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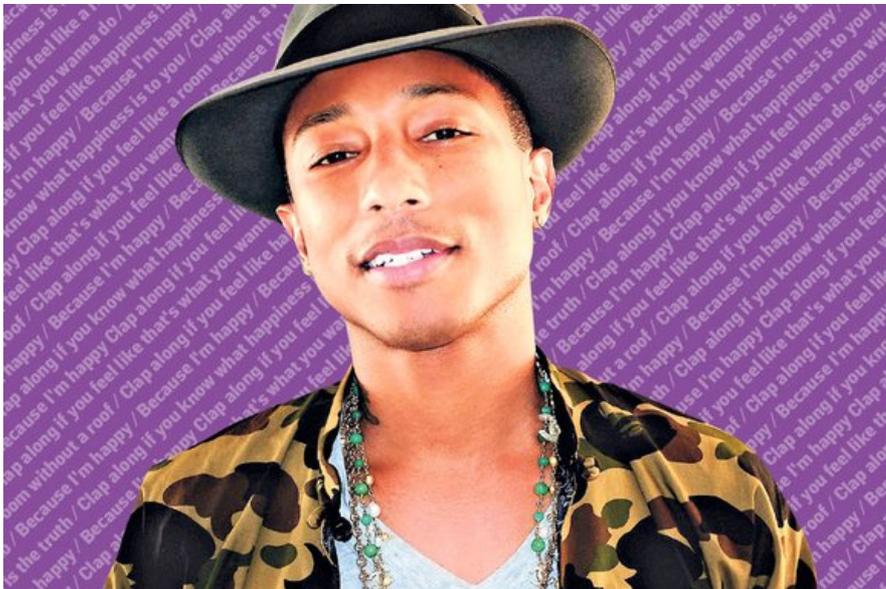
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THE SUNDAY TIMES

Happy as an earworm

Catchy tunes such as the hits of Pharrell Williams trigger highs and may bring other neurological benefits

Lauren Stewart Published: 9 March 2014



For a pop song that contains all the musical and lyrical depth of a radio jingle, Pharrell Williams's Happy is showing remarkable longevity. More than three months since its release, the hit last week registered its one-millionth sale and became the first song since the 1950s to reach the No 1 spot on three separate occasions.

As a psychologist looking at the phenomenon of “earworms” — tunes that get stuck in our heads — I think the song's success tells us a lot about the way in which certain melodies can burrow into our brains and stay there long after the music has stopped.

Of course, other factors also explain the Happy phenomenon. Having collaborated with Daft Punk on one of the biggest hits of 2013, Pharrell didn't just get lucky.

He is one of the industry's most prolific, hard-working and charismatic performers. He astutely blends a range of influences from Motown to Michael Jackson and hip-hop for maximum cross-generational appeal and is backed by the sort of music industry muscle that is reserved for only the most bankable stars.

Happy has also benefited from its exposure on the soundtrack to the animated film *Despicable Me 2*, which earned Pharrell an Oscar nomination and gave him a platform to market the song all over again by performing it in front of a global television audience of millions at last weekend's ceremony — and to dance to it with Meryl Streep.

There's no doubt that the message conveyed has universal appeal. In the video, gospel choirs, kids dancing on the pavement, a maid folding linen in a hotel and a fireman coming off his shift all break into song and dance, to declare that “happiness is the truth”. The use of hand claps is both a musical and social signal and the backdrop of the unlit alley and the contrast of shade and light echoes the message, “Sunshine, she's here, you can take a break”.

Yet, treated purely as a piece of music, Happy lights up all the areas that matter in the brain. For a start, it is replete with repetition so we can grasp the tune with the minimum listening effort. The repetition inherent to music like this is enjoyable, because listening to music causes us to unconsciously make predictions about how a melody will continue. When these



Lupita Nyong'o watches as Pharrell Williams asks Meryl Streep to dance at the Oscars (John Shearer)

high that can be as potent as any highly anticipated reward. expectations are confirmed, the result is a cerebral

But there are more subtle factors at work too. With the help of Shaun Keaveny, whose BBC Radio 6 Music breakfast show urges afflicted listeners to send in their early morning earworms as a form of exorcism, the Music, Mind and Brain group at Goldsmiths, University of London, has compiled a database of thousands of reports of these musical phantoms from the British public.

When we studied this data, we found that tunes reported as earworms did seem to share certain characteristics, such as relatively long note durations, and a change in the melody that involved small steps, rather than large leaps.

Happy is a perfect example of just such a tune. The chorus barely moves away from the initial note while the sustained gospel-style harmonies move in small steps to create interest.

Such melodically and rhythmically simple phrases are not only instantly memorable but also easy to sing along to, even silently and unconsciously, in our heads. A study that compared brain activity as subjects listened to familiar or unfamiliar tunes that were muted at certain points showed remarkably similar neural patterns whether we are “listening” to real or imagined music.

While muting a well-known tune causes a “filling in” experience, when the tune in effect carries on in your head, this is not the case for music you don’t know. So by comparing brain activity during these two types of silence, it is possible to map how the brain continues to “hear” a tune even when the music has stopped.

My bet would be that if you scanned someone’s brain as they listened to Happy, their mental jukebox would still be firing long after the tune ended.

I am often asked whether earworms serve any useful purpose at a neurological level. One theory we are exploring is whether they might be useful as a kind of sonic screensaver for the mind, so that when the brain lapses into “idle” mode, an earworm can be triggered to keep us vigilant and alert to our environment.

It might be the case that just as we might use real music as a form of stimulant, tunes in the head serve a function of changing our mood or energy levels.

Some people find it hard to accept that their earworms could be useful. One woman told us of how she has been plagued for years by Bananarama’s Nathan Jones at times of personal stress, ever since it first struck during a chemistry exam. If earworms do keep the brain vigilant at some fundamental level, it seems they are largely immune to such esoteric notions as musical taste and preference.

In the longer term, Happy’s catchiness might yet be its downfall. Most people will have experienced the pure annoyance generated by a carefully crafted advertising jingle aimed squarely at the musical brain, and overexposed pop tunes risk the same fate. Listening to or mentally replaying a song too many times will lead to an overfamiliarity that listeners will no longer find rewarding.

Personally speaking, I’m not in a rush for this particular earworm to cease — Pharrell’s brand of “happy clappy” is an auditory pick-me-up that I can live with for a little while longer.

Earworms are being explored as part of National Science and Engineering Week, March 14-23. Find out more at britishscienceassociation.org. Lauren Stewart is reader in psychology at Goldsmiths, University of London, musicmindbrain.com

Get Happy: how it works, by Lauren Stewart

Pharrell says: ‘Because I’m happy. Clap along if you feel like that’s what you wanna do’

Dr Stewart says: There is the importance of movement [in the song’s video] in reinforcing the song — so-called embodied listening — while the call to ‘clap along’ is highly engaging and social

Pharrell says: ‘Because I’m happy. Clap along if you feel like a room without a roof’

Dr Stewart says: It’s replete with repetition, so we can grasp the tune with the minimum listening effort

Pharrell says: ‘Because I’m happy. Clap along if you feel like happiness is the truth’

Dr Stewart says: It’s an earworm. It gets stuck in our head because of its long-duration notes and relatively small changes in the melody — like a jingle — which make it easy to sing along to

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