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In a different timeworld

Steve Taylor seeks to make sense of time expansion experiences

A few years ago, I had a car crash. I was driving in the middle lane of a motorway, when a truck pulled out from the inside lane and hit the side of our car, spinning us around, and then hitting us again...

As soon as the truck hit us, everything seemed to go into slow motion. I heard the sound of the impact and asked my wife, 'What was that noise?' Time seemed suspended, as if a 'pause' button had been pressed. Then the car began to spin. I looked behind, and the other cars on the motorway seemed to be moving extremely slowly, almost as if they were stationary. I felt as though I had a lot of time to observe the whole scene and to try to regain control of the car. Everything became clear and vivid, and I was able to take in a lot of detail. I was surprised at how calm I was. Rather than panicking, I thought

clearly and methodically about the situation. I tried to regain control of the car, gripping the steering wheel and pressing down the brake, but the car kept on spinning, for what seemed at least half a minute (although in reality it could not have been more than a few seconds). Luckily, the car spun in the direction of the hard shoulder of the motorway, and we finally careered into a crash barrier, without any injuries. Then everything seemed to switch back into normal time again.

This is an example of a phenomenon which I call a 'Time Expansion Experience' (or TEE). I have just published a qualitative study of these experiences (Taylor, 2020). Following a pilot study of 22 TEEs specifically linked to accidents, I collected 74 general reports of TEEs, and examined their causes and characteristics. I found that 40 of the 74 reports were linked to accidents (mostly car accidents). Twelve were linked to meditation or spiritual experiences, while seven were linked to sports and games, and another seven to psychedelic drugs. (There were a few other minor triggers, like traumatic experiences or listening to music.)

Most people described their TEEs as positive, even if they occurred in accidents and emergencies. Almost everyone reported a sense of calmness, despite the danger they were (in most cases) facing. Most people reported a sense of alertness or even heightened awareness. They felt that their slowed down sense of time gave them the opportunity to take preventative action. They reported rapid and detailed thinking, with more time to make plans and decisions. As one participant who had a car accident reported, 'My head was really clear because I seemed to have so much time to think ... I will always remember how much time I seemed to have to think and work things out.' Some people also reported a sense of quietness, as if noise from their surroundings had become muffled.

In many cases, the time expansion was very dramatic. Seconds seemed to turn into minutes, or time seemed to stop or disappear altogether. As one participant who had a TEE during a hockey game reported, 'The play which seemed to last for about 10 minutes... occurred in the space of about 8 seconds.' One person who fell off a horse reported, 'It only lasted a few seconds for me to be thrown from the horse and hit the ground; however the whole experience seemed to last for minutes.'

Theories of time perception

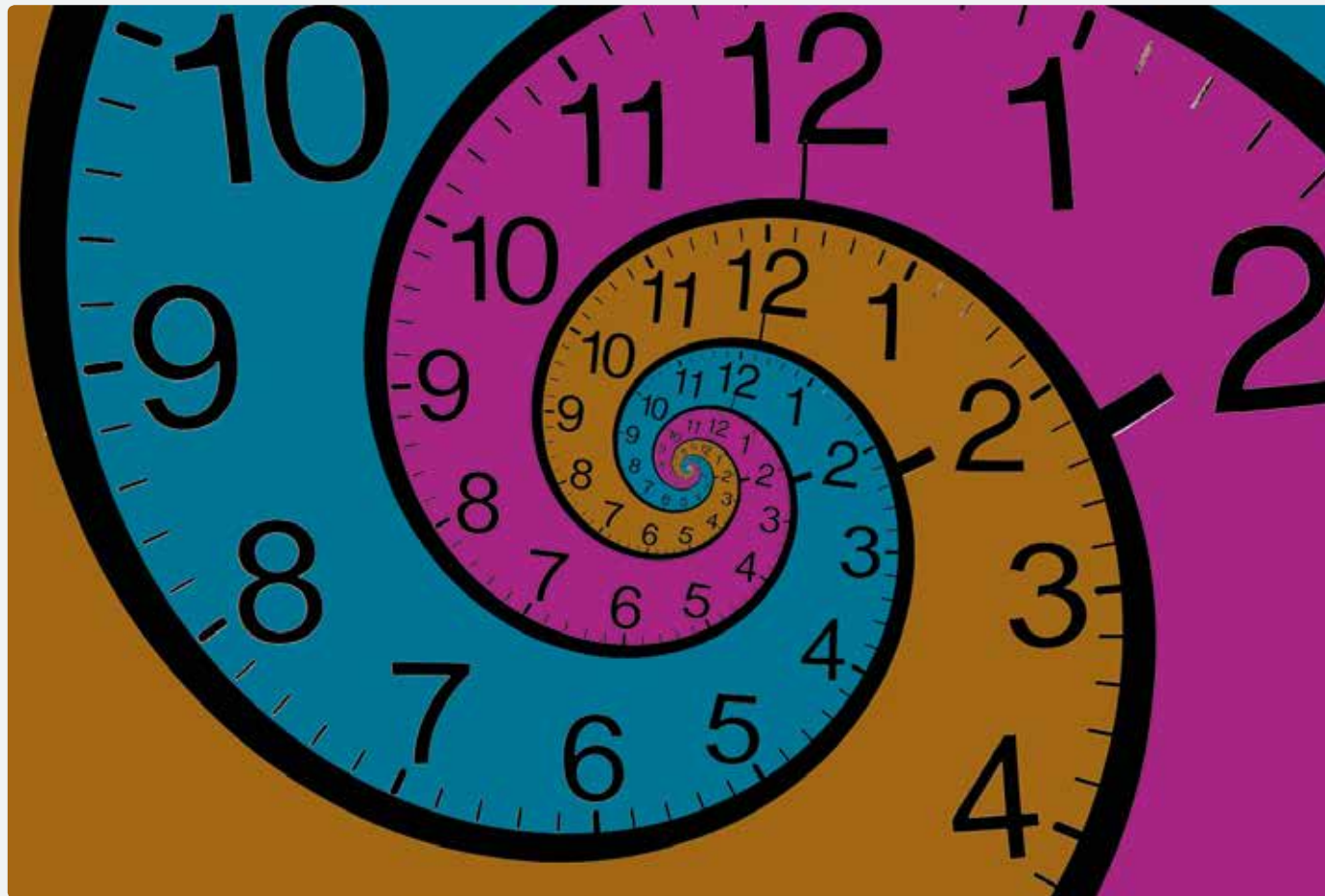
The flexibility of time perception has been a topic of interest for psychologists ever since psychology emerged as a field of study. In his foundational text *The Principles of Psychology* (1897), William James made a connection between the human experience of time and intensity of perception. James puzzled over the fact that time seems to speed up as we get older, and suggested that this is because, 'in youth, we have an absolutely new experience, subjective or objective, every hour of the day... but as each passing year converts some of this experience into automatic routine which we hardly note at all, the days smooth themselves out in recollection to contentless units, and the years grow hollow and collapse' (James, 1897/1950, p.624). James also suggested that new experiences, such as foreign travel, have a

similar time-expanding effect. As he noted, 'rapid and interesting travel' results in the same 'multitudinous, and long-drawn-out' time perception as childhood.

Later psychologists have concluded that time perception is related to a number of different factors. Firstly, in the words of one of the UK's leading researchers on time perception, John Wearden, there are 'deep connections between time perception and information processing' (Loveday & Sutton, 2012, p.582). Simply put, the more information our minds process, the slower time seems to pass. This doesn't just mean the sheer volume of information, but also includes factors such as complexity, variation and segmentation (Ornstein, 1969; Block & Read, 1978; Poynter, 1983).

Two other contemporary researchers, William Matthews and Warren Meck, have linked this to factors such as perceptual clarity and ease of information-extraction, which lead to 'vivid representations and efficient perceptual decision-making' (2016). Other research has looked at self-reported mood (or subjective wellbeing) and arousal. Positive affect and high arousal are associated with a swift passage of time, while negative affect and low arousal have the reverse effect. Boredom, anxiety and depression seem to slow time down (Droit-Volet et al., 2011; Gil & Droit-Volet, 2009; Wyrick & Wyrick, 1977). In duration estimation studies, fear and threat have also been associated with a slowing down of time (Anderson et al., 2007; Campbell & Bryant, 2007).

"Most people described their Time Expansion Experiences as positive, even if they occurred in accidents and emergencies. Almost everyone reported a sense of calmness..."



Conversely, studies have shown a link between hedonic wellbeing and a swift passage of time. As the saying 'time flies when you're having fun' suggests, tasks that are engaging and enjoyable are reported as passing more quickly (Sackett et al., 2010). Ruth Ogden (2020) found that people with a higher level of social satisfaction, less stress and a decreased task load reported a swifter passage of time during the 2020 UK Covid-19 lockdown.

Explaining TEEs

Can any of these theories explain the type of dramatic 'time expansion experiences' which I have investigated in my research?

Perhaps TEEs related to accidents could be explained in terms of negative affect – specifically, in terms of fear, threat or pain. However, most participants in my research didn't report feeling anxious or threatened during accidents and emergencies. On the contrary, they reported feelings of calmness, detachment and even wellbeing. As one person who was stung by a wasp in his mouth reported, 'I couldn't breathe and it felt like this was possibly it. I felt okay about it (despite the years prior to having somewhat of a death anxiety) and felt pretty calm.' The fact that TEEs occur during states of high positive affect (such as meditation, psychedelic experiences and sports) is further evidence against this interpretation.

Perhaps, then, TEEs can be explained in terms of information processing? Certainly, many of the participants of my research reported feelings of high alertness and heightened awareness. High alertness generates more vivid perception, which leads to the processing of more information. Along these lines, Zakay (2012) applies his 'attentional gate' theory to emergency situations, suggesting that accidents and emergencies bring a widening of the attentional gate.

However, a possible problem here is the degree of time expansion in these experiences. Time often appears to expand by several orders of magnitude, even to the point where seconds seem like minutes. In the words of one participant who had a car accident: 'It seemed as though this took minutes, but it all happened within a second or two.' Significantly, similar degrees of dramatic time expansion were reported in altered states of consciousness, such as drug experiences and spiritual experiences. For example, one person who inhaled butane gas reported that 'a few seconds was like hours'. Some participants reported a sense that time had stopped or disappeared altogether. One person who was in a deep state of meditation reported that 'the self disappeared along with the past, the future and the passage of time. Everything just happened. There was no before or after.'

If there was an association between information processing and time perception in these experiences, then the degree of information processing would also have to increase very significantly. Imagine the sheer

intensity and volume of perceptual stimuli that a person would have to absorb and process for their time perception to stretch a few seconds into minutes! This isn't impossible – for example, psychedelic drugs often bring a high level of perceptual intensity and perhaps this is connected to their time-expanding effect. However, I'm inclined to doubt this as an explanation, since the participants of my study generally didn't describe being flooded with impressions. Many people in accidents and emergencies reported a high level of alertness, and a heightened awareness, but at the same time, their attention was focused in quite a narrow way – namely, on their immediate predicament, and how to take preventative action. So I think it is doubtful that the level of information processing that they experienced could fully account for the slowing down of time.

In the moment or recollection?

Another question that we need to answer is whether TEEs happen in the moment, or whether they are the result of recollection.

An experiment in which people made frefall jumps (for 31 metres) before landing in a net, conducted by Stetson and colleagues (2007), points to recollection. The jumpers wore a chronometer on their wrists, and were asked to read the numbers on it during their fall. However, they were unable to see numbers on the watches, only seeing a blur. Despite this, the participants retrospectively overestimated their own falls by 36 per cent, compared with the falls of others. The authors concluded that this shows that an expanded sense of time in emergencies is based on memory rather than perception. The increased number of impressions that people take in are 'encoded' in memory, so that when people recollect the experiences, they have the illusion that they lasted for a long time (Stetson et al., 2007).

However, one issue here is that the frefall jumps were not a real emergency. Real emergencies are unexpected and involve real danger. The participants were fully aware of the nature of the activity in advance and that it did not involve real, life-threatening danger (since they had a safety net). The jumps were not dramatic or sudden – participants underwent preparations, climbed up to the tower, and waited, while watching others make the jump before them.

Certainly, the participants in my research had a strong subjective sense that they were experiencing time expansion in the moment rather than as a recollection. As noted above, many participants felt that their TEEs enabled them to take preventative action in the face of danger, potential injury or death. They described carrying out complex and detailed patterns of thought and complex sequences of actions in periods of no more than a few seconds in real time. Many participants were convinced that a slowing down of time enabled them to plan and execute actions which would have been impossible under normal



circumstances. For example, one described how time expansion allowed her 'to react and divert a major accident'. A woman who saved her children from a fire reported, 'I think the only reason I was able to do this was that I first experienced a great calmness and then that time seemed to stop'.

It remains possible that all of this could be a recollective effect. Perhaps a state of heightened alertness allowed the participants to think and act much more quickly than normal, and they interpreted this retrospectively as a slowing down of time. However, it is also possible that they were able to react and think so quickly *because* time was moving very slowly to them.

A survival response?

Since many participants reported the sense that their TEE enabled them to take preventative action, is it possible that TEEs are a survival mechanism, a kind of adaptive trait that our ancestors developed as a way of increasing their chances of survival in dangerous situations? It would certainly have been beneficial for our early human ancestors – surrounded by wild animals and dangerous natural phenomena – to develop the ability to slow down their experience of time in emergency situations. However, one might argue that this doesn't explain why TEEs occur in nonemergency situations, such as meditation and psychedelics. As Piovesan and colleagues point out, 'if lengthening of subjective duration is to be adaptive, it must also be limited to circumstances of specific threat' (2019, p.1157). (The idea that TEEs are adaptive also, incidentally, works against the notion that they are an illusory phenomenon produced by recollection. After all, it is difficult to see any survival advantage in

remembering accidents in more detail afterwards.)

One suggestion put forward by the Finnish philosopher Valtteri Arstila (2012) is that time expansion in accidents may be linked to increased levels of norepinephrine in the brain, related to the 'fight-or-flight' response. However, the most common theme of TEEs (in accidents and other situations) is calmness and a sense of wellbeing, which doesn't fit with the fight-or-flight response or higher levels of epinephrine. In addition, as we have seen, TEEs don't just occur in accidents and emergencies but also in nonemergency situations such as sports, psychedelics, meditation, and listening to music. With the exception of sport, none of these are situations in which one would expect to find high levels of norepinephrine. In fact, states of meditation (and other relaxed states – for example, listening to classical music) are usually experienced as states of stillness and inner peace, in stark contrast to a fight or flight response.

Craig (2009) suggested that time perception is linked to the brain's anterior insular cortex (AIC), explaining time dilation in relation to 'emotional salience'. In highly emotional situations – such as accidents – there is an accumulation of what Craig calls 'global emotional moments' in the AIC, which produces the effect of time slowing down. However, again, this doesn't seem to fit with the sense of calmness and detachment reported by many of my participants, and also the fact that TEEs can occur in peaceful and positive states such as in meditation or while listening to music.

Altered states of consciousness

In my view, perhaps the best way of understanding dramatic TEEs is in relation to altered states of

consciousness. As noted by Marc Wittman (2018), a contemporary researcher on time perception, our experience of time is closely bound up with our sense of self and our state of consciousness. When we shift into a different state of consciousness, due to unusual circumstances or triggers, then we shift into a different 'timeworld' in which time expands dramatically.

This takes us back to William James (1902/1985) who suggested that human beings' normal state of consciousness is 'but one special type of consciousness, whilst all about it, parted from it by the flimsiest of screens, there lie potential forms of consciousness entirely different' (p.388). Our normal sense of time is associated with the psychological processes and structures of our normal state of consciousness. But when we shift into 'entirely different' forms of consciousness, different psychological processes and structures operate, generating a different experience of time.

In other words, when we experience dramatic variations in our time perception, such as in accidents or emergencies, it's because we shift out of our normal state of consciousness and into a dramatically altered state. This would explain why some of the dramatic TEEs in my research were linked to psychedelic experiences, meditative states, and spiritual experiences, since these are all associated with altered states of consciousness. This could apply to the TEEs of sportspeople too, since the intense absorption of

competitive sport may lead to the altered state of consciousness which is sometimes described as being 'in the zone' (Murphy & White, 1995).

An alternative way of looking at this would be to think in terms of a loss of the sense of self. As Hartocollis put it, 'Inner time or duration is virtually indistinguishable from the awareness of the self, the experience of the self as an enduring, unitary entity that is constantly becoming' (1983, p.17). After all, spiritual and psychedelic experiences are often interpreted in terms of a loss of self, or ego-dissolution.

But how about accidents and emergencies? These aren't normally thought of as altered states of consciousness, or a loss of the sense of self. But perhaps they can be understood in these terms. Accidents and emergencies bring about a shift into an altered state of



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consciousness, due to their sheer shock and intensity. They can suddenly 'jolt' us out of normal consciousness – and our normal sense of self – into a dramatically different state in which our awareness shifts significantly, along with our perception of time. From this point of view, all of the TEEs in my study were linked to dramatically altered states of consciousness.

In reality, there is no binary distinction between normal and altered states of consciousness. There are gradations between them. One could possibly see all variations in time perception as the results of changes in our state of consciousness – for example, when time seems to drag when we're bored or in pain, or to speed up when we're absorbed in an activity. So perhaps, from this point of view, it's simply a question of degree: the more dramatic the alteration in consciousness, the more dramatic the time distortion. Boredom, pain and absorption alter our state of consciousness to a small degree, and so cause a small degree of time distortion (sometimes speeding time up, as in the case of absorption). Accidents, psychedelics and spiritual experiences cause a more drastic and dramatic alteration in consciousness, and so bring a more dramatic time distortion.

Another way of looking at this is to suggest that factors such as information processing, arousal, mood, and attention may themselves generate altered states of consciousness. Certainly, previous theories of altered states of consciousness have suggested that shifts in consciousness occur as a result of significant psychological and physiological changes. For example, the transpersonal psychologist Charles Tart (1983) suggested that states of consciousness are the result of the interaction of a large number of neurological and psychological processes – such as attention, perception, cognition, emotions – and that if any one process is altered sufficiently (e.g. if one concentrates to an intense degree or experiences intense emotion) an overall consciousness shift may result.

So while it is clear – in my view – that there is a strong relationship between TEEs and altered states of consciousness, the exact nature of the relationship is difficult to determine. It may be that further research will clarify this. There is no objective or standard passage of time, only infinite variations which arise in relation to different psychological processes, and our state of consciousness. My feeling is that we will only be able to fully understand the passage of time once we fully understand consciousness – which will most likely not be any time soon...

Key sources

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Call for Nominations

Honorary General Secretary 2021-2024

Nominations are sought for the election of Members of the Society to fulfil the role of Honorary General Secretary with effect from the AGM 2021.

The Honorary General Secretary is a trustee of the Society and has the overall task of ensuring that the administration of the organisation is conducted with probity and integrity. The HGS has a number of formal responsibilities within the Society including the oversight of the election/appointment of officers to the Society and responsibility for certain actions within the Society's complaints and Member Conduct processes. Whilst the Board of Trustees takes ultimate responsibility, it is the Honorary General Secretary who assures the operation of the organisation.

Descriptions of the role and responsibilities, together with requirements and time commitments, are available on request. Please contact Kerry Wood, kerry.wood@bps.org.uk

Procedure

The Board of Trustees has the responsibility to ensure that there is at least one candidate for this position.

Those wishing to propose candidates or to discuss this position are invited to contact the Honorary General Secretary, Dr Carole Allan (e-mail: governance@bps.org.uk) for guidance.

Deadline for nominations is **30 April 2021**

Nominations can be made via the link:
<https://www.mi-nomination.com/bps>

If more than one candidate is nominated, the election will be decided by a ballot of the Membership and the result announced at the AGM in July 2021.

Please Note: There are proposals to reform the governance of the Society and when implemented are likely to result in the role of Honorary General Secretary being removed. If this happens before the end of the three year term of appointment, the successful candidate will continue to be a trustee on the Board of the Society until the end of their three year term.