What is Pain?

Scientists' understanding of pain has advanced considerably over the last 25 years. For many years doctors had a simplistic view of pain - that pain either had a physical or psychological cause. This has proven to be wrong, and they now know that pain is much more complex than this. We can use the latest research about pain to help us learn and understand how to manage our pain more effectively and live well with it. Knowledge is power!

Understanding your pain is the single most important thing you can do to start on the road to recovery.

What is the purpose of pain? PAIN IS A PROTECTOR

The purpose of pain is to protect us – to keep us safe. There are number of protective systems in the body, but pain is one of the body's most powerful protective systems. It is like an internal alarm that alerts us to danger. It motivates us to stay safe and take care of any problems in our body. Pain protects us by causing a change in our behaviour.

EXAMPLE

I am walking along and I stand on a drawing pin that goes into my foot; it will be the pain that I experience in my foot, which will stop me from continuing to walk. In other words the pain will change my behaviour - it will make me remove the drawing pin from my foot and take other actions to keep myself safe, such as wash my foot and put a plaster on it.

If I didn't experience the pain, I probably would not realise that I had stood on the drawing pin and continue walking with the pin in my foot. This would likely to cause more damage to the tissues in my foot and possibly result an infection.

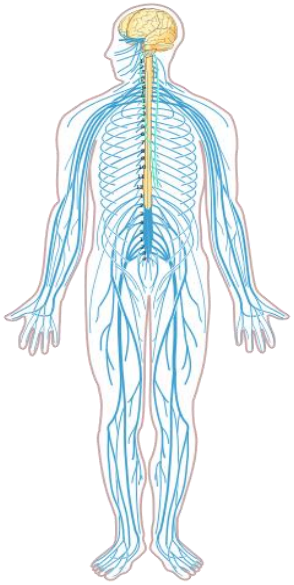
Can you see how pain has protected me from these potential dangers?

However, scientists have found that pain isn't just related to damage to our body's tissues; it's more complicated than this! Think about people who experience pain in limbs that have been amputated (this is known as phantom limb pain). How can they experience pain in a limb that no longer exists? The purpose of this handout is to help you understand pain more so that you can learn how to manage it better.

How is pain generated in the body?

Scientists have found that our nervous system is involved in creating pain. Our nervous system consists of our brain, our spinal cord and a network of peripheral nerves which are spread throughout our body.

Sensors, at the end of our peripheral nerves, detect changes in our bodies - for example changes in temperature, pressure, movement. Our sensors send this information via messages (small electrical impulses) to our spinal cord. Our spinal cord then passes the messages onto our brain, to analyse the information and decide if we need to take any action. For example, if the brain receives messages that we're cold, it may decide that we need to put on another jumper or turn up the heating.

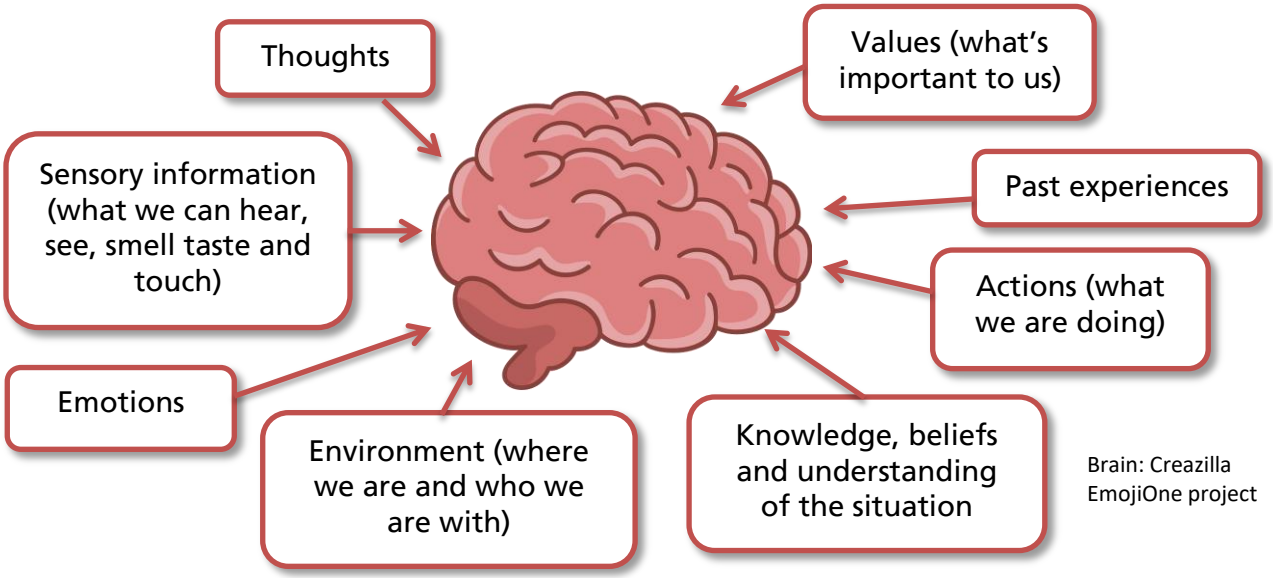


Medium69, Jmarchn / CC BY-SA

Some of our sensors only send messages when things are getting dangerous or harmful - for example getting too hot, if there's too much pressure or if a nasty chemical enters the body (such as wasps sting). These danger sensors send warning messages to our brain to analyse.

Scientists have found it is our **brains that decide** whether or not we experience pain, depending upon whether it thinks we are threatened and need protecting.

The brain makes this decision by considering the warning messages it receives from our sensors, as well as other information it receives or has stored. Other factors the brain considers when deciding whether we need protecting include:



Brain: Creazilla EmojiOne project

The brain analyses and interprets all this information and then decides whether or not to create pain depending upon whether it thinks we are threatened. Remember, the purpose of pain is to protect us from potential danger! The problem is that sometimes our brain can come to the wrong conclusion and we can experience pain when we are not actually in any danger.

Are you saying the pain is in my head?

NO, YOUR PAIN IS REAL. Just because your brain decides whether you experience pain or not, it does not mean that your pain is imaginary or "in your head". Scientists have found that brains are always involved in producing pain. There's no pain without a brain!

EXAMPLE

One day Professor Lorimer Moseley (a highly acclaimed pain scientist) was walking through the Australian bush chatting with a friend. Whilst walking he felt something touch the outside of his left leg. Thinking nothing of it, he continued walking and chatting, until he suddenly collapsed. He then can't recall anything until he woke up in hospital, only to find out that he'd been bitten by a venomous snake. Luckily, for him he survived.

Several months later, Lorimer went walking in the bush again and was chatting to a friend, when he felt something touch the side of his left leg. Immediately he experienced an excruciating pain, which brought him to the ground. Clutching his leg, he shouted to his friend to call for help as he'd been bitten by a snake again. His friend immediately started looking for the snake, but couldn't find one. His friend then asked to look at his leg. To Lorimer's amazement, there was a small scratch (probably from a stick) on his leg, but no evidence of any snake bite. On realising that he hadn't been bitten by a snake, Lorimer's pain levels immediately started to ease and he was able to complete his walk.

Why did Lorimer not experience pain the first time, when he was in danger, but did the second time, when he wasn't in any danger?

The sensors in Lorimer's leg would have sent the same messages to his brain each time, but the first time his brain remembered that he had walked in the bush many times before and had scratches from bushes without any danger. His brain therefore decided that he was not in danger and so did not need protecting with pain.

The second time, his brain remembered what had happened the previous time he felt a scratch on his leg, when he had been in danger for his life. So his brain protected him with pain, even though he was not actually in any danger this time.

Can you see from this example how our pain experience is influenced by lots of factors and is not necessarily related to damage to our body's tissues?

Scientists have found that lots of factors influence the pain we experience. In fact they have found that anything that is a threat to our body, our lifestyle, our happiness, or our day to day function, increases the likelihood of our brain producing pain and increases the duration and severity of pain we experience.

However, they have also found that anything that makes us feel safe, stronger, better, healthier, more confident, more secure and certain, reduces the likelihood of our brain producing pain and therefore reduces the duration and severity of pain we experience.

These factors include:

Biological:
Things that occur in the body, things we hear, see, smell, taste & touch and things

Psychological:
Things we think and believe and emotions

Social:
Places we go, people in our lives, and life events

This is known as the **biopsychosocial** approach to pain.

Here are some examples of factors that can **increase** our threat level:

Biological:
over-doing things, having a cold or infection, becoming less fit

Psychological:
being fearful of movement, thinking "I'm useless" depression/ stress/ anxiety

Social:
Not seeing friends, not doing hobbies, family/relationship issues & work, housing or financial issues

Here are some examples of factors that can **reduce** our threat level:

Biological:
Doing activities in manageable ways, relaxation, getting good sleep, gentle exercise.

Psychological:
Learning about pain, focusing on what you can do, knowing you're not the only one in this situation.

Social:
Spending time with friends, doing hobbies, being with people who understand.

This approach can help us to learn how to manage our pain levels better.

Persistent pain

If you have an injury you would expect to have pain, and normally that pain will disappear after a few days or weeks once healing has occurred. However, sometimes it can persist. When pain lasts longer than 3 months it is called chronic or persistent pain. This type of pain continues because even though the body has healed, the nervous system has become over-sensitive. Persistent pain can also start without any injury to the body at all.

The over-sensitive nervous system can cause us to experience pain when you wouldn't expect to, for example:

- things that should hurt a little, start to hurt a lot (for example, hitting your leg on a table)
- things that shouldn't hurt at all start to hurt (such as normal movements or everyday activities)
- pain starts to spontaneously appear randomly in the body.
- old injuries can start to hurt

These are all signs of having an overly sensitive nervous system

Why does the nervous system become over-sensitive?

At present, scientists do not fully understand why persistent pain starts. However, they have found that when we have pain for a long time, the nerve cells in our body physically change and become more sensitive. The whole pain system becomes switched on and turned up to 'high alert'. The longer our nervous system protects us with pain, the better it gets at doing it.

Here's another way of thinking about persistent pain:

Let's compare our pain to a fire alarm. A fire-alarm rings to warn you when there's a fire. Just like our pain system can be triggered to warn us of danger. What happens if our fire alarm malfunctions and becomes overly sensitive? It might now be turned on by the heat from a candle, or on a hot day, or you using the toaster! An over-sensitive fire alarm would be activated too often. It would interrupt birthday parties, romantic dinners, or any other events where we might light some candles. The over-sensitive alarm may even go off randomly, without any heat or smoke!!!!

Like a sensitive fire alarm, when the body's nerves become too sensitive, they are activated too often, creating excessive pain that interrupts daily life. What would you do if the fire alarm in your house kept ringing? Initially, you may call out the fire brigade, so they can put out the fire. But if there's no fire and the fire-alarm kept

ringing, you would need to fix your overly sensitive fire alarm, rather than call out the fire brigade. Treating persistent pain is similar to fixing a broken fire alarm. The main strategy is to help the nerves of the pain system become less sensitive. The aim is to retrain your nervous system to only provide pain when you need it.

Does this mean my nervous system will be over-sensitive for ever?

No, scientists have found that just as nerve cells can change to become over-sensitive, they can also adapt to become less sensitive. The nervous system can be retrained to become less sensitive. This is good news for people with persistent pain.

There are various ways to help you adapt your nervous system to become less sensitive. It will involve you doing things differently and thinking differently, and it won't happen overnight. However, with practise, patience and persistence changes can occur.

What influences your pain experience?

As we have discussed, we know that multiple factors influence the onset, duration and severity of our pain experience. Remember the biopsychosocial approach? It can be useful to identify factors that influence your pain experience, in order to better understand your pain and to find ways to manage it better.

Over to You

Write down any things in your life that make you feel threatened, worried or increase your pain experience:

Biological

Psychological

Social

Over to You

Write down any things in your life that make you feel safer, happier, or reduce your pain experience:

By trying to reduce the factors that contribute to **increasing** our "threat level", and increasing the factors that **reduce** our "threat level", we can start to calm down the sensitivity of our nervous system. It may not be possible to change or eliminate all the factors that contribute to our pain levels, but by looking at those things that we can control, we can learn to manage our pain more effectively.

Further Information

Websites:

- www.tamethebeast.org
- www.retrainpain.org

YouTube videos:

- Understanding Pain and What to do about it in less than five minutes
- Why Things Hurt
- Pain and Me: Tamar Pincus talks about chronic pain, acceptance and commitment
- The mysterious science of pain - Joshua W. Pate
- TEDxAdelaide - Lorimer Moseley - Why Things Hurt (telling the snake story!)

Book:

- The Explain Pain Handbook: Protectometer by GL Mosely and DS Butler