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So McEnroe had a point after all. Scientists study 4,000 tennis points and find 80% of umpire 'out' calls are 'in'

By DAVID DERBYSHIRE FOR MAILONLINE UPDATED: 04:57 EST, 28 October 2008

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John McEnroe may have had good reason to turn on the tantrums.

Scientists have shown that tennis umpires tend to succumb to an optical illusion that makes balls appear to be out when they are just inside the line.

The discovery, based on analysis of more than 4,000 Wimbledon tennis points, comes nearly three decades after McEnroe's infuriated outbursts at umpires' apparent sight problems made him a household name.

The authors say the illusion is so powerful that every shot in tennis games should be reviewed by instant replay.

Players and spectators have long been puzzled by the ability of umpires to make the strangest calls, particularly in the days before electronic linesmen.

In 1981, McEnroe sealed his reputation as the Superbrat of tennis with a vitriolic outburst against an umpire.

'You cannot be serious!' he yelled. 'That ball was on the line! The chalk flew up! It was clearly in! How can you possibly call that out?

A team of researchers at the University of California have shown the unfortunate umpire may have been the victim of a simple trick of the eye.



John McEnroe reacting in anger after a disputed 'out' decision

Dr David Whitney, who led the study, said the human brain struggles to keep track of moving objects - or objects that appear to move because we are moving our heads or Site Web

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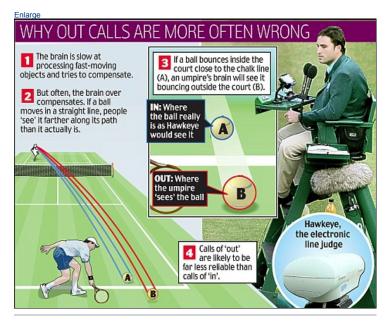
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'The visual system is sluggish. It takes 100 or more milliseconds for us to become aware of an image that strikes our retina,' he said.

'So by the time we perceive an object like the coffee cup in one location, it will have already changed location as we move toward it. Our perception lags behind reality.'

To get around this delay, the brain tries to compensate and mentally repositions the object where it thinks it should be. The trouble is, it often overcompensates.

Studies have shown that when people follow an object moving in a straight line, their brains usually think the object is slightly further along its path than it is.



'You cannot be serious!': The 1980 war of words between McEnroe and referee Fred Hoyles

Dr Whitney said umpires, players and spectators would experience the same illusion at Wimbledon. If a ball is moving through the air towards the chalk lines from left to right, it will appear to spectators at any one time to be slightly further right than it really is.

'And if it bounces close to the line inside the court, many people watching will wrongly 'see' it touching the grass outside the court.

That means umpires will make far more mistakes when calling a ball 'out' than calling one 'in', he said.

To test the theory, his team looked at 4,000 randomly selected tennis points from the 2007 championship.

Out of the 83 incorrect calls, they found that 70 $\,$ - or 84 per cent $\,$ - were wrong 'out' calls.

This supports the view that visual processing rather than poor judgment was to blame.

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Alexander O'Neal, Chloe Goodman and Ken Morley up for the public vote in shock face-to-face Celebrity Big Brother nominations



'I'm devastated that I lost my old man': CBB's Calum Best shares details of his father George's struggles with alcohol during intimate chat with Perez Hilton



A blossoming beauty! Pregnant Keira Knightley hides her bump in a loose-fitting floral dress at the AFI Awards Actress looked glowing



She's a winner! Angelina Jolie suits up to take Brad Pitt to the AFI Awards as her film Unbroken is honoured by the institute Second directorial effort



A winning look! Anne Hathaway, Jessica Chastain and Patricia Arquette stun in elegant



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'Teddy Rupert is here!' Radio DJ Chris Evans, 48, tweets his delight as he becomes a grandfather for the first time Daughter Jade's baby

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PICTURE EXCLUSIVE: Floored by his talent! Rita Ora falls off her chair as she flirts with handsome hopeful on debut The Voice appearance



Revealed! David Cassidy, 64, got caught in a catfight between his girlfriend and another woman Police called to house in Boca Raton, Florida

Haute pink! Pixie Lott dons a bright trouser suit as she attends LC:M party with model boyfriend Oliver Cheshire Welcomed in New Year with a skiing trip

The REAL Last Tango in Halifax: A heart-lifting interview with the woman whose late-life love inspired the enchanting TV show Dorothy and Alec Walker (right) reunited

Girls star Lena Dunham to show animated inked skin in guest spot on The Simpsons... as she catches Homer's wandering eyes













Business in the front, party in the back! Hugh Jackman showcases throwback hairstyle as he brings back the mullet in new film Chappie

How Rita Ora, the risqué new star of BBC's The Voice - and daughter of an Albanian pub landlord - has built a career out of outrageous attention seeking

SEBASTIAN SHAKESPEARE: Ring





swap hints Emilia could be chef Marco's No 4 Emilia Fox was snapped leaving her West London home



A winning look! Anne Hathaway, Jessica Chastain and Patricia Arquette stun in elegant dresses as they score top honours at the AFI Awards

A disastrous marriage to Joanna Lumley, an affair with Charlotte Rampling... memoirs of late comic genius behind 'Allo 'Allo and Are You Being Served Jeremy Lloyd reflects



Feel fat when you're on? Your period is tricking you! How menstrual hormones make women think they're putting on weight



'I imagined Halle Berry coming out of the water': Samantha Harris reveals she channelled Hollywood star's Bond performance for Flickerfest acting role



Rainbow Brite! Liam Hemsworth steps out with mystery blonde while sporting multicoloured nail polish on his toes during break Down Under



Broody Heidi Pratt cradles a cuddly toy as she and husband Spencer Pratt talk about naming future child Speidi Call a Speidi a Speidi?



What a beach bum! Stunning Irina Shayk reveals two hand prints on her pert derriére as she strikes a pose for idyllic coastal snap Ronaldo's hands?



Michelle Keegan shows off her trim figure as she rounds up gym session in sporty gear and retro scrunchie Her rigorous workout routine really shows



'Das my girl! Danny Dyer's daughter Dani gets pally with model Casey Batchelor at East London rehearsals of their new gangster flick Just like her father



'I couldn't think of anyone better': Frankie Bridge sends well wishes to Strictly tour replacement Rachel Stevens after pulling out due to pregnancy

Neil Patrick Harris and Elton John's husband David Furnish take their kids paddle boarding as they continue couples' retreat in Hawaii On St Tropez break

You Got It All! Union J star Josh Cuthbert displays his Barbados tan as he arrives at Hollywood nightspot with stunning girlfriend Chloe Lloyd

Doing her thing! Tulisa Contostavlos cuts a striking figure in bold geometric-print dress before slipping into black and white poncho for promotional duties

Brit abroad! Elton John wears a Nike polo shirt and black shorts to shop at Prada with Neil Patrick Harris and David Burtka Belied his star status

She's red hot! Miranda Kerr shares behind the scenes snap from her raunchy Harper's Bazaar photo shoot Mind-bending look

Hometown glory: Alex Gerrard dons faux fur gilet for a girlie night out with her pals... as she prepares to quit Liverpool for Los Angeles

Pregnant Catherine
Tyldesley covers up her
bump in a faux fur coat
as she celebrates oneyear anniversary with
fiancé Tom
Special evening for pair

'Getting ready for bed selfies': A barefaced Jessie J cuddles up to boyfriend Luke James in her bra as they holiday in Jamaica Went make-up free

Heavily pregnant Shakira steps out with her brother as she prepares for the birth of her second child

















Any day now for the Colombian singer





Carry On star and That Was The Week That Was stalwart Lance Percival dies aged 81 Died after 'a long illness. His funeral will be held later this month

'I'm left to rot like these walls': Middleaged photographer takes nude self-portraits in abandoned buildings to show her fear of aging

'Dance it out!' Kelly Clarkson shares heartwarming video of daughter River to promote new single Heartbeat Song Short but sweet

Kelly Brook nails offduty chic in black skinny jeans and leather jacket as she continues new weight-loss mission New face of Atkins diet

'I think Amal is going to kill it': Giuliana Rancic predicts Mrs Clooney will be best dressed at Golden Globes

Rumoured to be attending with George

Mark Wahlberg's wife Rhea rips Bieber's CK ad and says her husband's shots were the real deal amid claims Justin's package got a digital boost

Rihanna rocks customised varsity jacket poncho on chilly NYC outing She sacrificed her warmth in the name of fashion

'Behind the scenes for my new campaign': Brooklyn Beckham follows in his family's fashionable footsteps as he shares modelling snaps on Instagram

I am Batman's nemesis - so you better behave! 13-year-old Gotham star uses villain role to keep her baby brother in line Clare Foley is young star

















EXCLUSIVE 'My boob was on Cameron's

office window!'
Charlotte Crosby on the
moment her body was
projected onto the
Houses of Parliament



'We have to set this kid straight': Liam Neeson prank called Maggie Grace's exboyfriend as his fearsome Taken character Shared clip on US show

Madonna accused of using Paris terrorist attack to promote her album Rebel Heart Singer used album hashtags alongside Paris hashtags

Melanie Sykes steps out make-up free in gym gear and beanie hat as she goes out and about in North London A world away from the hot and sticky jungle

All aboard! Nicole Scherzinger flashes some cleavage in cutout LBD... as she is unable to hide her excitement at London Boat Show launch

Only the best for baby! Abbey Clancy keeps her pregnant tummy warm as she collects Sophia following indulgent spa day In North London

T'is the Ski-son! 'Mrs Bond' Rachel Weisz goes make-up free as she hits the slopes in Austria... while husband Daniel Craig shoots Spectre

Kylie Jenner, 17, dresses down as she steps out with boyfriend Tyga, 25... after describing blossoming relationship as 'strong infatuation'

Age is just a number: Music legend Joni Mitchell, 71, is unveiled as the new face of Saint Laurent - days after Joan Didion, 80, debuted Céline campaign

Gillian Anderson, 46, wows as she wears her buttermilk yellow dress unzipped to the cleavage at pre-Golden Globes bash Still shining

















Not there fur long! Kim Kardashian wraps up in fluffy coat and skintight black trousers as she and Kanye West jet out of New York after whirlwind visit

How chic Kate claimed the style crown: As the Duchess of Cambridge turns 33, she's more elegant than ever... and it's all down to Prince George

'She doesn't like to leave me with the kids': Broadchurch's Matthew Gravelle says his portrayal of child killer has left his own WIFE in fear of him

Jennifer Connelly, 44, wows in chic new Louis Vuitton campaign Photographed in Miami by Bruce Weber

'Ladies unite': Charli XCX teams up with fellow British singer Rita Ora as she unveils her new single Doing It Both have duetted with Iggy Azalea last year

Proud mother! Kym Marsh cheers on teenage daughter Emilie Cunliffe as she auditions for The Voice Corrie actress cheered from backstage

It's over... again: Chloe Sims and Elliott Wright split up for a second time after giving their relationship another go Split in November after six months

Big Bang Theory's Jim Parsons leaves 13-yearold super fans speechless after surprising them on Ellen DeGeneres Show She has brain tumour

A trim and toned Chelsea Clinton leaves four-month-old daughter Charlotte at home to enjoy a rare night out Just given birth to her first child

On/off couple Chris Brown and Karrueche Tran enjoy casual lunch date at Urth Caffé in

















West Hollywood Are reportedly in couple's therapy



Pulling out all the stops! Chloe Goodman makes desperate last ditch attempt to save herself from eviction with bikini clad display on Celebrity Big Brother

'I've never had this sort of connection': John Cleese, 75, claims he never 'experienced love' before meeting FOURTH wife Jennifer Wade, 43



Courteney Cox keeps a protective arm around daughter Coco, 10, as they enjoy a low-key girls' shopping trip A bit of one-on-one time for mum and daughter



Is this the coolest campaign ever? David Beckham, Rita Ora AND Pharrell Williams join forces for adidas to define what it means to be a superstar



Seal hits the slopes with his son Johan for a ski vacation... as ex Heidi Klum returns from romantic Caribbean holiday with her toyboy In Mammoth, California



Kim Kardashian heats up freezing New York in cleavage-baring dress to attend John Legend's birthday party with Kanye West Putting it all on show



Sold! Backstreet Boy A.J. McLean makes a cool \$1.2 million profit on his Hollywood Hills home Bought in 2001 for \$430,000



Jennifer Lopez is a classic beauty in rose hues to promote her new film... as the multitalented singer is tipped for Las Vegas residency Just like Britney & Celine



Tina Fey and Amy Poehler will not hold back on topics like Bill Cosby for their final time hosting Golden Globes Star-studded ceremony is on Sunday



Jodie Kidd replaces Sally Bercow on The

Jump after she is forced to pull out after fracturing two ribs during training Another bites the dust



Total Recall! Cycle enthusiast Arnold Schwarzenegger takes his bike for yet another spin The 67-year-old worked up a sweat on his wheels

Victoria Silvstedt, 40, shows off her beachready bikini body in pink string two-piece as she enjoys St Barts getaway Fabulous in fuchsia



'I've been running around my hotel room screaming!' Felicity Jones reveals excitement at BAFTA nod as stars respond to their nominations

Downton Abbey's Joanne Froggatt looks sensational in tight sky blue two-piece as she takes husband James Cannon to pre-Golden Globes event

Oscars producers fear they will 'lose viewers to Downton Abbey' because audiences are not interested in the niche films set to dominate nominations

"I'm missing a bit of my brain, which might be quite apparent": Katie Hopkins discusses her epilepsy ordeal on Celebrity Big Brother Diagnosed at 18

'Thanks Dr. Silly Putty!' Kaley Cuoco jokes about nose job rumors after nasal surgery by wearing prosthetic in 'big reveal' photo Went under the knife

Vinnie Jones shows off his playful side as henchman Gareth in Galavant... as new stills of fairytale comedy are released A comedic role

















Mila Kunis and Ashton Kutcher's baby daughter Wyatt seen for the first time in leaked family holiday card She was born on October 1



Calum Best and Cami Li share a kiss on Day 2 in the Celebrity Big Brother house... amid reports 'womaniser has sets his sights on tattooed model'

Bankruptcy, boot camps and THREE hair transplants! How Calum Best cleaned up to become Big Brother's most eligible bachelor He's never been in love

Coronation Street's Ken Morley boasts he 'groped and grabbed' women in the 1980s: 'Everyone was at it' claims Celebrity Big Brother housemate

Would you let YOUR man wear a shaggy sheepskin coat or knitted crop top? Topman sets the season's trends as LC:M kicks off

Leading ladies, assemble! Rosamund Pike, Amy Adams and Reese Witherspoon toast their 2015 BAFTA nods as they make stylish appearance at pre-Golden Globes bash

The toast of Tinsel town! Eddie Redmayne and Felicity Jones presented with congratulatory cake as they both land 2015 BAFTA nominations

The Grand Budapest Hotel leads the 2015 BAFTA nominations as Rosamund Pike, Reese Witherspoon and Felicity Jones battle it out for Leading Actress

Cheeky Cara
Delevingne photobombs
fellow supermodel
Naomi Campbell as she
rocks a seriously sexy
low-cut minidress at
pre-Golden Globes bash

EXCLUSIVE: It might be Kate's birthday but HARRY is the nation's favourite royal... Prince























is number one while the Duchess languishes in second place





Joined at the hip! Inseparable couple Nikki Reed and Ian Somerhalder opt for trademark casual attire as they enjoy another day out

leaving him for work

Miley Cyrus puffs enormous hand-rolled cigar in controversial new selfie... before posting snap of bloody knee as she continues to make light of 'drug allegations'

A+ for style! Kimberly Stewart shows off her slim figure in leather and leggings on the schoolrun Looked chic dropping her daughter off at school.

Pregnant Keira Knightley jets into LA for Golden Globes... as she scores MORE awards season success with a BAFTA nomination

The Kat that's got the cream! Atomic Kitten star Kerry beams as she slips into all black ensemble for dinner date with towering George Kay

Vampires don't get sunburn! Twilight actress Ashley Greene sports painful-looking red shoulders and crisscross strap marks Ouch, looks sore















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GADGET REVIEWS

Gadget review: Nexus 7 tablet - Premium quality at an affordable price

The Nexus 7 is a premium tablet which comes at a mid-range price. That's the main selling point, though it doesn't do justice to its sleek style and detailed screen.

comments

Headphones: Musical Fidelity EB-33

The Musical Fidelity EB-33 in-ear headphones are impressive. They offer a strong performance which more than matches their value - and look good too.

comments

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 remotecontrol racing car running on AA batteries.

comments

Gadget review: Snugs fitted earphones

Sound quality is normally the purpose of a headphones review - but not in the case of Snugs, because they can be used on any earphones.

comments

Gadget of the week: Waka Waka solar powered lamp

The Waka Waka lamp and phone charger is a useful camping tool and something that could be extremely useful in the developing world.

comments

Gadget review: Tivoli Radio Silenz noise cancelling headphones

The Tivoli Audio Radio Silenz headphones are light, comfortable and portable, which makes them good for travel. They feature stylish wood panels.

comments

Gadget of the week: Snapdragon 540 degree Photobooth

The Snapdragon Photobooth isn't a gadget you can buy, but it is the coolest thing we've seen this week - it's made up of 130 HTC smartphones around a spiral unit.

comments 1 video

Gadget review: Jawbone Mini Jambox

Fun. That's the first word that comes to mind when reviewing the Jawbone Mini Jambox. As you would expect from a product with mini in its name, it's small.

comments

Gadget of the week: Philips Wake-up Light can make the mornings easier

Nobody likes getting up in the morning. That's a fact. So spending money on anything that makes it less painful is probably a sound investment.

comments

Gadget review: Skullcandy Crusher Headphones

The Crusher does exactly what it says on the tin. Unleash an unrelenting torrent of deep bass through your eardrums. Be warned, these are not for the faint-hearted.

comments

Gadget review: Klipsch Image X7i in-ear headphones with 3-button control

The Klipsch X7i headphones are nearly perfect. Nearly. The sound is excellent - and in headphones, that's 90 per cent of the battle won. Just some blips hold them back.

comments





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