

The Science of Feelings and Emotions

Session 2 – February 10

This is the second session of The Science of Feelings and Emotions. There is always some repetition in this kind of course. There will always be new material, too, in every session, but I like to go over some of it more than once because it is designed to get you thinking about things you might not have thought about before and your thinking about them may change as you do the course. It's an ongoing process from session to session.

What we're thinking about in this course is our feelings, which some people would say is only asking for trouble, but the idea behind it is: if we can understand our experience of life better we can make it a richer experience. We get some scientific background about our actual experience. That's why I've encouraged you to talk about feelings with one another and examine your own feelings and try to prioritise them.

That's also why I'm seeking to involve you in shaping the course by asking you to pick out the particular feelings and emotions that interest you the most. Those who weren't here last time might like to make their own list of your good and bad feelings, from your favourite emotion to your very worst one. I noticed that quite a few of you did make lists last time and if you have anything to add you'll have another chance to discuss them today.

Later on today I'll say a bit more about emotions in general – what they are and what they do – and we might narrow down our list of what we think are the most important emotions to study in this course.

EMOTIONS and FEELINGS and their EXPRESSION

1. What are they? What is the difference between them?
 - Emotion is a constantly changing body state – physiological, biochemical, anatomical
 - A feeling is an intermittent mental awareness of your body state
2. What causes or triggers them? What happens when we experience an emotion?
 - Serial changes in our nervous system and our hormone system
3. What do they do? What is their purpose and value?
 - Emotions (1) set up what we say and do, (2) determine our relational space
4. Do we control them or do they control us?

Even when we get to look at the individual emotions, one at a time, there are some big general questions we'll be considering all the way through. And they don't have simple answers. I hope you can think about them and come to your own conclusions. What you learn will be what you wish to learn, not necessarily what I think I'm imparting. Each of us interprets things in our own way. Your personal experience is more important than the scientific explanation of it – that's only a bonus at best. Because you take ownership of your own life experience, you can take and use what you hear here in any way you like.

Here are the words we compiled on the whiteboard last session in our first attempt to pick out the feelings that are most important to us and therefore the best subjects for this course. The Jen ratio (the

ratio of good to bad) was 0.7 (rising to 0.8 when I added a couple to the good side near the end of the session), which is considered normal – people usually have a few more negative emotions than positive ones – which is something we will look into. After we did that, I handed out lists compiled by Charles Darwin, Claudia Hammond, Paul Ekman and Dacher Keltner.

I didn't give you Paul Ekman's expanded list of emotions that he found from his research were universal. Most of them we already have. I'll read them out: amusement, contempt, contentment, embarrassment, excitement, guilt, pride in achievement, relief, satisfaction, sensory pleasure and shame. Let me know if you think there is anything important missing from this list. And also please consider the words in capitals, which I have extracted from the list as topics that seemed to me to cover most of the words suggested.

GOOD (26) (23)		BAD (31)	
Joy		Sadness	
Happiness	HAPPINESS	Sorrow	SADNESS
Contentment		Grief	
Peace	PEACE	Fear	
Serenity		Trepidation	FEAR
Confidence		Anxiety	
Security		Depression	
Bravery		Insecurity	
Optimism		Loneliness	
Empathy	EMPATHY	Anger	
Gentleness		Rage	ANGER
Compassion	COMPASSION	Resentment	
Love		Hatred	
Patience		Revenge	
Kindness	LOVE	Guilt	
Helpfulness		Cruelty	
Charity		Embarrassment	EMBARRASSMENT
Forgiveness		Inappropriateness	
Humility		Frustration	
Gratitude		Belittlement	
Positivity		Dependence	
Curiosity		Unforgiving	
Excitement		Procrastination	
Surprise		Intolerance	
Awe	AWE	Pride	PRIDE
Hope	HOPE	Importance	
		Indecision	
		Indifference	INDIFFERENCE
		Boredom	
		Disgust	DISGUST

This distinction between good and bad is not entirely clear-cut as I said last session. In fact there are some quite positive things about the negative emotions too.

For example, research has shown that our brain responds more strongly to negative emotional cues than to positive ones. Reading or seeing negative words that are flashed up momentarily captures more of our attention process than seeing positive words. There is more detectable activity in the parts of the brain that have been studied, when you read words that trigger fear or sadness than when you read words that say somebody is happy or successful. So they are more important in a way.

Another research finding: when you're sad or gloomy, your cognitive performance is actually better than when you're feeling good. People in a bad mood consistently remembered better, made fewer errors and produced more cogent explanations than those in a good mood. The best eyewitness accounts of an accident or an incident came from the people who had the most fear, anger, disgust and sadness (the 4 basic negative emotions).

There's a new book exposing what they call myths from pop psychology – for example, that blowing your top reduces anger, which is a popular idea that doesn't really stand up to scientific scrutiny. One of the myths is that older people are less happy or intelligent than younger people. Often the older characters in stories and TV shows are forgetful or crotchety or sad and if you survey young people they mostly say old people must be very unhappy – even medical students answered that depression was more common in the elderly - but some recent survey evidence is quite the opposite.

The highest rate of depression was in people 25-45 and happiness generally increased with age. The happiest group of all were men in their late 60's, but there were also a third of 80-year-olds saying they were very happy. Of course, there are many exceptions, sadly – we all know elderly people who are unhappy – but I think the overall message is that getting older per se is not a biological reason to have more negative emotions. I find this interesting because, if it's true all over, it would be despite what seems to be almost an epidemic of chronic pain that affects many older people. Part of it is that we get to appreciate the so-called negative emotions more kindly. Older people's cognition is not too bad either, if they exercise their minds like we do in U3A.

Revision and Homework Checking

Last session I challenged you first up with the idea that emotions are more important than thoughts because they are what give our lives value and meaning. This is a bit provocative to get you thinking, but it's also something that I hope will grow on you as we go along. Of course, we need both thinking and feeling – they work together and we could not do without either of them. But the biological facts are that the rational part of our mind has developed through evolution as an overlay on top of the older emotional part and it operates within this infrastructure created by our emotional state.

Babies develop their human manner of thinking through emotional interaction so their expression of emotions at a very early age is interesting to compare with an adult's. The baby's first smiles don't have the meaning behind them we associate with a smile, but after a few months they do. Emotions are not differentiated at first in babies – they are either distressed or contented, have no fear of anything in particular. The driving emotional state is to connect emotionally with another human and imitate and learn what it all means, which they do by emotional contact. They have to learn to feel so they can learn to think and then speak.

We also talked about the way our society tends to privilege reason over emotion – to put down subjective or personal perceptions as inferior to rational objective perceptions, which in some practical respects they are – for convenience, we need simple objectivity to do things together. But in a deeper sense, emotions are not inferior – in fact the personal mode of perception matters far more than the objective because of our great need to make meaning – to make sense of the world for ourselves.

We also began to think about how we detect emotions in one another – in the voice, the way we walk and, particularly, in facial expression. That's where the smileys came in and emoticons in general. They can be a sort of an iconic theme running through the course and if you can draw emoticons or find pictures of them, please bring them along to share.

You did extremely well in correctly identifying most of the emoticons from Claudia Hammond's book, but there are some emotions that don't show much in terms of facial expression – and I think you found that was the case. I think it was love and hope, the only ones people got wrong, which is perfectly understandable – it illustrates the emotions that do show in the face and the ones that don't.

I mentioned the 43 sets of facial muscles that make our faces such incredible vehicles of emotion. Has anyone been practising them at home? I thought not. So I've got three for you to try now - the

depressor, the corrugator and the risorius. We need to study these to understand just how important emotions are for human communication.

There are still various theories about the origins of human communication, but several new books converge around the idea that humans learned to speak and communicate in the very refined way we do by means of an emotional interplay beginning with gesture and making faces and pantomime, learning to interpret and imitate one another's emotional expression and eventually developing a language that went hand in hand with this emotional interplay. So, as we study the expression of emotions, we are studying the very things that made us human – that make us so special and that turn little babies into beautiful human beings.

ACTIVITY

The three muscles are the depressor muscle which pulls down the corner of your lips, the corrugator muscle which furrows your brow, and the risorius muscle which pulls the lip corners sideways. I'm going to leave you to play with these for a while with the aid of three sets of pictures labelled Pic 1, Pic 2 and Pic 3.

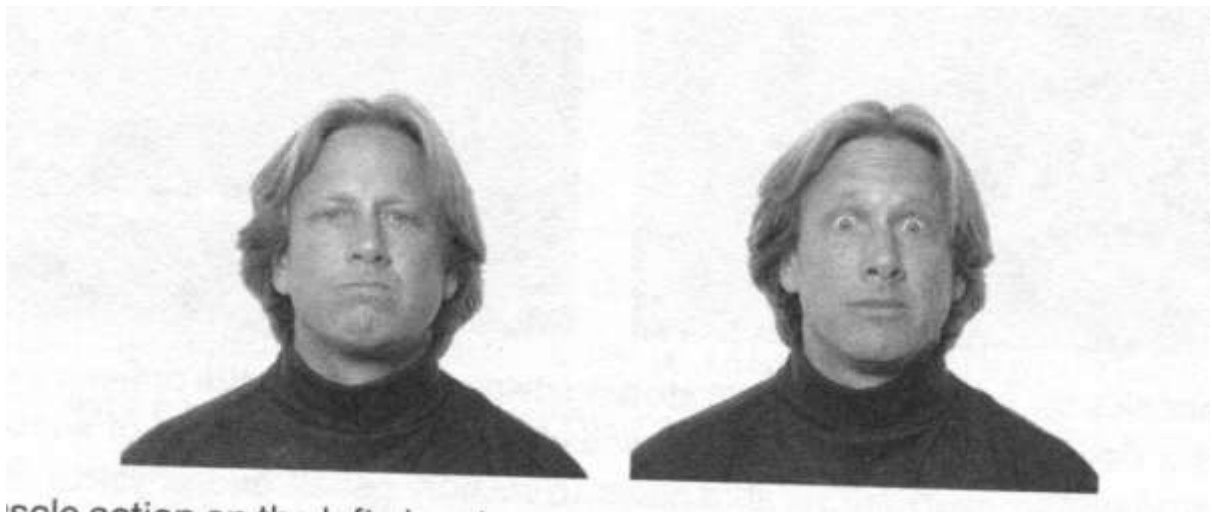
PIC 1



Pic 1 shows the three muscles I've mentioned – depressor, corrugator and risorius. What you will notice about these, if you try them and talk to one another about them, is that firstly, they are very easy to control, and secondly, they are not very important indicators of emotion.

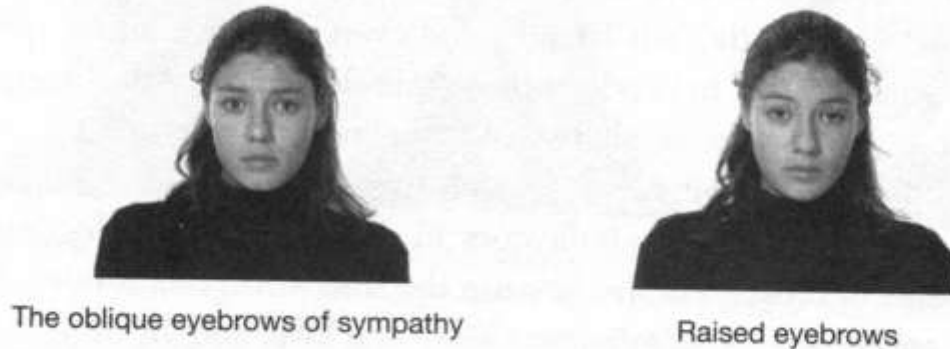
The really important muscles of emotional communication are the ones that are very hard to move voluntarily. The expressions in Pic 2 are examples. Try them to get an idea of why they are so hard. What emotions do you think they represent?

PIC 2



Then try to imitate the expressions in Pic 3. I'll come around and talk to each group about what you are doing.

PIC 3



In slip 3, the oblique eyebrows of sympathy on the left are very difficult to fake, and their meaning is unmistakable, whereas the raised eyebrows on the right, which are quite similar, are easy to do and could mean lots of different things including pretend sympathy.

Finally, in your activity: please review your list of best and worst emotions and most important one for the course – compare it with others – and add to the list on the board if necessary.

Now, let's look at these three questions before we review that list.

1. What are they and what is the difference between them?

To say clearly what is an emotion and what is a feeling I have to point out that, in modern biological science, our mind and body are not two separate things. Whatever happens anywhere in our body contributes to the operation of our mind – even if we don't realise that is happening – and whatever our mind is doing is affecting something in our body. Mind and body are two words that describe a single unified process – our being – but from two different points of view – a mental viewpoint or a physical viewpoint. Those of you doing my previous course will already be quite familiar with that way of looking at it. We need to see it that way to work out a lot of things about our emotions and our feelings.

An **emotion** is a constantly changing body state (also state of mind, but we're seeing it in our body). By body state I mean the physiological, biochemical and anatomical state of your physical body, all of which are changing constantly. Physiological change consists of altered blood flow, breathing, digestion and all the other processes happening within your body. Biochemical changes are the varying amounts of biologically-active chemical substances such as hormones and enzymes and antibodies. Anatomical changes are changes in your physical structure, often quite subtle, but also very important. I mentioned last time about your pupils enlarging when you see something exciting, which the salesman in the jewellery will be looking out for so he knows which ring you really fancy the most. Many of these emotional changes happen without you even realising it.

A **feeling** is a intermittent mental awareness of your body state (or, for that matter, your state of mind). It is the thought you apply to that awareness and the language you use to describe it. You say: I feel happy – to describe a certain kind of good feeling that you have – or I feel sad – to describe the opposite kind of feeling. It's the subjective experience of an emotion. These assessments we make do not always correspond to the actual emotional change going on within our bodies. The way we talk about our feelings is tied up in our complex web of social interactions. Some people have difficulty describing their feelings. In fact, many of the emotional changes occurring within us are not even noticed – we are simply not aware of them, even though they are affecting our lives quite profoundly.

Yet they are, as Charles Birch said, what matters most. The quality of our lives is all about how we are feeling. The meaning in our lives comes directly from the feelings that we have about ourselves and our situation – largely based on what we are thinking about all that. The value and significance we attach to ourselves and our lives are manifest in our feelings.

If you take away the ability to feel, life ceases to have value, behaviour becomes irrational and meaningless after a time. I gave the example last time of Phineas Gage - the man who had a metal rod through the front part of his brain and who could still reason, but couldn't judge the value of his actions – what they meant to others – so he became impossible to live with. It was his orbitofrontal cortex that was damaged – there is one on either side here – which we will study later. The frontal cortex connects with other centres in the middle of the brain to allow us to interpret deep emotions into manageable feelings that are absolutely essential for us to communicate and understand where we fit in the world in relation to everything else.

Sometimes powerful emotions break through this front part of the brain and take over awareness completely with terrible consequences for the person – this is serious mental illness. In the 1930's a man called Moniz discovered that if you knocked out this front bit of the brain you could cure the worst cases of this. The patient calmed down, but unfortunately no longer seemed to have any meaning or purpose in life. Moniz won a Nobel prize, nevertheless. A chap called Walter Freeman made this procedure notorious in the 1940's – it was called lobotomy. Since the 1950's it has become quite rare, but is still used in exceptional circumstances. Without the frontal lobe, the knowing we get from our feelings would not be possible.

2. What causes them and what happens when we experience them?

The first question is not a useful one because it's like saying what causes life – once it begins, each step 'causes' the next – it's a self-perpetuating process. But what we can ask is what triggers them, because they are the natural consequence of all the interactions we make with the world around us as we live our lives. Every moment of contact we have with another person or an object, or every thought we have about something that happened or could happen, acts as a trigger for emotional change, even though we are not always aware of anything happening at all. Every moment something is changing inside us – in our nervous system or our hormone system – which amounts to a change in our emotional state.

Now a trigger is not the same as a cause because a trigger just starts the process happening – it does not specify the outcome of the process – where that process goes. Think of the trigger on a rifle – it starts the explosion that projects the bullet, but it doesn't determine what the bullet hits. That depends on a much bigger scheme of things – the overall aim of the person firing the rifle and many other things as well.

It's like that with emotions. Outside events or circumstances trigger the internal changes, but they don't specify exactly what those changes will be. That depends on the person's mood at the time, previous experience, temperament, reproductive cycles, position in the family or the social situation, and so on – many other factors. You can often recognise that something triggered an emotion, but you can't say that's what caused all those things to happen. A little thing like a knotted shoelace can trigger an outburst of anger if you are just in a very sensitive state at that time.

The easiest way to think about the changing body state that is our emotion is to think of the body as having two major control systems – the nervous system and the hormone system. This is a gross oversimplification, of course, and I'll give you more precise details about what goes on, but you can sum it up by saying that emotional change is a series of events in the nervous system – particularly in your brain (the centre of your nervous system) – and a series of events in the hormone system, often a cascade of chemicals from different parts of the body, flowing in your bloodstream, one triggering the next, and so on.

3. What do they do – their purpose and value?

There are two main things that emotions do – two very important consequences that flow from the fact that we have these emotions changing all the time.

The first is that the emotional state sets us up for everything we say and do. Any particular emotion will predispose toward certain actions and certain words we might use. When Charles Darwin wrote down all those different emotions that are on your list he worked out three general principles, which were way ahead of their time, but which have generally been confirmed by subsequent scientific studies. The first principle was that certain emotions or ‘states of mind’ – as he called them – generally lead to certain actions and behaviours. He observed this in many different kinds of animals and in many different people that he studied. And the second principle, very closely related, was that the opposite emotional states tend to produce the opposite kind of behaviours.

Because you can’t see the internal changes in the nervous system and hormonal system, this gives us a way of recognising different emotions by the behaviour that results from them. For example, if a person starts shouting and throwing chairs around you would quickly conclude he was angry. It’s a bit more difficult with more subtle emotions, but we have an almost uncanny ability to sense emotional change in one another, so if you’re unusually quiet, someone might say: is anything wrong?

My favourite biologist of all, Humberto Maturana, used this principle as a definition of emotion. He said emotions are bodily predispositions to action. They don’t exactly determine what we will do, but they predispose towards certain actions and away from others. For example, if you are suddenly filled with fear you wouldn’t be saying “let us dance,” you would be more likely to freeze or scream or run away. If you are feeling very loving towards someone you probably wouldn’t find insulting remarks coming out of your mouth towards that person – unless your love suddenly came to an end, for some reason.

So that’s the first thing that emotions do – set us up for what we say and do. The second thing is they determine our relational space. This is something we will talk more about. I was saying last time that it is because we are such an incredibly social species that our emotions have become so refined. The way we feel in the presence of other people varies a lot. You have probably experienced the feeling that your personal space has been invaded when someone keeps wanting to get too close to you – or you have an overwhelming need to be close to someone you care about who is in pain.

All the dynamics of our interpersonal communication revolve around our relational space so we will have a look at each of the emotions to see how they affect that space. This idea of relational space has played a critical role in our evolution so we will also consider the evolutionary significance of the various emotions we study. Relational space is always a way of getting at the social purpose of various emotions, because some might not seem to have any evolutionary significance, but have developed as part of our culture and social mannerisms.

There are also behavioural habits that came from emotions which are no longer needed or appropriate such as many of our fear responses – you jump, but nothing is going to bite you or eat you in the situation we live in today. Children stamp their feet when they are angry even though the stamping doesn’t achieve anything much. You can see this in animals even more clearly. Before they lie down, dogs, and other animals, will turn round and round as if to find the best bit of ground, even though they are lying on a carpeted floor that has no variation whatsoever.

Returning to our list, we are aiming to make a definite decision in the next session about which emotions we will study and in what order – or at least, where you would like to begin.

