

# LOOKING WITHOUT SEEING

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Inattention blindness is psychology's way of describing not seeing what's right in front of you. It's a deadly threat to aviation.



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**A**ttention is your ability to focus, and maintain focus, on an object, event, or task.

We can't focus on every object, event, or task around us, however, because our brains have limited capacity to 'pay attention'.

That means that at any one time, we process only a small amount of the information – both what we're seeing and what we're hearing – beaming in from our environment.

Ideally, therefore, we concentrate on those things we believe are significant to us and our goals, and we filter out the 'noise'.

## Distraction

But sometimes it's the 'noise' that captures our focus – literally, if it's a cellphone ringing – when we're trying to concentrate on an important task. This is basically what 'distraction' is.

Minor or major distractions can turn any routine operation into a challenging situation.

In aviation, for example, this could happen when listening to, understanding, and responding to radio communications, or looking out for other aircraft in the same airspace, while at the same time trying to find a pen that's fallen to the floor and disappeared.

It's obvious that in aviation, being distracted from a primary task and missing important and critical changes in your immediate environment can have deadly consequences.

The United States crash of Eastern Air Lines Flight 401 in 1972 is classic example. All three pilots on the flight deck became utterly focussed on a burned-out landing gear light and failed to notice the autopilot had been disconnected.

The Lockheed L-1011 TriStar gradually lost altitude and crashed into the Florida Everglades, killing 101 of the 176 onboard.

Not all distraction is bad. If an alarm distracts us from our current task but make us focus on a more important one, that's obviously a good thing.

But distraction is a hazard when it leads to inattentive blindness.

## Inattentive blindness

It's logical to assume that you consciously see whenever your eyes are open, but this isn't the case.

Inattentive blindness – IB – is a failure of visual attention. It's different to distraction because with IB we fail to notice prominent and unexpected changes in our environment unless our attention is directed to it.

In complex environments or situations where our attention needs to be focused on one important task (or object) – or shifted between multiple tasks – our awareness decreases of objects or events not in our direct focus of attention.

Have you ever been wondering where your keys are and you're staring straight at them? Or looked for your cellphone using your cellphone torch? »



// Distraction is a hazard when it leads to inattentive blindness.

» We're also all affected by 'inattention blindness'.  
(It's not just teenagers.)

One of the best-known experiments used to demonstrate IB was the 'invisible gorilla' experiment, where participants watched a video of a group of people tossing a basketball and had to count the number of passes. More than half of participants reported seeing no changes, but in fact a woman dressed in a gorilla suit strolled through the scene, turned to the camera, thumped her chest, and walked away. It may seem impossible that participants missed such an obvious and strange sight. Some participants were looking right at the gorilla but not seeing it because all their attention was directed to the task of counting the passes and the gorilla essentially became completely invisible.

IB is not uncommon and everyone will experience it in their daily life more often than they realise.

But in a safety-critical and high-risk environment like aviation, an inability to detect unexpected changes in the visual environment is a major safety hazard, and can lead to serious incidents and accidents.

In practice, if automated systems fail and attention is drawn away from the primary task and the surrounding environment, the consequences could be:

- one or more incomplete tasks, such as a preflight check
- impaired situational awareness inside and outside the cockpit
- air traffic control displays not monitored due to disruptions in visual scanning
- not detecting, or misinterpreting, critical information – for instance, missing radio calls or instructions from ATC
- increased time dwelling (for instance, on displays) and incorrect or delayed decision-making
- standard operating and emergency procedures not followed.

Other consequences could include:

- impaired vigilance and signal detection, from, for instance, other aircraft in the same airspace
- impaired dual task performance – for example, scanning instruments and giving instructions to the crew
- slower detection and diagnosis of problems such as a faulty warning light
- delayed recognition of, or a failure to detect, threats, errors, hazards, and critical events at all – weather changes being a prime example.

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The consequences listed to the left lead to increased reaction times to detect and diagnose problems, adapt to system changes and proceed with the correct operations.

In an emergency, however, any additional seconds to respond to detected changes could be the difference between life and death, and cases where attentional failures have prevented pilots from noticing critical events are abundant.

### What affects attention?

- Under high workload – such as landing at a busy aerodrome – the brain has too much information to process, is overwhelmed, and struggles to prioritise tasks.
- When workload is too low – such as in a highly automated cockpit – the brain has trouble attending to the task because of a lack of stimulation causing the 'boredom factor'.
- Stress affects focus and the brain's ability to make quick decisions is lessened – this includes home and work stress.
- Poor sleep – perhaps as a result of irregular work shifts – may impair your ability to maintain focus on tasks.
- Working on a cognitively demanding task for long periods of time – for instance, boroscoping a 'hot' section of a turbine – the brain will often experience mental fatigue.

- Confusing, unclear, irrelevant, or low-quality information and communication – muffled radio calls for instance – impair our ability to focus on tasks and make quick and efficient decisions, set goals and prioritise tasks.
- Automation in modern aircraft, and reliance on it, can lead to complacency, and can easily diminish situational awareness if you don't have, and maintain, oversight of critical systems.

### How can attention be improved?

Rest! Take breaks. Attentionally demanding tasks, such as in aviation, use a lot of brain power and energy. It's unrealistic to expect yourself and your colleagues to be engaged in cognitively demanding tasks and sustain attention for long periods of time, yet still perform at 100 percent. Attention wanes over time and the brain gets tired and needs rest.

Follow standard operating and emergency procedures. To minimise distractions and disruptions, communicate early on with your crew or colleagues about roles and responsibilities, expectations of behaviour, key tasks, and priorities.

Prioritise and focus on key tasks to manage workload, share the workload where possible and appropriate.

Speak to your manager and/or colleagues and seek support if you're feeling tired, stressed, overwhelmed, or fatigued. These all affect your ability to focus on tasks and information, and increase the likelihood of making errors.

Being able to manage attention is a skill that needs to be maintained. Experience improves your ability to identify, understand, and manage tasks and different systems. Even experts are prone to attentional failure, becoming distracted and making mistakes. Keep current and keep learning.

When it comes to distractions, acknowledge that you may have control over some and not over others.

If you're faced with distraction, you need to quickly decide whether what's trying to get your attention is relevant to the task and a priority, whether it can wait, or can be disregarded altogether. ➡

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Comments or queries?

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## // DOES THIS SOUND FAMILIAR?

CAA Flight Operations Inspector Pete Gordon knows a thing or two about being blindsided by distraction and inattention blindness. Flying helicopter long-line extreme precision work in Papua New Guinea in difficult areas and at high-density altitude, his intense concentration was once completely undone by receiving a radio call about "...the weather up there, Captain?"

"I didn't even answer the call. Just acknowledging, somewhere in my brain, that the call had happened was enough to have guys on the ground who were guiding me in this exacting work '...just two inches to the left Captain...' wondering what on earth had me suddenly unable to follow their pinpoint instructions. 'We said two inches, Captain! Two inches!'"

Similarly, in New Zealand, using a lightbar and GPS to make lovely straight spraying lines across a block, Pete answered his wife's call on his cellphone, "And within seconds, I was seven metres off the line! Even though I was following the lightbar, I'd become distracted by our conversation and not acknowledged what the light bar was telling me, allowing the helicopter to drift off by half a swath! I had to stop, turn around, and start again."

But his purest experience of IB, and the scariest, was flying a Huey helicopter in New Zealand, doing baiting work.

"The master caution warning light suddenly came on, so I looked down at the warning panel, and there was an oil pressure warning light showing. And that is not good.

"I needed to confirm what it was telling me with the oil pressure gauge – something I see innumerable times each hour as I do a scan across the instrument panel.

"But I could not find the gauge. I could not see it on the panel. It just wasn't there.

"So I put the machine on the ground, and once landed, there, on the panel in its usual place, was the oil pressure gauge, confirming what the red light warning was saying. Zero oil pressure.

"But clearly, my brain had been well-stressed, my mind was not accepting what was going on and the gauge was invisible to me."