

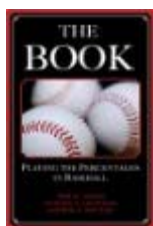


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Thursday, May 14, 2009

[World's Best Illusion: the curve ball](#)

By [Tangotiger](#), 02:59 PM

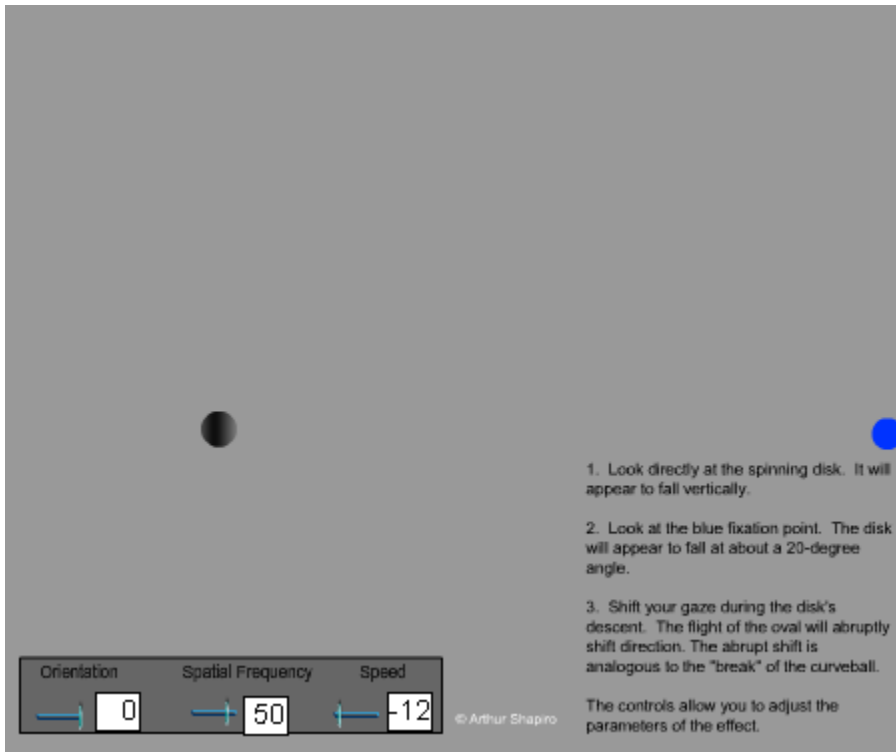
(Hat tip: Peter)

[Curveball](#)

This year's winning illusion, created by Arthur Shapiro of Bucknell University in Pennsylvania, may explain this phenomena. His animation shows a spinning ball that, when watched directly, moves in a straight line. When seen out of the corner of the eye, however, the spin of the ball fools the brain into thinking that the ball is curving.

So as a baseball flies towards home plate, the moment when it passes from central to peripheral vision could

exaggerate the movement of the ball, causing its gradual curve to be seen as a sudden jerk.



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#1 [Nick](#) ([see all posts](#))

2009/05/14 (Thu)
@ 15:44

Cool stuff. So is there anyway a pitcher could modify his delivery to get more "curve" out of his pitches?

#2 [dan](#) ([see all posts](#))

2009/05/14 (Thu)
@ 15:52

Nick--

If you go to the article it has a bit more explanation. If you mess around with the spacial frequency dial, the amount of spin changes. The faster it spins, the more it appears to curve. But with a curveball in real life, it will not only appear to curve more if it spins more times, it will actually curve more if it spins more times. So if a pitcher were to get more "curve" on his pitches, he would also be getting more **curve** (actual curving, not the illusion of more curve) on his pitches, if that makes sense.

#3 SirKodiak ([see all posts](#))

2009/05/14 (Thu)
@ 18:44

So perhaps opening up your stance helps with hitting curve balls, since you might be moving the ball more into your central vision. Would be interesting to see if there is an illusion to sliders as well since they spin mostly around the ball's path.

#4 dpjbro ([see all posts](#))

2009/05/14 (Thu)
@ 23:10

I tried the open-stance approach in my youth and got beamed by the pitcher's fastball. Seems the open stance made the fastball look slower than it was. At least that's the conclusion I came to when I came to...

#5 MGL ([see all posts](#))

2009/05/15 (Fri)
@ 02:25

Have you seen the 2nd and 3rd place entries in the "illusion contest?" The moving dove and the male and female faces. Are they kidding? They suck. I can barely see any color when the dove moves across the sky and both of the faces seem pretty much the same to me, with one looking slightly more feminine than the other.

#6 Mike Fast ([see all posts](#))

2009/05/15 (Fri)
@ 10:59

Though this is a neat optical illusion, I'm skeptical of it as an actual explanation for a batter's perception of late break. A major league pitch spins so fast, 1000-2000 rpm or more, that the human eye can't perceive the flicker from the spin. Even the peripheral vision can't perceive flicker at anywhere near that frequency.

Bahill and Baldwin are the authorities on this topic, and if you go to Bahill's Science of Baseball Research site you can see some of their videos.

#7 Tangotiger ([see all posts](#))

2009/05/15 (Fri)
@ 12:01

I don't think the point was the "flicker". The flicker is just what they needed to do in the model.

The point was the shift from central to peripheral vision.

As an example for them to prove their point, you can have someone in the batter's box set to bunt. One batter does so being completely square to the pitch (bellybutton points to the mound), and the other has his feet pointing in the normal direction (bellybutton points to the plate).

According to their theory, the squared batter will be using only central vision, and so, will not see any kind of "late break". It will be a normal trajectory (as the catcher sees it). The batter in the normal stance will be using both visions, and so, that sudden switch will make it look like a late break. (I guess similar to the refraction you get if you put your hand in your bath, where there's some visual discontinuity.)

Their theory sounds fine on that basis. It would also explain why a same-handed and opposite-handed curve ball would have a different performance split outcome from the fastball.

#8 [Mike Fast](#) ([see all posts](#))

2009/05/15 (Fri)
@ 13:58

Tango, do you still see the visual discontinuity in their example if you set the spatial frequency to 1000? I see it at 50, but I don't see it at 1000. I understood the spinning aspect of the ball to be integral to the visual discontinuity.

I do think it's true that the opposite-handed batter gets a better look at the trajectory of the curveball, but that's because of the different angle from one batter's box to the other side of the pitcher's mound, so they get a better perspective on the movement in three dimensions.

#9 [Tangotiger](#) ([see all posts](#))

2009/05/15 (Fri)
@ 14:11

Mike, I'm presuming the settings are made to mimic (how they think) reality is working. So, within the confines of a 2-D computer screen, the four-inches between the two points, etc, that's supposed to represent the 3-D world, and how they eyes respond switching between the two visions as a 80mph curve makes its way.

So, I don't know that changing those setting will disprove anything. The question is if their model captures what's happening in practice. And their model is depending on the switching between the two visions. I'd like to see that exact test be performed.

Your results and Walsh's results on the curve/platoon I think at least makes the idea more than plausible.

#10 [Matt Lentzner](#) ([see all posts](#))

2009/05/15 (Fri)
@ 15:24

I think Adair's explanation of the causes of the platoon effect in "Physics of Baseball" is much more plausible.

Essentially, when you compound the batters errors you get a more effective pitch. Fast pitches that move toward the batter and are high and inside all cause the batter to be late and hit the ball toward the handle. Slow pitches that move away from the batter and are low and away all cause the batter to be early and hit the ball toward the end of the bat.

These conditions are best exploited by a same handed pitcher since his fastball should run in on a batter and his breaking ball will move away. It also explains why pitchers with really good changeups can have reverse splits since they can throw a slow pitch outside that moves away from an opposite handed batter.

Matt

[#11](#) **Matt Lentzner** ([see all posts](#))

2009/05/15 (Fri)
@ 15:36

Just to add...

I share Mike's skepticism that this illusion has any bearing on mlb batters.

Pitchers are trying their best to throw the pitch in such a way that the batter can't perceive which way it is spinning - scouts call it "tight spin". It is a key element of their deception.

If a batter can't tell if a ball has backspin or topspin then the pitcher can throw fastballs and curveballs that look the same coming out of his hand. Ideally those pitches have the same spin axis, just opposite spin directions.

Lastly, if the pitch appears to be breaking more than it is then we should see batters error in correcting too much. They should be swinging under sliders, not over them. That is not observed.

[#12](#) **Ike Hall** ([see all posts](#))

2009/05/17 (Sun)
@ 19:53

playing around with this a bit I noticed a few things:


The effect got larger if I put the screen very close to my eyes, and it got smaller if I moved my eyes farther from the screen. At a distance of a couple of yards, I noticed no effect at all.

Secondly, I personally feel that the visual effect of spin is far greater in this demonstration than on a real baseball. Most people can't pick up the spin of a baseball on it's way to the plate. Good hitters can. So the visual effect of a spinning baseball has to be very small. nearly imperceptible. If

I play with the simulation to make the spin nearly imperceptible (put the frequency at 4), I don't get any effect at all.

Thus, I don't think that their simulation really applies at all to baseball. After all, fastballs spin pretty well, and the ones that are straight still look that way to hitters.

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