children with any disability or special need.
Freephone 0808 808 3555
Web www.cafamily.org.uk

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ISBN 1 900870 01 0
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It's not just the hormones...

Scientists are discovering the real reasons for the hell of adolescence, writes Vivienne Parry

Thursday March 3, 2005 The Guardian

Something very strange happens at puberty, when truckloads of hormones begin arriving by the day. Children who were once sweet, helpful and good fun to be around turn, almost overnight, into grunting creatures, who wear nothing but black, lie abed until noon and consume 5,000-calorie snacks (followed immediately by saying that they are still hungry).

They are spotty, frequently smelly, and grow out of every item of clothing they have in the space of a few months. Their boredom threshold plummets and they do not seem able to concentrate on anything for more than five minutes at a time. You begin to wonder whether your child is a changeling, swapped with your own by an alien from the Planet MTV while you weren't looking.

Teenagers are trapped in limbo, neither children nor adults. An excruciating mix of vulnerability and potential, which by turns engages, inspires and alienates adults - everything they do has a high intensity feel about it. We know this because our own adolescent experiences - our first kiss, the first time we fell in love, the first time we drove a car alone - still burn brightly 30 or 40 years on.

There is a darker side, too - soaring rates of serious accident, illicit use of drugs or alcohol, risky sexual behaviours and their consequences and the first signs of emotional disorders which may be lifelong. Teenagers seem to be the very embodiment of hormonal mayhem - or are they? The truth about teenagers and hormones is not what you expect.

Puberty is an extraordinary hormonal event and humans are lucky in that they only have to go through it once -not the norm in the rest of the animal kingdom. Most animals do not become sexually active, and then remain so as we do, but go through the trauma of multiple hormone onslaught every new breeding season.

Human puberty is also unusual, because unlike all other animals, there is a gap between the time reproductive hormones first appear and the prime reproductive age. Boys become fertile at around 13, whilst they are still puny and unappealing. Girls on the other hand, acquire a womanly shape at puberty yet are relatively infertile for several years thereafter. It's not as far out of sync as it appears; the conjunction of top male specimen at around 20 and fully reproductive female at 18, is reflected in the average age of first birth across all cultures of 19 years of age.

The first hormone event which will lead to puberty is largely hidden from us. Between the ages of six and eight, the adrenal glands on top of each kidney start to step up secretion of androgens such as DHEA (dehydroepiandrosterone), which the body uses as construction material for the manufacture of other steroids. These androgens prime hair follicles for pubic hair growth and make the skin greasier. Body odour is also a key feature. Parents first notice this change at their children's parties, when 20 rampaging seven-year-olds are noticeably whiffy in a way that they were not when younger.

The next big change involves the reproductive hormones. The hypothalamus, a part of the brain located roughly behind the eyes, is the grand vizier of the hormone system in the body and is connected by a stalk to the pituitary gland, which dangles beneath it. In adult men, and in women of reproductive age, it is its constant pulses of gonadotrophin-releasing hormone (GnRH) that tell the pituitary to secrete its hormones, which then act on ovary and testes to produce eggs and sperm, and also the hormones oestrogen and testosterone. These have a profound influence on behaviour as well as body shape, turning a child into a sexual adult. During childhood, there is no production of GnRH, almost as if a brake had been applied. Only when that brake is released - and no one is quite sure what the signal for this is - does puberty start.

In boys, luteinizing hormone (LH) from the pituitary stimulates production of testosterone by cells in the testes. Simultaneously, levels of the substances that keep testosterone under lock and key in the bloodstream (sex hormone binding globulins) decrease, thus making even more testosterone available - in total, up to 50 times more than was experienced before puberty. That is some hormone rush.

Once oestrogens and testosterone begin to appear, it is their impact on body form which provides the most dramatic expression of adolescence. Oestrogen stimulates growth of the womb and breast but also determines the shape of the female figure by re-arranging the deposition of fat. In boys the consequence of testosterone is also to sculpt the body, increasing lean body mass and shaping features as well as to promote body hair and beard growth.

One minute, teenagers behave like adults, the next, like a retarded chimpanzee

Teenagers get a rush from intensity, excitement and arousal. Loud music, big dippers, horror movies? That's where you'll find teenagers. In some teens this thrill-seeking and quest for novelty is subtle and easily managed. In others, the reaction is more severe and can become out of control. This is reflected in the statistics for teenager deaths, three quarters of which result from accident or misadventure.

It is tempting - indeed it has always been assumed - that such behaviours are entirely hormone-driven. After all, aren't teenagers hormones on wheels? From all that I have said so far, it seems logical. But links between hormone levels and poor behaviour in teenagers are either weak, or non-existent.

Nevertheless, if the number one risk factor for homicide is maleness (as it is) and the second is youth, and given that boys have loads of testosterone, and girls don't (or certainly not nearly as much), surely this must put testosterone in the dock as the cause of aggressive adolescent behaviour?

Actually not. First, there is no consistent relationship between normal circulating testosterone levels and violence in teenagers. In fact, there is a rather better correlation between high testosterone levels and levels of popularity and respect from peers. One hypothesis is that teenage boys pick up cues from the environment and use them to determine "normal" behaviour. This is illustrated by recent work from the MRC unit at the Institute of Psychiatry which shows that it is not testosterone levels that determine your waywardness as a teenager, but basically, the people you hang with. Keep the company of bad boys, and you will take your behaviour cue from them. Hang out with sober sorts and your behaviour will be like theirs. As we all remember, being split up from your best mate is a peril of adolescence. "They're a bad influence on you" is the general gist of parental or teacher wisdom on this one. Oh dear. The ignominy of the Institute of Psychiatry proving Miss Mansergh, year nine form teacher, right.

Deprivation may be a more important determinant of teenage violence. The theory - and there is a wealth of literature on this subject - is that if low-status males are to avoid the road to genetic nothingness (the words of neuroscientist Steven Pinker), they may have to adopt aggressive, high-risk strategies. If you've got nothing, you have nothing to lose through your behaviour. Certainly, in humans, both violence and risk-taking behaviour show a pronounced social gradient, being least in the highest social classes and most in the lowest ones. This is surely not what you would expect if testosterone were the only driver of violence.

Another clue that testosterone is not the whole story here is that teenage girls, while not as violent, certainly rival boys for downright bloody-mindedness during their adolescent years. Worse, I can hear some parents say.

The thing that is really irritating about teenagers (and by now you will have guessed that I have two teenage boys) is that one moment their behaviour is that of adults, while the next it is that of a not very bright three-year-old, or possibly, a retarded chimpanzee. Or an amoeba. The rapid oscillation between child and adult is one of the hallmarks of the teenager.

In fact teenage brains are going through a process of maturation, and it is this maturation which many now believe to be responsible for much of the behaviour that we classically attribute to hormones. These changes are independent of hormones and are a function of age.

It has only been discovered very recently that there are two main features of brain maturation that happen to coincide with puberty. Previously it was believed that the brain was pretty well set by adolescence but only in the last couple of years, and to everyone's surprise, it has been realised that maturation is not completed until late teens or even early 20s. One feature is that myelin, a sort of fatty insulating material, is added to axons, the main transmission lines of the nervous system, which has the effect of speeding up messages. The other feature is a pruning of nerve connections, the synapses, in the pre-frontal cortex. This is an area of the brain which is responsible for what is called executive action, which is a shopping list of the things that teenagers lack - such as goal-setting, priority-setting, planning, organisation and impulse-inhibition. During childhood, for reasons that are not clear, a tangle of nerve cells sprout in this brain area, which lies behind the eyes, but during puberty, these areas of increased synaptic density are then reduced by about half, presumably to increase efficiency.

These changes in the adolescent brain that occur around the time of puberty primarily affect motivation and emotion, which manifest themselves as mood swings, conflict with authority and risk taking. This new information has altered thinking about the effect of hormones on teenagers, because it has been realised that what we would call typical adolescent behaviour is not actually the result of hormones alone. For example, it is not just testosterone that drives risk taking, but the inability of the immature brain to assess risk properly that gets them into trouble.

This has particular implications for sexual behaviour. Female adolescents have, thanks to their hormones, the body shape of a woman. In male adolescents, testosterone is driving them to think of sex every six seconds (as little as that?). Meanwhile, their reasoning is temporarily disabled while their brain sets up the "under reconstruction" sign. It's a recipe for disaster.

The remodelling of the cortex helps explain another feature of teenagers: their astonishing level of self-centredeness. For a while, as their brain is undergoing changes, they find it hard to recognise other's emotions. If you show teenagers pictures of faces, they will be some 20% less accurate in gauging the emotions depicted, not recovering this ability until they are 18 or so. This may be one of the reasons why they seem unable to read the signs, when treading on thin ice with their behaviour, with no appreciation of the impact of what they are doing on those around them. Teenagers exist in a universe of one.

Is there any hormone link to high-risk choices in teenagers? It is likely not to be testosterone, at least not initially, but the stress hormone, cortisol which returns us to deprivation. Stress during early life raises cortisol levels, so increasing behavioural problems (such as hyperactivity), tending to make children more aggressive, less affiliative and more likely to perceive others as threatening. Stress in either pregnancy or in early life permanently resets the stress response of the child, so that there is an increased reaction to stress - it's called hyperarousal. A stressed child, for instance, when meeting someone new (even in a familiar environment) will withdraw and refuse to make eye contact, rather than chat happily. This increased stress response plays out in reduced life expectancies because cortisol affects almost every body system. It is also closely linked with depressive illness in later life.

Their reasoning is temporarily disabled while their brain is 'under construction'

So testosterone plays a part here only after the fact. Aggression and stress raise testosterone levels. Aggression and stress also reinforce each other at the biological level. Animal work reported in the journal Behavioural Neuroscience recently suggests that there is a fast feedback loop between stress hormones and the hypothalamus, which allows aggressive behaviour to escalate.

Another example of how hormones

play only a minor role in the drama of adolescent life is to do with sleep. As every parent knows, teenagers find it very hard to get out of bed in the morning and to go to bed at night. Compare and contrast with what they were like as five-year-olds, when you had trouble keeping them in bed beyond six in the morning. Actually, this isn't just your teenagers being difficult, for a subtle biological shift in sleep patterns occurs during puberty, probably to ensure more sleep during rapid growth. There is an increase in the level of the hormone melatonin, which is the slave of the body clock, released during hours of darkness and intimately involved with sleep patterns. The effect of this change is similar to that of shifting the hapless teen through several time zones on a transatlantic flight, resulting in their classic school holiday sleeping pattern of 2am until noon.

Come term-time, the teenage body is in disarray as it is forced by a 7am wake up call - while still on Planet MTV time - to gather itself together, even though it thinks it's four in the morning. These jetlagged teenagers have come around by the end of the week to Parental Time Zone hours, only to wreck themselves with another bout of 2am to noon sleeping at the weekend. Many become chronically sleep-deprived, with all the implications for behaviour that implies - irritability, inability to concentrate, poor attention span - which is inevitably reflected in their school performance.

For all their maddening traits, teenagers are still glorious creatures. Full of promise and potential. The truth about hormones may help us understand them a little better.

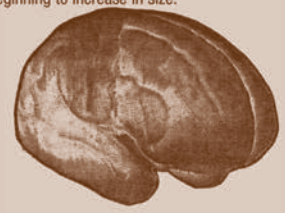
Growth record

The brain at age 12

Frontal grey matter peaks at about 12 in boys and 11 in girls. So far so good. But the pre-frontal cortex area, responsible for executive action is about to be pruned.

The brain at age 16

By 16, temporal grey matter (at the sides of the brain) has reached its maximum size. The pre-frontal cortex has been modified and is beginning to increase in size.



The brain at age 20

Only in our 20s does the dorsal lateral pre-frontal cortex responsible for controlling impulses reach adult dimensions

Percentage of grey matter

50 40 30 20 10 0

Source: National Institute of Mental Health

Teenage myths, so hard to beat

Fried food gives you spots

Acne is common in both sexes during adolescence. Mums tell their teens that their spots are the result of eating too much chocolate or fatty food. Not enough fresh air (as in, you've been in your room too long) is also proffered as a cause. Actually, it is the fault of your hormones, not your diet. There is an abnormal response in the skin to normal levels of testosterone in the blood. This has a profound effect on appearance for some unlucky people. The response is self-limiting and goes away with time, but there is no way of predicting how long it will take - it can be a couple of years or decades.

You won't grow up to be a six-footer if you don't sleep at night

Adolescence is marked by a huge surge in growth hormone production. The secretion of growth hormone is carefully timetabled in a pattern that persists through puberty. Growth hormone is released principally at night during sleep, short bursts, every one to two hours during the deep sleep phase. So when your mum says "if you don't go to bed now, you won't grow up to be big and strong," she's right. If onset of sleep is delayed, so is onset of growth hormone release. Children who are deprived of sleep are smaller than they should be.

The surge of GH follows that of increasing levels of GnRH. The relationship between these two hormones is not a direct one, however, but an indirect one, involving oestrogen. The idea that a female hormone is driving growth in boys as well as girls, is counterintuitive at first, but it explains much about the gender differences in growth. Before the onset of the teenage growth spurt, boys grow very slightly faster than girls, but a girl's growth spurt starts about two years before that of boys between 12 and 14. For some four years, girls are, on average, taller than boys. But by adulthood, men are on average 14cm taller than women. This difference is almost entirely due to what happens at puberty - for boys grow on average for two years longer after puberty. It also helps explain why girls grow earlier and faster than boys - it's because they have oestrogens which pump up the production of growth hormone.

The age of puberty is falling

The age of puberty (or rather first period) was 17 in the mid 19th century and is now about 12. This is largely due to better nutrition: a hormone produced by fat, leptin, seems to permit puberty in girls when body fat reaches a certain percentage of body weight. It is probably not the trigger for puberty. The sedentary nature of many children may also have contributed to a lowering in puberty age. Hower, after many decades of fall, it seems to have stabilised, and indeed, some European countries, including the UK, have seen a modest rise in the age of girls at their first period.