Celebrity Children Who Look Exactly Like Their Parents

Time To Break

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How 'devil's staircase' maths formula could predict when serial killers will strike next

- Killers could be 'driven' by firing of their brain cells
- 'Neuronal' urges driven by mathematical pattern
- Analysis of Russian killer who murdered 53 people
- Could allow police to be 'ready' when killers strike

By ROB WAUGH
UPDATED: 03:53 EST, 19 January 2012

Two mathematicians have found that a serial killer's pattern of murders seems to conform to a strict mathematical formula.

They theorise that the reason killings stick to a mathematical function known as 'the devil's staircase' is that serial killers work to a 'rhythm' - driven by neurons in their brains.

The pattern of brain cells 'firing' is similar to the patterns in epileptics' brains which drive them to have fits - but instead, overwhelming the killer with the urge to strike.

Killers are more likely to strike again directly after a murder, and their 'murder probability' falls during long quiet periods - but it adheres to a broadly predictable pattern of killings.

The researchers think that the neural impulse to kill overwhelms the killer even after the 'sedative' effect of killing - leading to 'bursts' of murderous activity.
The research, using data from a prolific Russian serial killer whose murders are well known, seems to offer the possibility that police could be 'ready' when other killers are driven to strike.

'We make a hypothesis that, similar to epileptic seizures, the psychotic urges that cause a serial killer to commit murder, arise from simultaneous firing of large number of neurons in the brain,' say the researchers.

The researchers suggest that their data could be refined by allowing for days when killers have tried, and failed, to kill.

'The probability of a new murder is significantly higher immediately after murder and is significantly lower when long time has passed since the last murder,' said the researchers, M. V. Simkin, V. P. Roychowdhury of UCLA.

The killer, Andrei Chikatilo, murdered 53 people between 1978 and his arrest in 1990. The shortest interval between two killings was just three days, and the longest 986.

At first glance, it might not seem likely that there was pattern to his actions.

The researchers found that the 'stepped' curve of Chikatilo's killings conformed to a mathematical function - driven, they suspect, by neurons in his brain.

The researchers say, 'It is highly irregular with long time intervals without murder interrupted by jumps, when he murdered many people during a short period.

'Such a curve is known in mathematics as a "Devil's staircase."'

Peter Sutcliffe - the Yorkshire Ripper - twice puzzled detectives with year-long 'breaks' in his murderous career, after two rapid-fire killings in 1976, and again in 1978. Sutcliffe's killings generally happened rapidly, in clusters, but with lulls, which would conform with the UCLA researchers' findings - short, intense bursts driven by neuronal 'surges' followed by 'flat' periods.

Likewise, Jack the Ripper's known crimes were 'broken up' by long lulls.
The researchers compared Chikatilo's murder pattern against mathematical models and found that the two were extremely close.

Some adjustments had to be made.

The model needs to be a bit more complex,’ say the researchers. ‘We cannot expect that the killer commits murder right at the moment when neural excitation reaches a certain threshold.’

‘He needs time to plan and prepare his crime. So we assume that he commits murder after the neural excitation was over a threshold for a certain time period.’

‘Another assumption that we make is that a murder exercises a sedative effect on the killer,’ say the researchers.

Chikatilo’s actual ‘curve’ of killings conformed closely to their predictions. The researchers think that the model can be made even more accurate.
The comments below have not been moderated.

Nikki, Boise, USA, 3 years ago
Antigone, Ancient Greece -- Most serial killers who get CAUGHT are white and male... all that means is that they are the worst at it. Who knows about the ones that have never been apprehended?

Click to rate 3 4

paulmarkj, London, 3 years ago
"We hypothesise", or, 'we guessed'. Please do not publish your results until you have facts. You will only look foolish when you are wrong. - Brian, Solliu, 19/1/2012 14:57
There is nothing wrong with hypothesising, it is part of the scientific process. The hypothesis leads to further research - otherwise where do you go with hypothesising, it is part of the scientific process. The results until you have facts. You will only look foolish when you are wrong. — Brian, Solliu, 19/1/2012 14:57

Click to rate 8 3

Antigone, Ancient Greece, 3 years ago
I wonder why most serial killers are white and male.

Click to rate 8 3

Brian, Solliu, 3 years ago
'We hypothesise', or, 'we guessed'. Please do not publish your results until you have facts. You will only look foolish when you are wrong.

Click to rate 5 15

Peter, Earth, 3 years ago
As bad as killing is, I think this "pre-crime" mentality is worst considering people's freedom and a totalitarian government who is in every single part of anyone's life all the time.

Click to rate 10 3

Eds, UK, 3 years ago
The problem is you can see lawyers thinking 'my client was driven to kill and it wasn't his fault, it was the firing neurons in his brain. It was just like he had a cold and couldn't help it. He should be let off because of his Human Rights and the need to have a family life' etc.
Then these people will get lighter sentencies and be back on the streets killing again before too long. Information like this needs to be worded very carefully before release.

Libby, Houston TX USA, 3 years ago

eh? so how does someone like the Green River Killer do with this theory?

Cobain, Nirvaanna, 3 years ago

Watched Silence of the Lambs the other day. Really good film.

alice, wonderland, 3 years ago

Inhumane to blame serial killers then. Biology is to blame. Their biology does not let them control themselves.

Vincent, Jacksonville, FL, USA, 3 years ago

Lol...

The views expressed in the contents above are those of our users and do not necessarily reflect the views of MailOnline.
Getting ready for Vegas? Britney Spears heads to dance class weeks before returning to Sin City residency. Will be returning to Planet Hollywood.

Legendary photographer Mario Testino focuses on Sydney as he prepares for new role as guest editor of Vogue Australia. In the editor's chair.

"I was a baby": Nicole Kidman opens up about her marriage to Tom Cruise but admits she doesn't 'regret any of it'. Showbiz couple were married for ten years.

Single and ready to mingle! Body confident Ariel Winter wears tight top and see-through trousers to Jingle Ball. She is starting 'new chapter' in her love life.

Solved! Riddle of the rocker who vanished: James Morrison reveals the triple heartbreak - and the personal demons - that kept him in hiding for four years.

Meet Australia's own Taylor Swift! Teen 'checkout chick' who is constantly mistaken for superstar singer finally meets her lookalike during 1989 tour.

"Beyond worth the wait": Country singer David Nail and wife Catherine welcome twins after long struggle with infertility. Huge news for couple.

Selena Gomez teases her cleavage in plunging jumpsuit and chic blazer-style jacket as cuts a glamorous figure on her way out of Jingle Ball event.

"Jaime King sent me the BEST baby gift!" New mother Kim Kardashian shares cute snap of presents from celebrity gal pal. Goodies for Saint.

Making a splash! New mother Jaime King dons a cherry print bathing suit for beach day with her family. Welcomed new son Thames in the summer.

A cheeky pair: Supermodels Martha Hunt and Elsa Hosk frolic together in TINY bikinis for latest Victoria's Secret swimsuit shoot.

Simon Cowell's girlfriend Lauren Silverman keeps a protective hold of their son Eric in NYC... as
Rita Ora burglary is linked to their recent home raid.

Leggy lady in red! Miranda Kerr shows off her perfect pins as she takes to the catwalk in rose dress in Tokyo. As the saying goes if you've got it, flaunt it.

She's certainly got a flare for fashion! Pixie Geldof cuts a retro figure as she steps out in bell-bottom jeans and striped top. Cut a fashionable figure.

I don't Believe it! The moment Justin Bieber gets ticketed for speedy car park departure in his powerful blue Ferrari. In Los Angeles driving around.

Oh baby! Mindy Project's Ike Barinholtz's wife Erica is pregnant with their second child. Have a two-year-old daughter named Foster.

Christmas miracle! Terminally ill country singer Joey Feek gets out of hospice bed to play with her toddler daughter. Shared inspiring photo.

I had to tell my older brother I don't want to be like you any more'. Duggar brothers finally break their silence and turn on Josh for his affairs and sex scandals.

Double date night! Amy Adams and Chloe Sevigny hold onto their men as they head home from a night at the Chateau Marmont in West Hollywood.

Make Room For Daddy actress and active philanthropist Marjorie Lord dead at 97 in Beverly Hills. Played her defining role from the 1950s to 1970s.

Amy Winehouse's former fiancé Reg Traviss caught up in violent brawl outside London nightclub. Offset his gentlemanly tuxedo.

Kate Upton offsets her business-chic image with a casual low-scooped T-shirt as she makes a stylish arrival in LA. Sports Illustrated model.

Jessie J flaunts her legs in tiny black mini dress.
and fishnets for Cambodia gig... before celebrating by stripping down to her bikini for a late night dip in the pool

Birthday boy Jamie Foxx drops $20K on fresh paint and for his $500K Rolls-Royce Phantom... which is his daughter Annalise's favorite ride

The dog and pony show! Kylie Jenner and all her entourage go on a shopping spree with her very pampered pooches

Did some serious credit card damage

"Excellence is the best deterrent to sexism, so be excellent" Oprah stuns in pretty pink outfit as she delivers inspirational speech in Sydney

Merry Chris-tmas! Hemsworth races against talk show host Jimmy Fallon in festive scooter sleigh competition

Fooled around on show

Season's greetings! Demi Lovato sizzles in jade green leather skirt while Selena Gomez is heavenly in sleeveless white dress at Jingle Ball

EXCLUSIVE: "I'm very proud I spoke out": Farrah Abraham talks about amazing response since coming forward with James Deen assault allegations

Jingle belle! Mariah Carey turns heads in figure-hugging floral dress as she heads to her Christmas concert

Not the shy and retiring type

Newly-single Ellie Goulding flashes her undergarments in a racy lace gown before slipping into an edgy mindress for Spanish music ceremony

Kourtney Kardashian shows off her high-fashion credentials in plunging white top and chic trousers for star-studded night out

A ruched white leotard

Miss you little brother": Ruby Rose shares screenshot of FaceTime chat with close friend Justin Bieber

Supporting her celebrity doppelganger
She'll be on the naughty list! Busty Rita Ora shows off her peachy derriere as she poses as sexy Santa for Mean Girls inspired LOVE advent shoot

Kate Moss is low-key in leopard print as she flaunts her natural beauty while taking beloved pet pup Archie for a stroll. Looked sensational!

'One more down, thousands to go': Mark Zuckerberg posts picture while changing newborn daughter's diaper and gets more than half a million likes...

'What a way to end it!' Ed Sheeran rounds off epic X tour in Auckland and reveals he's taking a break after four and a half years of touring to get ear surgery

Superstar line-up: UK X Factor finalists 'to sing with Rod Stewart, Craig David and Rita Ora' in eagerly-anticipated duets with the contestants

No tearing them apart! James Franco and little brother Dave have a family day on set as they film The Disaster Artist about 'the worst film ever made'

Alessandra Ambrosio showers son Noah with affection while highlighting her lithe legs in racy leggings during sweet outing. Her typically doting self!

Braless Rihanna makes slinky nightwear look evening-appropriate as she hits her favourite eatery in a satin slip dress. Suitably glamorous.

Disney star Tiffany Thornton posts heartwrenching snap of her husband to commemorate one week anniversary of his death

Canonball! Bindi Irwin leaps into a creek with her Dancing With The Stars partner Derek Hough in Queensland. Showing her dance partner Australia.

Making a splash! Behati Prinsloo tumbles into the water while paddleboarding with fellow Victoria's Secret Angel Sara Sampaio. Models are in St Barts.

Imperial in leather! Shady lady Cindy Crawford turns heads in racy biker jacket as she jets into Los Angeles.
Can make almost any garment look special

Smiling Amanda Bynes looks happy and healthy at festive party as she sports raunchy underwear-flashing mini dress
Looked sensational

Fetty Wap's on-off girlfriend Masika Kalysha is pregnant and names him as father... but paternity is questioned as he writes 'It gotta be my money'

Is this little girl the Queen's illegitimate cousin - with a sex mad spy for a mother? It sounds preposterous but a new book reveals compelling evidence...

She's just a big baby! Miley Cyrus sports blonde ringlets and a DIAPER in self-directed video for single BB Talk
Also sucks on a comically large bottle

That's the spirit! 5 Seconds Of Summer dress up in matching band-themed Christmas sweaters as they perform at Jingle Ball in New York

Wholly hairline! Jermaine Jackson rocks an impressive new 'do as he marks his 61st birthday... without his wife who was arrested for biting him

Is this the most graceful blooper ever?: Vanna White's dress gets caught on a Christmas present during show taping
Dragged it along with her

Meeting her match! Daisy Ridley is unable to hide delight as she is greeted by cherubic young fan dressed as her Star Wars character Rey

'She called me the day my best friend died': Boyd Holbrook reveals Elizabeth Olsen ended their engagement with a phone call
Still reeling from the split

'Two weeks until we are a family of three!': Bristol Palin shares snap of her baby bump - photobombed by her son Tripp - as she counts down to her due date

EXCLUSIVE: Elizabeth Taylor's $8.8 million 'Taj Mahal' heart-shaped
• Diamond - gifted to the star by Richard Burton on her 40th birthday - to hit auction block again

• Gawking head! The Walking Dead star Lauren Cohan shows off new pixie cut at iHeart Radio Jingle Ball in New York

• Another close shave

• Ed Sheeran pays touching tribute to Jonah Lomu by wearing the late rugby legend’s jumper on stage in New Zealand

• Strong gesture

• Just the ticket! Reese Witherspoon grins after shopping spree... then winces when she discovers parking fine

• Not so happy now...

• She knows how to advertise! Lupita Nyong’o dons T-shirt promoting upcoming Star Wars sequel as she arrives at LAX following fan event in Mexico

• Lo, unto the world’s most brash couple another little money-spinner is born. And his name is Saint...

• A British guide to who Kardashian family are!

• Kendall Jenner goes bargain shopping at Target... as Vogue declares that she and Gigi Hadid are officially ‘supermodels’

• She still loves a discount

• An Angel’s work is never done! Bikini-clad Taylor Hill makes a splash in St. Barths after her Victoria’s Secret fashion Show triumph

• Mid West-born model

• Paris Hilton is rebuked for ‘tacky’ snap at the Bataclan theatre just a month after massacre in French capital

• Even the best intentions can be misconstrued...

• Cheryl Fernandez-Versini’s marriage under strain as she tires of her husband’s ‘party lifestyle’. UK pop star ‘regrets’ rushing into the union

• Lily Aldridge shows off her beautifully bronzed body in a little pink bikini for Victoria’s Secret photo shoot in St. Bart’s

• Recently wore the VS $2M Fantasy Bra

• New couple? Hailey
Baldwin gets cozy with Australian model Jordan Barrett as they party together in New York. He was linked to Paris Hilton a few months ago.

“She has a lot of energy!” Corey Gamble makes Kendall and Khloé cringe by boasting about their momager Kris Jenner. He is 25 years her junior.

Birthday girl Hailee Steinfeld flashes toned tum in crop top and thigh-high PVC boots as she turns 19 at Jingle Ball. Looked amazing.

“A photo worth melting for!” Vanessa Lachey shares sweet snap of three-year-old son Camden meeting Frozen characters at Disney On Ice.

Has Jamie Oliver bitten off more than he can chew? Angry staff being laid off, bad reviews, a $19.4million loss - and questions over his brother-in-law...

“As handsome as ever!” Catherine Zeta-Jones praises father-in-law Kirk Douglas as she and husband Michael celebrate the acting legend’s 99th birthday.

Rapper Boosie Badazz, 33, “now cancer free after extremely invasive kidney surgery”. Only announced he had kidney cancer in late November.

Miss-see Elliott! Misdemeanor debuts new long-fringed hair-do as she receives Innovator Award at Billboard Women In Music 2015.

A big step forward! Luxury shoe brand Christian Louboutin casts its first ever plus-size campaign star to appear in video ad for its beauty range.

Camille Paglia calls Taylor Swift a ‘Nazi Barbie,’ and says her model girl squad is a ‘performance prop that promotes elitism’. Cultural critic lashed out.

Santa’s little helpers! Lady Gaga and fiancé Taylor Kinney dress their pups in festive outfits as they exit Billboard event in NYC. Big day for her
Their romance is no drag! James Middleton cozies up to girlfriend Donna Air as she puffs on a cigarette outside a Chelsea pub
Kate's brother

The parent trap! Lindsay Lohan's dad Michael appeals to have restraining order from wife Kate lifted 'so they can hook up'
Seeing each other again

When teen dramas collide! Gossip Girl's Blake Lively shares childhood photo taken with Beverly Hills 90210 star Jason Priestley
He was Brandon Walsh

Kristin Cavallari's brother found three miles from his car with no bullet holes, stab wounds or signs of foul play
Toxicology report not out

FROM THE MAKERS OF CANDY CRUSH
Farm Heroes Saga, the #4 Game on iTunes. Play it now!

GADGET REVIEWS

B&W's P5 Wireless review - The ultimate commuter headphones
They cost $400, but B&W's P5 wireless headphones will change the way you listen to music on the move - and could spell the end for annoying wires.

Samsung's $99 Gear VR gives a glimpse into the virtual world
Samsung's Gear VR headset is pretty impressive as first-generation devices go.

The iPad grows up: Apple's iPad Pro
The iPad Pro is, for many, a real laptop replacement - and a way to combine work and play in a gadget that will last all day and won't break your back to carry.

'A glimpse into the future of the living room': The new Apple TV
Apple says apps are the future of TV, and while its new $149 box does have some issues, its combination of streaming...
services, games and other apps make it the best way to make your TV smart.

> Intuitive controls and gorgeous visuals: Heads on with PlayStation VR
Sony’s Playstation VR will go head to head with Facebook’s Oculus Rift and HTC’s Vive next year - Experts predict it will be a bloody battle - and Dailymail.com was able to try out the technology.

>$799 Blackphone 2 is secure handset anyone can use
The Blackphone 2 is fully encrypted by default and comes with a suite of secure features that let you make calls and send texts that are impossible to eavesdrop on or track.

>The end of wonky wifi: Google’s OnHub
It's incredibly simple to set up, and we found it tripled the speed of our home wifi connection - but at $199 is expensive...

>No more tangled wires: Powerbeats2 Wireless review
Beats by Dre's Powerbeats2 headphones have a new look - so now you can pound the treadmill, listen to your favourite tunes and make sure you’re fully colour-co-ordinated.

>The best all in one wireless speaker you’ll ever hear: Naim Mu:So review
It might not be a name familiar to the US market, but Naim is a legendary British brand hoping to make a splash with the American launch of its $1499 Mu:So speaker.

>The only remote you’ll ever need: Logitech’s Harmony Elite works with 270,000 gadgets from TVs to speakers and lights
Harmony Elite (pictured) was unveiled at this month’s IFA conference in Berlin. It works with the Bluetooth and Wi-Fi enabled Logitech Hub which connects all the devices together.

>The Mail's verdict on the Apple Watch
While it's not the first smartwatch on the market, the $349 (£299) Apple Watch is the first you’ll actually want to use - and will change the way you communicate.

>$99 'morphing' Phorm case adds physical keys to iPad
Californian-built Phorm (pictured) consists of a case and screen protector lined with microfluidics - small amounts of fluid that raises up from the screen when a button on the case is pressed.
mean the end of tangled wires
The Dash headphones are wireless, and even contain their own MP3 player and fitness trackers, and won a best in show award at CES in Las Vegas.

Gadget of the week: Orbotix Sphero 2.0
The Sphero 2.0 is a modern Christmas present. In years past you would have had a remote-control racing car running on AA batteries.

FROM THE MAKERS OF CANDY CRUSH
Farm Heroes Saga, the #4 Game on iTunes. Play it now!

HEAD START TO HOME COOKED
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