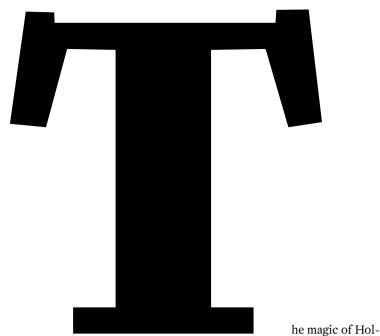


CHA•OTIC: (kā ät ik) adj. 1. in a state of chaos; in a completely confused or disordered condition 2. of or having to do with the theories, dynamics, etc. of mathematical chaos 3. how Hollywood really Operates by Leonard Mlodino



lywood success—how can one account for it? Were the executives at Fox and Sony who gambled more than \$300 million to create the hits "X-Men: The Last Stand" and "The Da Vinci Code" visionaries? Were those at Universal responsible for the box-office disaster "United 93" and their peers at Warner Bros. and Virtual Studios who pumped \$160 million into the flop "Poseidon" just boneheads?

The 2006 summer blockbuster season is upon us, one of the two times each year (the other is Christmas) when a film studio's hopes for black ink are decided by the gods of movie fortune—namely, you and me. Americans may not scurry with enthusiasm to vote for our presidents, but come summer, we do vote early and often for the films we love, to the tune of about \$200 million each weekend. For the people who make the movies, it's either champagne or Prozac as a river of green flows through Tinseltown, dragging careers with it, sometimes for a happy, wild ride, sometimes directly into a rock.

But are the rewards (and punishments) of the Hollywood game deserved, or does luck play a far more important role in box-office success (and failure) than people imagine?

We all understand that genius doesn't guarantee success, but it's seductive to assume that success must come from genius. As a former Hollywood scriptwriter, I understand the comfort in hiring by track record. Yet as a scientist who has taught the mathematics of randomness at Caltech, I also am aware that track records can deceive. That no one can know whether a film will hit or miss has been an uncomfortable suspicion in Hollywood at least since novelist and screenwriter William Goldman enunciated it in his classic 1983 book "Adventures in the Screen Trade." If Goldman is right and a future film's performance is unpredictable, then there is no way studio executives or producers, despite all their swagger, can have a better track record at choosing projects than an ape throwing darts at a dartboard.

That's a bold statement, but these days it is hardly conjecture: With each passing year the unpredictability of film revenue is supported by more and more academic research.

That's not to say that a jittery homemade horror video could just as easily become a hit as, say, "Exorcist: The Beginning," which cost an estimated \$80 million, according to Box Office Mojo, the source for all budget and revenue figures in this story. Well, actually, that is what happened with "The Blair Witch Project" (1999), which cost \$60,000 but brought in \$140 million—more than three times the business of "Exorcist." (Revenue numbers reflect only domestic receipts.)

What the research shows is that even the most professionally made films are subject to many unpredictable factors that arise during production and marketing, not to mention the inscrutable taste of the audience. It is these unknowns that obliterate the ability to foretell the box-office future.

But if picking films is like randomly tossing darts, why do some people hit the bull's-eye more often than others? For the same reason that in a group of apes tossing darts, some apes will do better than others. The answer has nothing to do with skill. Even random events occur in clusters and streaks.

Imagine this game: We line up 20,000 moviegoers who, one by one, flip a coin. If the coin lands heads, they see "X-Men"; if the coin lands tails, it's "The Da Vinci Code." Since the coin has an equal chance of coming up either way, you might think that in this experimental box-office war each film should be in the lead about 10,000 times. But the mathematics of randomness says otherwise: The most probable number of lead changes is zero, and it is 88 times more probable that one of the two films will lead through all 20,000 customers than that each film leads 10,000 times. The lesson I teach in my course is that the fairness of the goddess of fortune is expressed not in alternations of the lead but in the symmetry of probabilities: Each film is equally likely to be the one that grabs and keeps the lead.

If the mathematics is counterintuitive, reality is even worse, because a funny thing happens when a random process such as the coin-flipping experiment is actually carried out: The symmetry of fairness is broken and one of the films becomes the winner. Even in situations like this, in which we know there is no "reason" that the coin flips should favor one film over the other, psychologists have shown that the temptation to concoct imagined reasons to account for skewed data and other patterns is often overwhelming.

In science, data are not accepted as meaningful if they're the result of chance alone. People in the film industry are diligent about gathering data, but are far less skilled at understanding what the numbers mean. The fact is, financial success or failure in Hollywood is determined less by anyone's skill to pick hits, or lack thereof, than by the random nature of the universe. The typical patterns of randomness—apparent hot or cold streaks, or the bunching of data into clusters—are routinely misinterpreted and, worse, acted upon as if a new trend had been discovered or a new epiphany achieved. And so, despite a growing body of evidence that box-office revenue follows the laws of chaotic systems, meaning that it is inherently unpredictable, the superstructure of Hollywood's culture—that pervasive worship of who's hot and the shunning of who's not—continues to rest on a foundation of misconception and mirage.

ast year was a champagne year for Brad Grey, who took over in March 2005 as chairman and chief executive officer of Paramount's Motion Picture Group. Under the previous regime, Paramount had been experiencing, as Variety put it, "a long stretch of underperformance at the box office." Paramount's parent company, Viacom, applied the usual strategy: ax the studio head and bring in a new guy with new ideas.

What followed is a Hollywood ritual. Grey's next moves were described in the trades as a "sweeping revamp" and "massive makeover." Among the many forced to walk the plank were Donald De Line,



Fail (vi.)

1. to be lacking or insufficient; fall short 2. to be unsuccessful in obtaining a desired end; miss 3. to spend about \$160 million on a much-hyped "Poseidon" remake only to see it capsize and sink without a trace at the box office



Succeed (vi.)

1. to achieve or accomplish something planned or attempted 2. realize a goal or goals, esp. in becoming wealthy

3. release critically panned "The Da Vinci Code" and still make about \$200 million

Paramount's president; Rob Friedman, vice chairman and chief operating officer of the Motion Picture Group; and Bruce Tobey, an executive vice president. Grey rebuilt the studio according to his own philosophy and presented it to the press as a hipper, edgier film company cleansed of the outmoded thinking that had weighed down Paramount's bottom line. And now, under Grey and his wise helmsmen, Paramount's ship is making way.

At least that's what the Hollywood establishment likes to believe. After all, it justifies the salaries of all those senior executives. But like many Hollywood plot lines, this one doesn't hold up under closer scrutiny. To understand what really happened at Paramount—the same thing that has happened time and again in the movie industry—we have to look at the events that led to the situation Grey was hired to fix.

When Viacom Chairman Sumner Redstone bought Paramount Pictures in 1993, he inherited Sherry Lansing as studio chief and decided to keep her on. Until just a few years ago, that seemed brilliant, for, under Lansing, Paramount won best picture awards for "Forrest Gump," "Braveheart" and "Titanic" and posted its two highest-grossing years ever. So successful was Lansing that she became, simply, "Sherry"—as if she were the only Sherry in town. But Lansing's reputation soon plunged, and her tenure would not survive the duration of her contract.

In mathematical terms there is both a short and long explanation for Lansing's fate. First, the short answer. Look at this series of numbers: 11.4%, 10.6%, 11.3%, 7.4%, 7.1%, 6.7%. Notice something? So did Redstone, for those six numbers represent the market share of Paramount's Motion Picture Group for the final six years of Lansing's tenure between 1999 and 2004. The trend caused BusinessWeek to speculate that Lansing "may simply no longer have Hollywood's hot hand." In November 2004, she announced she was leaving, and a few months later Grey was brought on board.

How could a sure-fire genius lead a company to seven great years, then fail practically overnight?

There had been plenty of theories explaining Lansing's earlier success. Prior to 2001, Lansing had been praised for making Paramount one of Hollywood's best-run studios, controlling costs and having the ability to make \$100 million hits from conventional stories. But when her fortune changed, the revisionists took over. Her penchant for making successful remakes and sequels became a drawback. She was now blamed for green-lighting box-office dogs such as "Timeline" and "Lara Croft Tomb Raider: The Cradle of Life." Suddenly, the conventional wisdom was that Lansing was risk-averse, old-fashioned and out of touch with trends. Most damning of all, perhaps, was the notion that her failure was due to her "middle-of-the-road tastes."

But can she really be blamed for thinking that a Michael Crichton best-seller would be promising movie fodder? And where were all the "Lara Croft" critics when the first "Tomb Raider" film took in \$131 million in box-office revenue? Even if the theories of Lansing's shortcomings were plausible, consider how abruptly her demise occurred. Did she become risk-averse and out-of-touch overnight?

In theoretical physics, the field in which I was trained, a theory's greatest triumph is to predict something that is later confirmed. Some modern-day scientists go for less, a kind of confirmation-lite, in which a new theory is accepted not because it correctly predicts new phenomena but because it verifies things that we already know. In the physics world, the sometimes derogatory term for this is postdiction—the "prediction" of something after the fact.

Postdiction is less impressive than prediction. But as the final chapter of Lansing's career shows, postdiction is how Hollywood does business.



cademic research provides an alternate theory of Lansing's rise and fall: It was just plain luck. After all, a film's path from Lansing's greenlight to opening weekend is subject to unforeseen influences ranging from bad chemistry on the set to nasty competition in the theaters, and even after the movie is in the can its appeal is difficult to judge. So one could argue that what is farfetched is not the comparison of Lansing's success and

failure to the tossing of darts, but rather the belief that a studio chief's taste can really matter. That's not a popular viewpoint in Hollywood, but there are exceptions, such as former studio executive David Picker, who was quoted in "Adventures in the Screen Trade" as having admitted, "If I had said yes to all the projects I turned down, and no to all the ones I took, it would have worked out about the same."

Few people—including Lansing—wish to discuss it, but in Lansing's case there's already evidence that she was fired because of the industry's flawed reasoning rather than her own flawed decision-making. It's too early to determine how Brad Grey is doing, because Paramount's 2005 films (and even half of 2006's) already were in the pipeline when Lansing left the company. But if we want to know roughly how Lansing would have done in some parallel universe in which she had not been forced out, all we need to do is look at the data from last year.

With films such as "War of the Worlds" and "The Longest Yard," Paramount had its best summer since 1994 and saw its market share rebound to nearly 10%. That isn't merely ironic—it's one of the characteristics of randomness called regression to the mean: In any series of random events, an extraordinary event is most likely to be followed, due purely to chance, by a more ordinary one. Thus an extraordinarily bad year is most likely to be followed by a better one.

A recent Variety headline read, "Parting Gifts: Old regime's pics fuel Paramount rebound," but one can't help but think that, had Viacom had more patience, the headline might have read, "Banner year puts Paramount and Lansing's career back on track." [CONTINUED ON PAGE 42]



Hit (n.)

1. a stroke of good fortune 2. a successful and popular song, singer, book, author, etc. 3. spending almost nothing on "The Blair Witch Project" and making more than \$140 million

Chaotic

[CONTINUED FROM PAGE 19]

till, anecdotes are just anecdotes.

That's where the economists come in. "The moviemaking process is so complicated," says Anita Elberse of the Harvard Business School, "that at the green-lighting stage it is unclear whether you can even pull off making the movie that you think you are planning to make." Adds Charles Moul of Washington University in St. Louis: "There are two schools of thought. According to one, you can't know the appeal of a film until you've completed it, but once you have the movie you can run focus groups and determine whether it is a hit or a dog. According to the other school, you can't tell even then. Either way, it doesn't bode well for your ability to make \$80-million green-lighting decisions that are more than just guesses."

The leading advocate of the second, more radical school of thought is Arthur De Vany, recently retired professor of economics and a member of the Institute for Mathematical Behavioral Sciences at UC Irvine. De Vany likes to illustrate the oddities of the film business by comparing films to breakfast cereal. If breakfast cereals were like films, he says, each time we visited the store we would find a large selection of new cereals, and only a few brands that survived from our last trip. Most of these cereals would languish unnoticed, but crowds would gather at certain parts of the aisle, scooping up the popular brands. And yet, within a few weeks, or at most months, even those popular brands would vanish from the shelves. And so our typical cereal breakfast would consist of a product we had never before tried, and very well might not like, but bought because we heard about it from friends or read of it in the newspaper cereal section.

That's precisely how films behave in the marketplace. If we hear good things, we go and perhaps tell others; if we hear bad things, we stay away. It's that process—the way consumers learn from others about the expected quality of the product—that De Vany found is the key to the odd behavior of the film business today. Economists call it an "information cascade."

"People's behavior is simple," De Vany says, "but in the aggregate it leads to a complex system, a system bordering on chaos."

The theory of chaotic systems grew popular in the 1970s among physicists who wanted to understand how phenomena described by a few simple variables could develop behavior so complex that it's virtually unpredictable. When computers developed in the 1950s, some scientists believed we eventually could accurately predict and perhaps even control the development of rainstorms. They were thwarted by one of the trademarks of chaotic systems, a phenomenon scientists call the "butterfly effect." The term derives from a 1972 talk by mathematician/meteorologist Edward Lorenz, "Predictability: Does the Flap of a Butterfly's Wings in Brazil set off a Tornado in Texas?"

According to the butterfly effect, a small change in the early stages of a chaotic system can lead to such huge and complicated alterations in its later stages that its behavior appears random. In the case of weather, that makes long-term forecasts almost worthless. You can measure the basic parameters—temperature, pressure, humidity, wind velocity—at thousands of different points and plug them into your theoretical model, but if you miss by a

tenth of a percent, the rainstorm you predict for Las Vegas on Thursday will show up as the snowstorm that hits Boise on Tuesday.

In the film business the butterfly effect means that the budget, the genre, the star and the story might all appear to measure up, but if the co-star doesn't quite deliver on her charming smile, if the scenes don't play out just as you imagined them or if the country's mood changes by just a few degrees, then somewhere between the first day of principal photography and the day the movie opens the film that you predicted would take the country by storm instead creates a flurry of calls for your resignation. Films don't succeed or fail without reason, but the only reliable predictor of a film's box-office revenue in a given week is its take the prior week, and the best-laid plans of studio executives go awry as often as the 10-day weather forecast.

Of course, a studio can try to "make a film" through a massive marketing blitz. But although stars and a big ad budget can generate high initial revenues, De Vany's data show that such efforts only help in the opening weeks. After that, the information cascade takes over, and unless viewers like the film, the money spent on a wide release won't bring a return. In fact, if viewers don't like the film, a big ad campaign will create a large flow of negative feedback, killing the film faster than had the studio not pushed it. The result: a starless \$18 million film such as "Home Alone" brings in more than \$285 million while Kevin Costner's \$175 million "Waterworld" dies a quick death, generating a disappointing \$88 million.

ctors in Hollywood understand best that the industry runs on luck. As Bruce Willis once said, "If you can find out why this film or any other film does any good, I'll give you all the money I have." (For the record, the film to which he referred, 1993's "Striking Distance," didn't do any good.) Willis understands the unpredictability of the film business not simply because he's had box-office highs and lows. He knows that random events fueled his career from the beginning, and his story offers another case in point.

For seven years, starting in the late 1970s, Willis lived in a fifth-floor walkup on 49th Street in Manhattan, struggling to make a name for himself off-Broadway and in television commercials. Meanwhile, he tended bar to make ends meet. He remained a minor actor no matter how hard he worked to get good roles, make the right career choices and excel in his trade. Then he made the best decision of his life: He flew to Los Angeles for the '84 Olympics.

While Willis was in L.A., an agent suggested that he go to a few television auditions. One was a show already in its final stages of casting. He landed the role of David Addison, the male lead paired with Cybill Shepherd in a new ABC offering called "Moonlighting." But choosing Willis was hardly a unanimous decision. Glenn Caron, the show's executive producer, liked Willis; the network executives thought he did not look like a serious lead. Viewers seemed to share their opinion: "Moonlighting" debuted on March 3, 1985, to low ratings. Luckily for Willis, in those days networks had patience, and the following season the show became a hit.

Willis had all the ingredients for stardom—acting talent, good looks, a unique personality—but so do many others who never make it big. For Willis, the coin landed heads enough times in a row that he hit the jackpot; for the unlucky fellow who would have won the "Moonlighting" lead had Willis not

THE GALLERY

shown up, the coin took one bounce too many. Other examples of Hollywood's unpredictability are easy to find. "The executives at Warner Bros. didn't think anvone wanted to watch a dark film about a woman boxer," says Harvard's Elberse, "They made 'Million Dollar Baby' because they have an ongoing relationship with Clint Eastwood." And who hasn't heard the tales of "Ishtar" (Warren Beatty + Dustin Hoffman + a \$55-million budget = \$14 million), or "Last Action Hero" (Arnold Schwarzenegger + \$85 million = \$50 million)? In 1972 a young director named George Lucas shot a film called "American Graffiti" (1973) for less than \$1 million. Universal had doubts about the finished film that eventually took in \$115 million, and even graver doubts about Lucas' next idea. Lucas called the story "The Adventures of Luke Starkiller, as taken from 'The Journal of the Whills.' " Universal called it "unproduceable." Ultimately, Fox made the film, but its faith in the project only went so far—it paid Lucas only \$100,000 to write and direct it; in exchange, Lucas received the sequel and merchandising rights. In the end, "Star Wars" took in \$461 million on a budget of \$11 million, and Lucas had himself an empire.

people, at certain times, have a hot hand?

The work of former UC Berkeley professor Daniel Kahneman helps explain this. While at the Hebrew University in Jerusalem in the 1970s, Kahneman and co-worker Amos Tversky addressed people's misconception of randomness and its effect on the way we make decisions. His research proved so influential in understanding how people make financial decisions that in 2002 Kahneman won the Nobel Prize in economics.

f hits are so hard to predict, why does it often appear that certain

One of the questions Kahneman liked to put to his subjects concerned the sequences in a coin toss. For instance, in a toss of seven coins, which of the following head-tail combinations is more likely to occur, HHHHTTT or HTHTTHT? Most people erroneously believe that the first sequence is less likely than the second, but the two sequences—and all other sequences of seven heads and tails—are equally probable.

Not only are people bad at recognizing random processes, they also are

PUZZLE SOLUTION

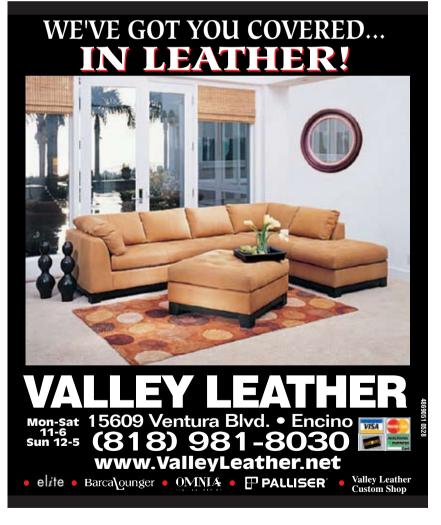
This Week's Puzzle: Little Miss Literal

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Miss (vi.)

1. to fail to hit something aimed at; go wide of the mark 2. to fail to be successful 3. to launch an expensive and long-awaited prequel to 1973's "The Exorcist" that turns few heads

easily fooled into thinking they are controlling them. Sociologists first noticed this while observing gamblers in Las Vegas. Dice players, they noted, act as if tossing the dice is a game of skill. They throw them softly if they want low numbers, or hard for high ones. Much like Hollywood executives, gamblers have their theories about how to make lucky throws.

The temptation to believe that you or others are causing chance events is so strong that psychologists coined a term for it: the illusion of control. In a classic study, psychologists Ellen J. Langer and Jane Roth recruited Yale undergraduate psychology majors to watch an experimenter flip a coin 30 times. One by one, the subjects watched the coin flips and tried to guess how the coins would land. They found that, although students at an Ivy League university are surely aware that a coin toss is a random event, those who experienced the early winning streaks developed an irrational attitude of confidence that they were "good" at intuiting the coin toss. Forty percent said their results would improve with practice; 25% even reported that, if in the future they were distracted during the test, their performance would suffer.

Ithough economists and psychologists have no problem understanding Hollywood's randomness, Hollywood executives, not surprisingly, are generally less convinced. "They are hostile to 'the nobody knows anything' school of thought," says Moul, "because it completely undercuts what they do." Jehoshua Eliashberg of the Wharton business school at the University of Pennsylvania says that unlike executives in the pharmaceutical or packaged goods industries—other industries he has analyzed—in Hollywood "most executives feel threatened."

One Hollywood executive who spoke up against De Vany's work in the late 1990s was Frank Biondi, who ran Universal. Biondi thought he had it figured out. After running the numbers, he concluded that the industry was not as chaotic as it appeared. Films that cost more than \$40 million had the highest return on capital, he said, and so the Harvard MBA directed his studio's dollars toward films he called "impact movies."

De Vany scoffs at such notions. "A naive analysis will often present false patterns," he says, "like faces in the clouds. But a careful study reveals that no strategy the studios devise is going to give them any kind of advantage at all." Then he adds, "So any studio executive getting paid more than the salary of a comparable executive at your local dairy is getting paid too much."

Who is right? In the case of Biondi and his strategy, the jury has delivered its verdict. Two years of impact movies later, with depressed film earnings and no relief in sight, Biondi was fired, leaving behind a legacy of film gems such as "Meet Joe Black" (\$90 million budget, a feeble \$44 million box office) and "Babe: Pig in the City" (\$90 million budget, \$18 million box office).

Old style seat-of-the-pants executives also object to the randomness theory. White-haired seventysomething Richard Zanuck, currently developing the upcoming Tim Burton-directed Jim Carrey film, "Ripley's Believe It or Not," is the son of 20th Century Fox founder Darryl F. Zanuck. Dick Zanuck ran production at Fox and then briefly ran the studio until some major dogs such as 1967's "Doctor Dolittle," 1968's "Star!" and 1969's "Hello, Dolly!" crippled the studio financially and led his dad to fire him. Zanuck says he understands his being fired. "You don't keep someone on endlessly hoping

something will hit," he told me. "If you have a year of picking badly, you're walking down the street looking for a job."

In Zanuck's case, as in Lansing's, his bad streak ended and regression to the mean took over, but not in time to save his job. The films he developed before he got canned ended up doing well, and two of them, in fact, won best-picture Academy Awards—1970's "Patton" and 1971's "The French Connection."

I asked him if he thought he was fired prematurely.

"I don't think it hurt my career."

It certainly didn't. A few years later, Zanuck became the man responsible for Steven Spielberg's 1974 feature debut, "The Sugarland Express," as well as Spielberg's 1975 follow-up, "Jaws" (which took in \$260 million on a budget of about \$7 million). Did he feel "Jaws" would be a hit of historic proportions? "We didn't have any idea," he says. "We bought it from a manuscript, and the book became a bestseller while we were still doing the film."

Zanuck's career illustrates the randomness theory. He has made successful and unsuccessful films, and he obviously hasn't had an inkling in advance which would be which. But Zanuck disagrees with that take.

"True," he says, "nobody can pick a hit in advance because unpredictable things happen to each individual picture. But if you average over a five-year time span, over 100 pictures, 20 a year, the guys with talent will have a higher rate of success. You have to judge someone by their entire career."

Moul sympathizes with Zanuck's point of view. De Vany, too, understands what Zanuck is talking about. "Zanuck's father," he says, "and Thalberg and Disney had records of success that went far beyond chance. They were showmen. They had a knack for picking good stories. But they also had real power over their product and its distribution." They made movies the old-fashioned way: Prior to the 1960s, studios were able to integrate production (including actors and directors on long-term contracts) with large-scale exhibition interests. That meant the studio heads not only had complete creative and budgetary control, they also controlled the screens so they could adjust the release pattern as a film ran, making it less vulnerable to the information cascade.

hy are smart people in Hollywood blind to the randomness that rules their industry? Because we find comfort in having control. And then there are our egos. We like to believe in our own power.

But Langer also uncovered another important factor: competition. In the Yale coin-flip study,

for example, most of the students assessed themselves as being better than their counterparts, even if the game was clearly no more than a series of random events.

And so we turn back to Hollywood, where both ego and competition reign supreme, and those involved in the game find it hard to believe that success and failure lie beyond their control. What lessons can we draw from all this?

De Vany's voice rises. "Today's Hollywood executives all act like wimps," he says. "They don't control their budgets. They give the actors anything they want. They rely on the easy answers, so they try to mimic past successes and cave in to the preposterous demands of stars. My research shows you don't have to do that. It's just an easy way out, an illusion."

Then he adds: "But, hey, it's Hollywood. Why should we expect the way they run the business to be any more real than the films themselves?" w