

# Understanding Internal Body Sensations

Interoception – The Eighth Sense  
Thirst – Hunger – Pain – Toileting - Temperature



# What is sensory processing?

We all take in sensory information constantly. This is from within our body and from outside our body.

Sensory processing is the central nervous system's (spinal cord and brain) acknowledgement of and the organisation of all of this sensory information for our everyday use and for our ability to function.

When our senses are integrated correctly, we are able to respond appropriately to the sensation. For example, we move away from something hot or breathe in deeply to enjoy a favourite scent.

We are receiving information all the time, from all the senses. This information tells us about our current world and how we should respond.

However, we only use about 5% of this information and ignore or filter out the other 95%.



# Sensory processing dysfunction

Difficulties can arise when we filter out more than 95% of the information or we let in more than 5% of the information. This challenge can be in any system individually or together.

This affects our overall arousal level – our whole body's ability to change our level of alertness.

Even small disruptions to sensory process have an impact on our function, participation and self-esteem.



# We have 5 external senses...

- How we perceive and interpret the world around us
- Essential to interact with the world



# We also have 3 internal senses...

**Proprioception:** information from our muscles, tendons and joints help us adjust body position, apply the right amount of pressure and move smoothly.

**Vestibular:** our sense of head movement and balance, our position against gravity –an internal gyroscope. Posture and muscle tone depend on these signals from the inner ear.

**Interoception:** allows us to ‘feel’ our internal organs and skin, gives information regarding the internal state or condition of our body. The body strives constantly for balance – or homeostasis. Interoception is our internal gauge.

# Interoception tells you...

- Hunger or fullness
- Thirst
- Pain
- Body temperature
- Heart rate
- Breathing rate and pattern
- Muscle tension
- Itch
- Sexual arousal
- Nausea
- Sleepiness
- Tickle
- Physical exertion
- Fullness of bowel
- Fullness of bladder
- Energy levels
- **The state of our emotions**

# How does interoception work?

**Tissues inside the organs, muscles and skin send information to the insula of the mid-brain**

These signals are translated into: How do I feel?

**Body States:** The basic functions or physical condition of the body: hunger, thirst, itch, full bladder, cold, headache

**Emotion States:** Our moods or emotional conditions: anger, anxiety, happiness, sadness, fear, excitement

# Interoception is important

Internal signals can be felt globally or locally in the body.

They are linked to fight/flight/fear and calming responses, travelling along some of the same pathways (Vagal nerve).

**Body States:** We rely on interoception to detect our body state, which is vital for our health, well-being and survival.

- Injury > Pain > Urge to Act

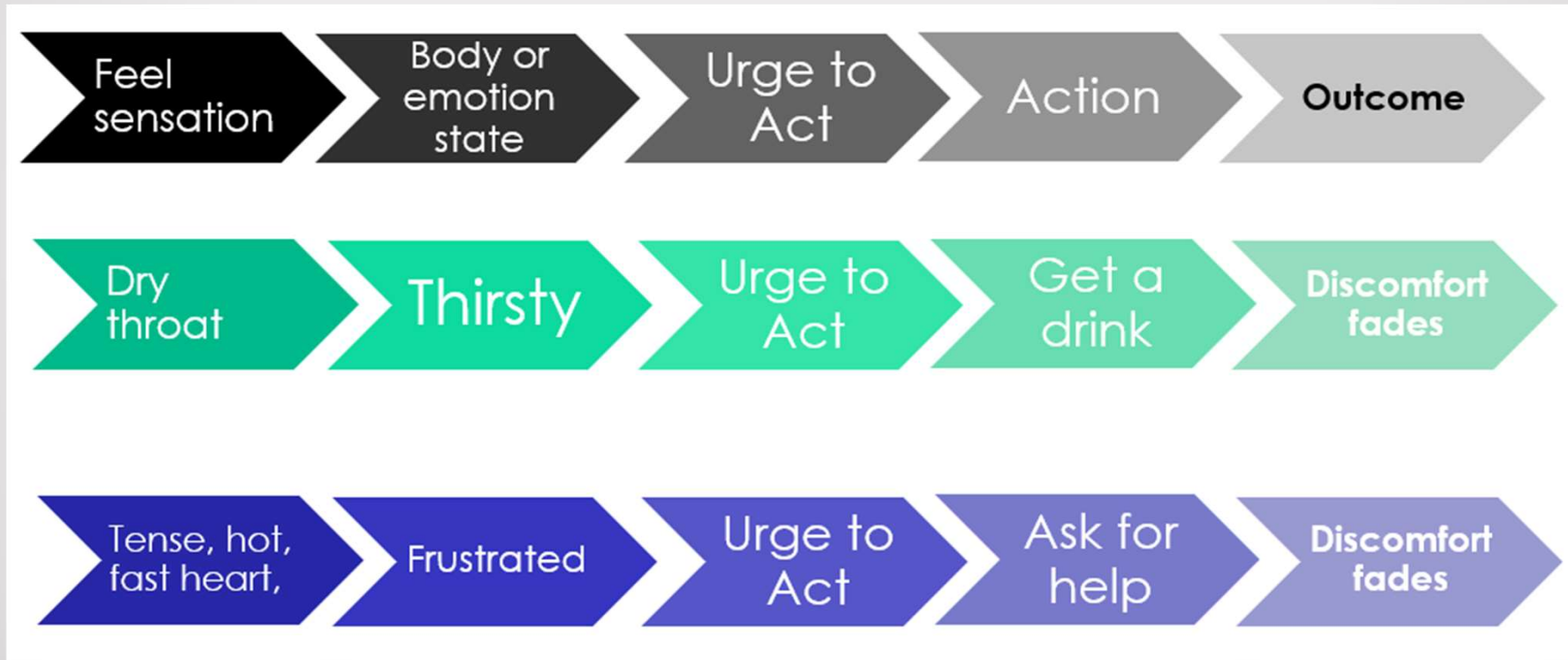
**Emotion States:** interoception signals guide our emotional experience. Our everyday language reflects this: cold feet, butterflies, broken-hearted, can't keep my eyes open.

- In brain imaging studies, the insula is activated during any task designed to evoke emotion





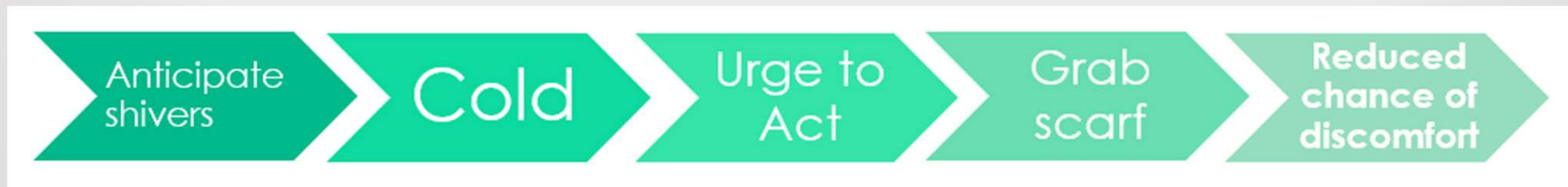
# This information gives us an urge to act



# The brain learns to anticipate

Even the anticipation of sensations that a future situation may provoke can drive our behaviour or urge us to act.

The anticipation of the uncomfortable interoceptive signals provides a strong urge for action



# Compliance and internal body awareness

Sometimes social expectation means we learn to ignore our body signals.

This can lead to poor interoceptive awareness or learning to ignore signals:

- Forced to eat everything on the plate – learn to ignore feelings of being full
- Unacceptable to move in class – need to move builds, reduces focus and causes a stress response when they get home
- Often seen in ASD, hold all their interoceptive signals in at school and explode at home – or the other way around.

# Interoception is key to self-regulation

Self-regulation is the ability to control the way we feel and act.

Interoception alerts us that our internal balance is off and motivates us for action –to restore the balance and self-regulate.

We learn it from co-regulation by our parents as infants:

- Baby is hungry > Baby cries > Caregiver feeds baby

The infant is learning valuable information on how to regulate an imbalanced system. When able to fulfil their own needs they will know what to do **(Adverse Childhood Experiences may impact on this).**

# Types of self-regulation

## **Body State Regulation:**

- Bladder full > Go to the toilet

## **Sensory Regulation:**

- Feel discomfort from noise / light touch > seek a firm hug

## **Attention Regulation:**

- Feel distracted > Turn off background music

## **Energy Regulation:**

- Feel high in energy > Let off steam in break, wiggle in chair

## **Emotion Regulation:**

- Feel frustrated > seek help

# Emotional awareness

Good interoception allows us to clearly *feel* emotions in the body.

**Emotions can be localised distinct sensations:**

- Lump in throat, tightening in chest

**Or global, generalised sensations:**

- Painful wave spreading through the body

**These sensations vary depending on the emotion:**

- Sad feels different from nervous
- Calm feels different from embarrassment

**The intensity of the emotion varies the sensations**

- A little sad feels different to very sad
- A little bit excited feels different to extremely excited.

# Emotional regulation

Good interoception leads to good emotional regulation – we are able to act quickly to regain our balance when faced with distress or intense joy.

We act using two types of strategy:

- Kate has lost her favourite pencil > Her muscles tense, she gets hot & her heart rate increases > she knows she is getting frustrated

**To directly alter the current emotion**

- Kate squeezes a stress ball > she feels calmer

**To alter the current situation**

- Kate asks for help and the teacher lends her the ‘special pencil’ > Kate has a pencil and feels special.



# Gut feelings

As we grow up, we develop connections between a given experience , the body sensations it evoked and the corresponding emotion.

We store our observations for later use. These are called 'somatic markers.'

These observations give us a speedy system that alerts us to positive and negative aspects of a situation and allows for thought free intuitive decision making – gut feelings! These are speedy but less accurate. **This can allow us to be more flexible and react more quickly to changing social contexts.**

People with poor interoceptive awareness use a much slower, logical cognitive process. It is more effortful but more accurate. **This can drive the need for sameness and an inability to keep pace with rapidly changing social contexts.**



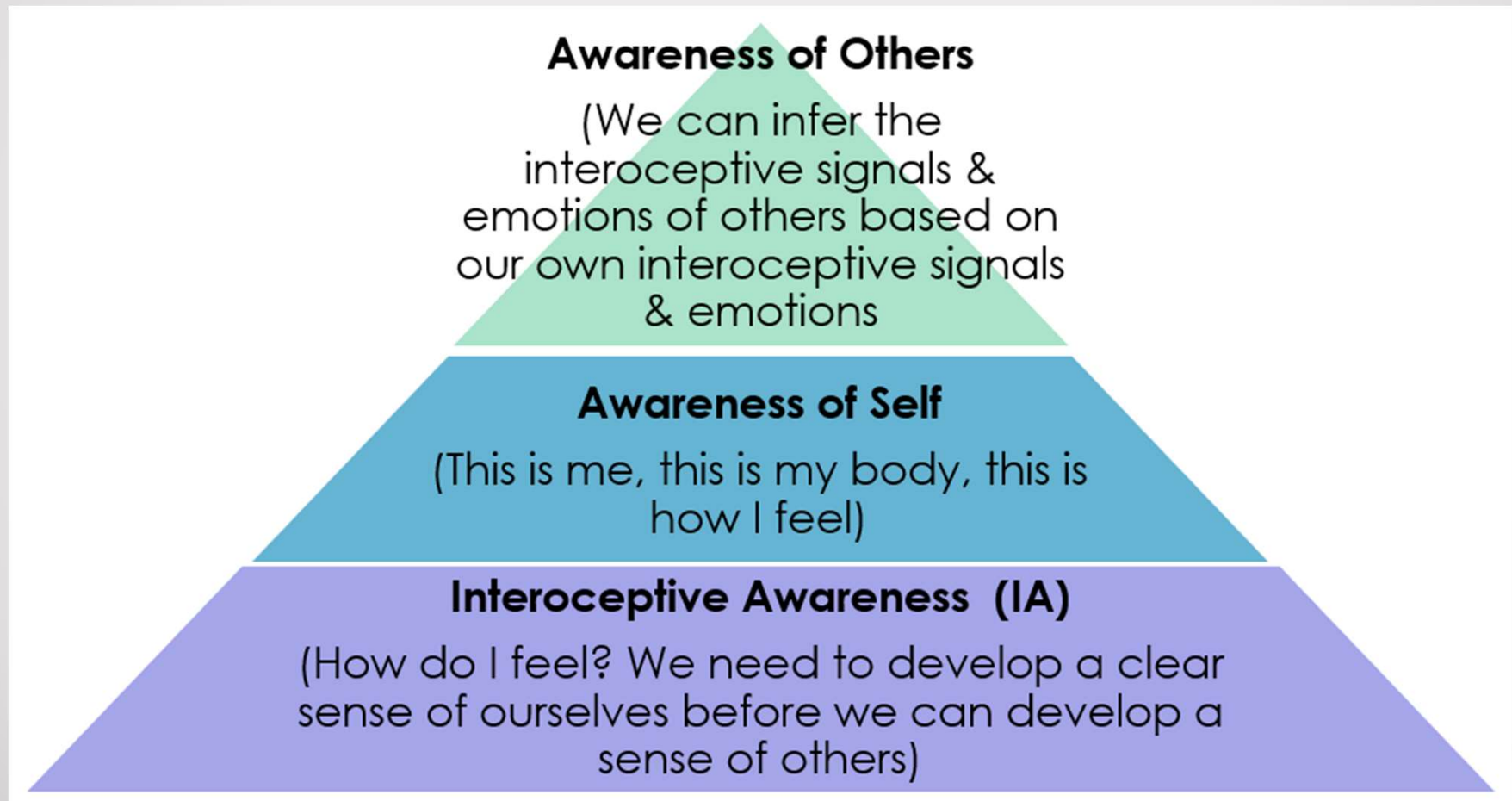


# Good vs poor emotional awareness

The ability to distinguish subtle differences via our interoceptive system is crucial to emotional experience.

Good	Poor
Better able to adapt and go with flow	Often rigid and inflexible. Likes things to be the same
Good control of emotions	Lack of control of emotions
Larger repertoire of coping skills	Limited repertoire of coping skills
Less aggressive behaviours when angry	Higher occurrence of intense emotions
Good self esteem	Low self esteem
Good ability to read others emotions	Difficulty reading others emotions
Able to feel the emotions others might feel - empathy	Reduced empathy

# Self awareness and empathy



# What if interoception is ineffective?

If we are unable to register/discriminate these body sensations:

- We feel body disconnection (un-embodied)
- We don't know what our body needs
- We don't know what our body is saying
- We can't tell the difference between a body state and an emotion state
- We can't label what we are feeling
- We can't understand what we are experiencing
- We can't change what we are experiencing
- We have no security or control (internal/external worlds)
- We cannot communicate our personal experience
- We are reliant on others and what they say/do to label our experiences.

# Examples: Over sensitive interoception

## Body states

What you might observe	Relation to Poor IA
Asks for the toilet a lot.	The slightest stretch in the bowel / bladder causes discomfort or urgency.
<b>Complains frequently of aches or pains.</b>	<b>Child overly feels discomfort and the slightest pain can feel major.</b>
Injuries hang around for ages.	Child continues to feel pain even when it might be slight to others.
<b>Refuses to take jumper off despite it being warm.</b>	<b>Have a keener awareness of body temperature and feel cold for longer</b>

# Examples: Over sensitive interoception

## Emotion states

<b>What you might observe</b>	<b>Relation to Poor IA</b>
When calm can describe detailed sensations related to emotions but when upset loses this ability.	Their feelings may be overwhelming and it is hard to know which to be salient to.
Child reports sensations but cannot determine emotions.	Signals are too overwhelming and cannot determine the most relevant signals for the emotion.
Panics after a short period of physical exertion.	The increase in heart rate and breathing may be uncomfortable or intense, or confused with panic.
Is over dramatic about minor ailments.	They are highly sensitive to pain and the feeling is amplified.



# Examples: Under sensitive interoception

## Body states

What you might observe	Relation to Poor IA
They suddenly need the loo and have to race there.	Does not sense the need to go to the toilet until the feeling is extreme.
<b>Never feels hungry or thirsty –has to be pushed to eat or drink.</b>	<b>Does not feel the discomfort of an empty tummy or dry throat.</b>
Keeps going until extreme exhaustion.	Does not read the signals of “too much” and so doesn’t stop.
<b>Doesn’t complain of a serious health issue.</b>	<b>Cannot sense the discomfort and so doesn’t report it.</b>

# Examples: Under sensitive interoception

## Emotion states

<b>What you might observe</b>	<b>Relation to Poor IA</b>
All or none emotions.	Cannot sense subtle changes , only recognises them when extreme and so strong, so emotions seem sudden.
Cannot use calming strategies, once stress is sensed it's too late.	Only senses intense emotions, therefore cannot use the strategies at the start of stress – where they are more successful.
Unable to say how their body feels during certain emotions.	May not recognise a variety of emotions as has never recognised the sensations behind them.

# Examples: Difficulty working out exactly what the body signals are telling them

## Body states

What you might observe	Relation to Poor IA
Says “I don’t know” or “maybe” when asked if hungry / needs toilet.	Might have a general feeling of hunger or needing the loo, but cannot determine if it can wait or is an immediate need.
<b>Complains of hunger, but then only eats a bite.</b>	<b>May have mistaken the feeling of hunger for another need – e.g. thirst, needing the toilet.</b>
Complains of feeling poorly but can’t tell you exactly what’s wrong.	May have a vague feeling of illness but cannot pinpoint the specific areas or problems.



# Examples: Difficulty working out exactly what the body signals are telling them

## Emotion states

What you might observe	Relation to Poor IA
Insists they are ok even though they are clearly angry.	Cannot distinguish subtle differences in internal body symptoms – for example when we are happy and angry our heart beats fast. These body signals feel the same so cannot distinguish the 2 emotions.
Can identify feeling angry but unable to identify the degree or intensity of the anger.	Has a general sense of what angry feels like, but cannot distinguish the slight differences that give clues as to the intensity: slight vs. significant.

# What can we do to help poor IA?

**Step 1: Explain what interoception is:** our body gives signals about how it feels and we have to learn to listen to these signals and figure out what they mean.

**Step 2: Adaptive strategies:** if adaptive strategies can improve health and well-being, use them.

**Step 3: Build Interoceptive Awareness:** help them notice body sensations

**Step 4: Give IA meaning:** start to connect body sensations to emotions.

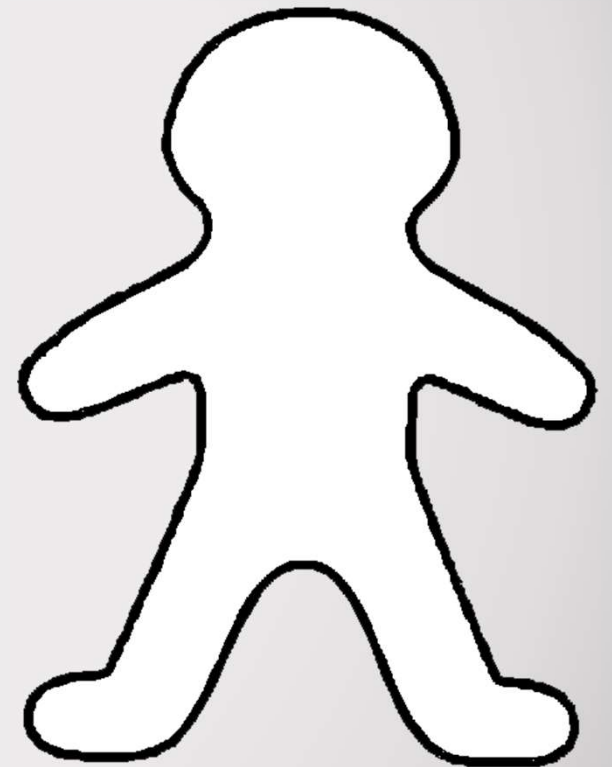
**This may take a lot of practice and a really, really long time!**



# Step 1: What do they feel and explaining the body

Use an empty body drawing to see which parts of the body they come up with (without prompting). There may be very little on the drawing, or it may be based on what they have seen in lessons rather than a lived experience.

When they come up with a body part, see what words they have to describe how it feels. They may not have any.



# Step 1: Ideas for explaining body parts

- Your eyes tell your brain if it is too bright or too dim
- Your nose tells your brain about the smells
- Your mouth tells your brain what things taste and feel like and if your jaw is tight or loose
- Your throat tells your brain if it is dry and needs water
- Your voice can change with how you feel and what you are doing
- Your skin tells your brain if it is hot or cold, and what you are touching
- Your lungs breathe faster if you need more air, do exercises, or if you feel upset
- Your heart goes faster if you are moving a lot or if you feel upset
- Your muscles tell your brain if they are squeezing, moving or twisting
- Your tummy tells your brain if it is empty or full
- Your bladder/bowel tells your brain if it is full or empty
- Your brain tells you what this all feels like, but sometimes it can be too busy!

## Step 2: Adaptations

These can be used to ensure health and well being is maintained whilst you work on building interoceptive awareness. Examples are:

- Toilet / food / drinking schedules
- Setting alarms to eat / drink / toilet
- Reminding the child to eat / drink / toilet
- Visual aids of what to wear for certain weather or activities
- Increasing roughage / fibre in diet to aid feeling full in the stomach or bowel
- Social stories exploring the sensations behind feelings.

# Step 3: Building interoceptive awareness

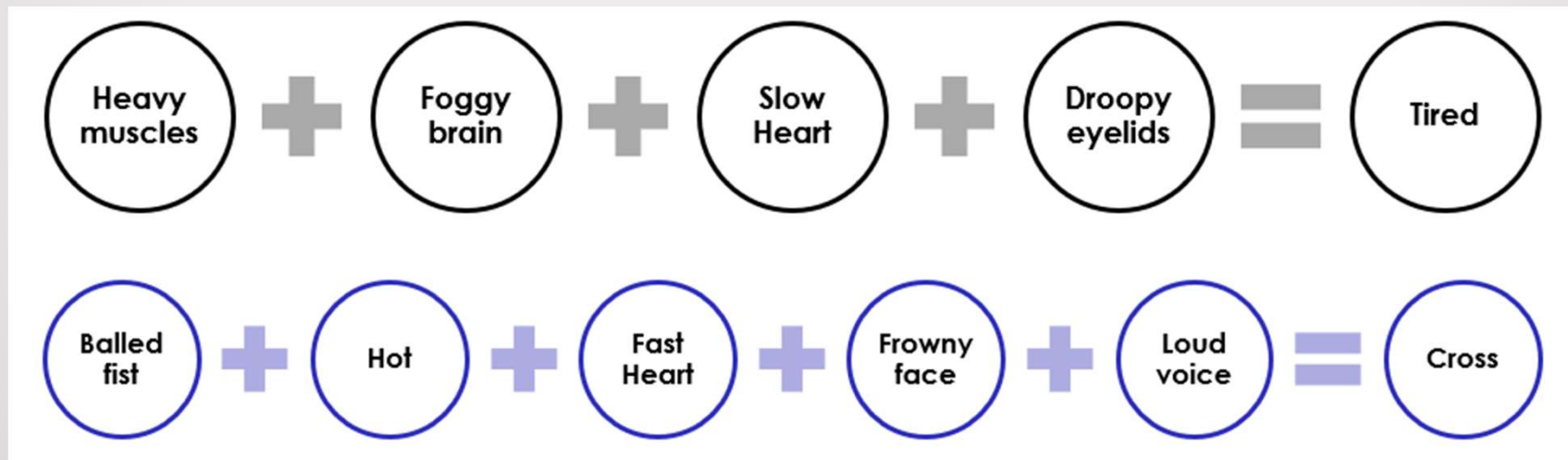
Please see the PDF handout provided on the website: [Building Interoceptive Awareness](#).

- Start to model and discuss different body sensations in context, for example before, during and after a meal for hunger / feeling full, OR before, during and after exercise for heart rate or breathing, OR after your tummy growls bring attention to this and how it feels for you, OR after they have goose bumps in the cold.
- Use the child's words where possible, but if you or they struggle there's some examples on the handout to help.
- You can do some of the suggested exercises on the handout to increase awareness. Discuss whether they can feel any differences. You may need to help them with word ideas to describe their feelings. Give examples of how you feel, or over-exaggerate it, to help them.

# Step 4: Making connections

Once the child is consistently feeling sensations in their body, see if you can link these to emotions with them.

At first, focus on only a few body states or emotions, only expand when they seem proficient. Test out ideas.



# Step 4: Making connections continued

Remember the importance of feeling subtle differences between similar emotions: For example, with a funny feeling in the tummy, try to work out how this feeling differs for hunger or sadness. Then highlight that the solution for hunger is different to the solution for sadness.

Use specific body state and emotion terms: For example, I feel irritated; I feel slightly cross; I'm really excited, it hurts a little, my tummy feels very empty and is growling.

Being specific will model to your child all the different ways we feel sensations and emotions.

Our ability to acknowledge and interpret interoceptive sensations give us our security in the world, our joy and our pain.





# Resources

More information about interoception is available here: [Kelly Mahler | Interoception | Interoception Activities \(kelly-mahler.com\)](https://www.kelly-mahler.com/interception-activities)