

## About Time

*This article was written by Galen Schultz and was published in the Weekend Witness, Pietermaritzburg. It resulted from an interview with Frikkie de Bruyn.*

If you were abducted by aliens and asked to describe Earth's air in a language you understood, how would you describe it? It would be equally difficult to describe left and right without any points of reference. The same hypothetical can be applied to time – that dimension we all thought we knew until we were asked to describe it.

It's natural to think of time as a linear progression. Experience will tell us that we live and we die; that the seasons come and go; that the sun rises and it sets. All these have a beginning and an end.

Quantum physicists will argue differently – that time is far more precarious than we are conditioned to believe. When asked the question “what happened before the Big Bang?” physicists will most likely scoff at the notion and argue that space and time itself did not exist before the Big Bang. Without time, the notion of “before” becomes meaningless. It would be like asking “what's south of the South Pole” if the Earth was the only object we knew existed.

But there's no escaping our notion of time. Everything we do or experience takes place at a specific time and point in space. We all ‘experience’ time but can we ever be sure that it exists, out there, independent of our experience? Cosmologist, Frikkie de Bruyn, offers some insight into the precarious nature of time to help us better understand its nature.

“Time is experienced in two fundamental ways, explains de Bruyn. It seems to flow like a river, the seconds, days and years passing relentlessly. Our perception of time is also characterised by a succession of moments with a clear distinction between past, present and future.” We can all confidently say that we have knowledge about our past experiences, but not of the future. However, at any given point in time, our past and future are connected to what we describe as the ‘now.’ Some go as far as to argue that all that exists is the ‘now.’

These perceptions of time are closely related to the idea of time being either linear or cyclic. It is natural to assume that time is linear, with clearly defined beginnings and ends to most human experiences and unique events. “It is like a giant ruler, stretching back into the past marked in scale of years, decades and centuries and it stretches away into the future,” explains de Bruyn. The Big Bang theory also uses this ‘progressive’ perception of time.

However, cosmologists like de Bruyn will argue that most of the time, time appears to be cyclical and not necessarily progressive. Cycles occurring in nature, such as the days, seasons and years can be used to support this perception of time. Time therefore becomes “the element in which natural events occur,” says de Bruyn.

We have always been limited by our language when it comes to describing something like perception of time, yet it nonetheless remains central to our modern lives. GPS devices would not exist without pinpoint accuracy in timing, computers and networks wouldn't work and we couldn't have landed someone safely on the moon.

The invention of the clock and subsequently the watch brought about a new awareness of time. "Our minds process information from clocks and 'interpret' that information as 'being time'", explains de Bruyn. Another greatly significant revolution in our perception of time was Einstein's theory of relativity. "The Newtonian perception of time as separate and independent, ticking away irrespective of human activities, was replaced by the 'personalised' relative interpretation of time. Every person had his own time", says de Bruyn. At a more cosmological level, we now also know that time slows down as we approach velocities close to the speed of light. Stephen Hawking even described time as coming to a complete end within a black hole.

Einstein's relativity theory also allowed us to think of time as a measure of the separation of events in space – clearly connected to change. However, time does not exist in the sense of objects and changes. "It is a human invention that provides a mental tool to measure change and change means events separated in space", explains de Bruyn.

It should be difficult for anyone to consider time as a human invention; that our concept of time is so closely related to space – the spatial separation of objects and change. It's even more difficult to comprehend, that outside of this context, time simply has no existence.

It makes one wonder: if we discovered the secret to timeless longevity, where death was not feared as the end, would we still be so obsessed with time?