



HOW PHYSICAL ACTIVITY CAN HELP YOU LISTEN TO YOUR BODY

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YOUNG REVIEWER:



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AGE: 14

When we experience emotions, various bodily sensations help us to understand how we are feeling. Think about how you can feel your heart pounding when you are nervous, or your tummy rubble when you are hungry. This process of sensing internal bodily sensations is called interoception. Interoception helps us in lots of situations, from being prepared to run from danger to knowing when to eat. This makes interoception vital for human health and survival. So, finding ways to improve interoception is important! What if the solution is as simple as changing the way we exercise? Think about how you notice your breathing after running to catch the bus. In this article, we talk about how exercise could help us improve the understanding of our bodily sensations, promoting better mental and physical health.

WHAT IS INTEROCEPTION AND WHY IS IT SO IMPORTANT?

What comes to mind when you think about emotions? Chances are, you think of some changes coming from inside your body. It is hard to think about being scared without imagining the butterflies in your stomach, your heart beating faster, or the palms of your hands getting sweaty. Many scientists even believe that emotions would not exist without these bodily changes. It would be like watching a horror film without the scary music—not so scary anymore! It is likely that bodily sensations help us to understand which emotion we are feeling, providing a guide to our behavior so that we know how to respond in various situations. This guidance can even be happening without us noticing!

The process of sensing internal bodily sensations is called **interoception**, and it is gaining attention in science. This is not surprising when you think about how interoception helps us to feel many important emotions, like hunger, fullness, thirst, tiredness, sadness, and fear, to name a few. Interoception also helps us in situations beyond just regulating emotions, such as regulating our bodies during exercise. It is thought that interoception helps monitor changes in the body, so that we know when to speed up or slow down (Figure 1).

INTEROCEPTION

The process people use to feel and understand various sensations coming from inside their bodies (examples include heartbeat, breathing, and whether the stomach is full or empty).

Figure 1

Interoception is thought to play an important role in how we regulate our bodies during exercise. Changes in the body (like an increase in heart rate) are recognized by the brain, which then communicates back to the body to tell it what to do. This process is important to make sure that we are exercising safely.

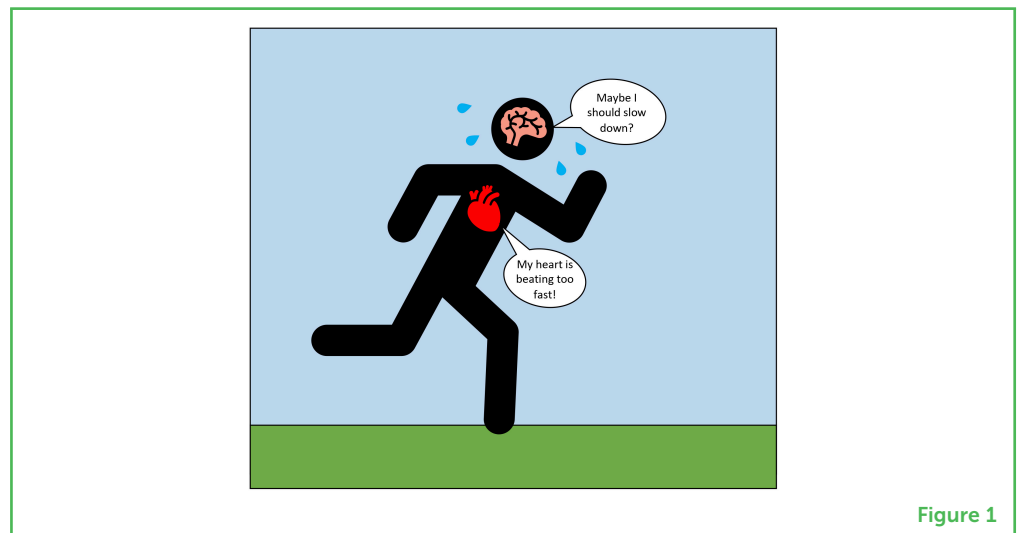


Figure 1

MEASURING INTEROCEPTION

How can we tell if someone has good or bad interoception? Well, there are multiple ways to measure it! One well-known example is called the heartbeat counting task (Figure 2). With this task, we can measure how good a person is at feeling the signals from inside their body. We record how many heartbeats the person thinks they can feel and compare it to how many heartbeats occurred (measured

INTEROCEPTIVE ACCURACY

How good people are at feeling the signals from inside their bodies.

Figure 2

The heartbeat counting task is one way to measure interoceptive ability. The participant is asked to silently count how many heartbeats they feel in their body, without physically checking their pulse. This is completed several times for various time durations that are kept secret from the participant (for example, 25, 35, and 45 s). While the participant is trying to feel their heartbeat, their actual heartbeat is recorded using a heart rate monitor. The number of heartbeats counted by the participant is compared to the actual number of heartbeats recorded by the monitor.

using a heart rate monitor). If there is a big difference between the two scores, the person is not very accurate at detecting the signals from inside their body. If their guess was very similar to the actual number of heartbeats, the individual is said to have high **interoceptive accuracy**. This score has been linked to many important things, such as how strongly we feel emotions and how well we regulate them, how we make decisions, and how we regulate our bodies during exercise. Even though the heartbeat counting task is commonly used, it is not perfect—but scientists are developing new and improved tasks to measure interoception.

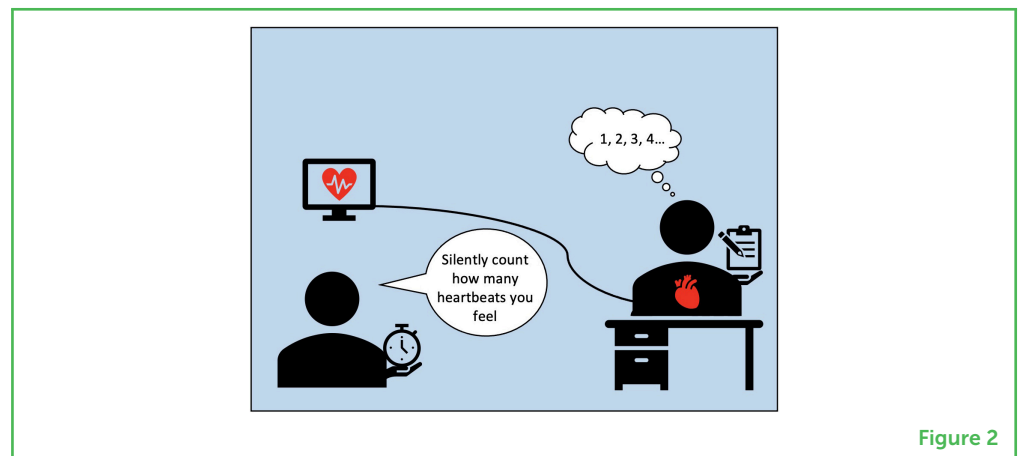


Figure 2

Try this simplified version of the heartbeat counting task at home with your friends!

- Make sure you are in a quiet room, then ask your participant to sit down with their arms and legs uncrossed.
- Tell the participant, "Without physically checking, I want you to silently count how many heartbeats you feel in your body, from when I say start to when I say stop."
- Start your stopwatch when you say "start," and time the participant for 30 s (do not let them see the time!)
- Write down how many heartbeats they counted.
- Repeat this, but this time, ask the participant to count their heartbeats while feeling their pulse (on their wrist or neck).

How does the heartbeat numbers compare between the two tests? Did they find the tests easy or hard? Test a few people, then see how their answers vary.

INTEROCEPTIVE DYSREGULATION

What happens when there are problems with interoception, and people are unable to feel or understand the signals coming from inside their bodies.

WHAT HAPPENS WHEN THINGS GO WRONG?

What about when we cannot understand the changes happening in our bodies? This can cause problems and prevent us from regulating our reactions. This is referred to as **interoceptive dysregulation**

[1]. Many scientists believe that interoceptive dysregulation plays an important role in mental health—misunderstanding of bodily signals could make those signals seem confusing or scary. Poor interoception has also been linked to problems with physical regulation, too. For example, if you cannot accurately sense how tired you are when you are exercising, you might either exercise too hard or not hard enough. Both options could be dangerous—exercising too hard could result in injury, while not exercising enough could lead to inactivity. The potential mental and physical health issues that arise from interoceptive dysregulation tell us that we need to find ways to improve our interoceptive abilities!

IMPROVING INTEROCEPTION

Improving how we detect and understand changes in the body could help reduce interoceptive dysregulation. If we better understand bodily changes, then we can respond to them correctly. For example, if you feel your heart beating faster before an exam, you will recognize that this is a normal reaction and not a sign of danger. Or if you can feel yourself getting tired during exercise, you can take a few minutes to rest and avoid getting an injury.

The good news is, there are ways we can improve interoception! Scientists have looked at several ways to do this. One example is **mindfulness**. You may have already heard of mindfulness, as it is even being used in schools these days. Mindfulness involves directing your attention toward your thoughts, feelings, and the bodily sensations. Scientists believe mindfulness could provide many health benefits. However, one problem with mindfulness is that it asks people to concentrate on how their bodies feel while they are at rest. Considering that some people already have trouble feeling the changes in their bodies, this could be very hard to do. It would be helpful if there were a switch to turn up the volume of the signals coming from inside the body!

What if the solution could be as simple as changing the way we exercise? Physical activity could work as a natural volume switch, making the signals from the body stronger and easier to notice [2]. If we pay more attention to how our bodies feel during and after exercise when the signals are stronger, we could get more benefits than we could while at rest.

PHYSICAL ACTIVITY TO BOOST INTEROCEPTION

Experiments have already shown us that most people are more aware of the signals from their bodies during and right after exercise [3]. You may have already noticed this. The next time you exercise, take a moment afterwards and write down which sensations you feel.

MINDFULNESS

The process of directing your attention toward your thoughts, feelings, and the bodily sensations. It is thought make you calm and improve your mood.

INTEROCEPTIVE EXPOSURE

When a person is exposed to and aware of bodily sensations, with the goal of making people feel comfortable when they notice changes in their bodies.

AEROBIC EXERCISE

A type of exercise that requires oxygen to perform. Aerobic means “with oxygen.” Typically, aerobic exercise can be done for quite a long time before getting exhausted.

Sensations might include the pounding of your heart in your chest, or the way your breathing gets faster and deeper. Also think about how you are in control of these sensations, and how they are not anything to fear. You may still find it difficult to feel anything, but that is ok! Scientists think this is something we can improve with practice.

Improving interoceptive ability with repeated exercise is an example of **interoceptive exposure**. The idea is that we can become familiar with these changes in the body, making them feel less scary in the future. The more we experience something, the easier it is to recognize it in various situations. Scientists have even suggested that **aerobic exercise** can be a way to reduce anxiety, helping us to realize that noticeable changes in the body, like a fast heart rate, are not always signs of danger [4]. This would not necessarily work with any type of exercise, though—a light walk might not be enough to cause the bodily changes that we need. Scientists have suggested that we need to exercise close to our limits to fully activate interoception during exercise [5]. This means exercising to the point where we are working hard, but can continue. Common signs of exercising close to our limits are a fast heart rate, deep breathing, or aching muscles.

There is still a lot we do not know about how exercise can be used to improve interoception, and scientists are trying to figure it out. Think about the well-known link between physical activity and mental health: “physical activity helps to improve your mood.” Could interoceptive exposure be the reason? It is possible that physical activity is helping us to regulate our moods by improving interoceptive ability. This makes sense given that interoception has already been linked to emotion, as we mentioned earlier.

HOW CAN THIS HELP YOU?

Although research is in the early stages and scientists are not yet sure of the best way to use physical activity to promote interoception, it is still something you can think about now. You already know the benefits of understanding your body better, so try to keep this in mind the next time you are exercising. Think about the sensations that you use to help regulate your body—which sensations tell you that you need to speed up or slow down? The more aware you become of this process, the more you will be able to regulate your body in various situations.

In summary, the ideas we have presented demonstrate just how important it is to understand your body. Your body can affect your thoughts just as much as your thoughts can affect your body! So, remember, listen to your body!

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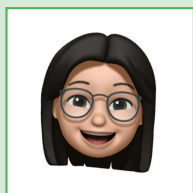
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YOUNG REVIEWER

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My name is Yoonsa and I am 14 years old. I play the violin and piano, and recently started to learn the viola. I am interested in marine biology, and when I was younger, I wanted to become a marine mammal vet. In my free time, I like to read, sight read ("zilch") chamber music with my friends, and play with my mini schnauzer.



AUTHORS

AMIE WALLMAN-JONES

I am a Ph.D. student at the Institute of Sport Science of the University of Bern, Switzerland. I am originally from Manchester in the UK, so the mountains are a nice change of scenery. I have always been interested in exercise and how it can be used to help people. In my project, I am working to test the ideas discussed in this paper—to see if we can improve interoception through physical activity. I will then look at how improved interoception affects mood and emotions, to see if we can use these ideas in schools. *amie.wallman-jones@unibe.ch



MIRKO SCHMIDT

As an professor at the Institute of Sport Science at the University of Bern, I am particularly interested in how physical activities ought to be designed if they are to have a positive effect on children's and adolescents' physical and mental health. I have conducted several studies to investigate the role that physical activity plays in the development of children's personalities, and my current research looks at how cognition and interoception can be enhanced by specifically designed physical activities. When I am not at work, I love to play in the garden with my three kids or to snowboard in the Alps with my wife.