Basics of Probabilities and Overlays

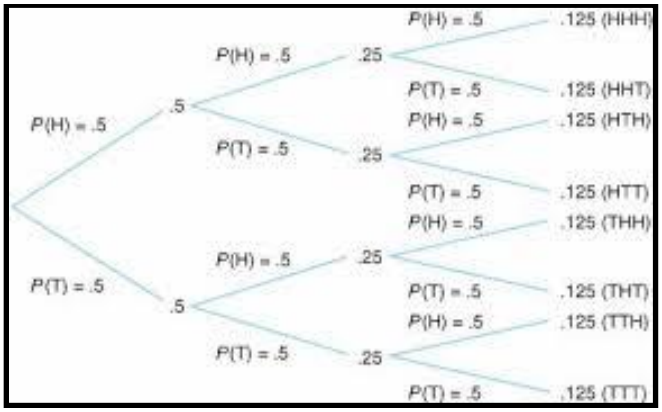
"Knowing that every bet can be a winner or loser, the issue is to define the risk in meaningful terms, not to just try and pick a winner".

Understanding statistical variation is the key to predicting the future. **No one can perfectly predict anything, but the probability of an event occurring is absolutely predictable.** Whether it's about a team winning a football game, a president being elected, a seven coming up on a two dice roll, a horse winning a race or an installed system solution, winners are able to predict the probability of success. Losers cannot!

As I said earlier, successful gambling is not about picking winners. Successful gambling is about making good bets, and a good bet is always defined as:

"A bet made where the "payback" is greater than the "risk".

To demonstrate this simple yet profound theory, I will use the coin flip example. Everyone knows that when you flip a coin, heads will come up 50% of the time, as will tails. If I bet heads and get paid even money (1 to 1 odds) on every flip, I will break even over time. However, if someone wants to give me say 2 to 1 odds on heads coming up, meaning they will pay me $2 every time I bet $1 on heads; I will win money over time. Sure, I may lose on one flip. I may even lose 5 times in a row or more, but it is inevitable that I will win over time. This simple coin flip example demonstrates why odds, essentially ignored by many analysts and 95% of the bettors at the racetrack, are critical to skillful and successful gamblers.



Since I know I will flip heads 1 out of every 2 flips, or win 50.0% of the time, my probability of winning money at 2 to 1 payoff odds, is much greater than the actual probability of flipping heads. In fact, the 50.0% actual probability, when compared to 33.3% (which is the payout probability represented by 2 to 1 odds) is called a 50% "probability" overlay. The 2 to 1 odds create a 100% "odds" overlay because the predictable odds of heads occurring are 1 to 1. Successful gamblers understand these terms, though they can often be confused.

With this simple coin flip example, I have just introduced you to the "basics" of successful gambling. I will explain more about probabilities, odds and overlays later in this chapter so don't get your undies in a bunch if you are already confused. Nevertheless if it's not clear to you by now, you need to be able to estimate probabilities to know if the payback (reward) is going to be better than the risk (bet).

Many gamblers say they value the odds and understand probabilities when they gamble. In truth, most of those people are full of it…..you can add the "sh" if you wish. They have no method for valuing the odds or constructively thinking about probabilities. Whether they are betting a pony at the track, taking points on the Golden Gophers, or investing on a stock some dumb ass on television suggested as a sure thing, they don't think like winners because they don't think in terms of probabilities.

At the racetrack I watch folks who claim to be racing geniuses. These "genius" jerks make their bets 5 or 10 minutes before post time and then wait for the race to be run. The odds on the horse they bet change every few seconds as money comes in on each horse. As a result, the $200 they may have bet on that 4 to 1 horse ten minutes before the race, might drop to 5 to 2 by post time. Then, even if they win, they

collect $700 ($500 for the win plus their original $200 bet). If the odds had stayed at 4 to 1, they would have collected $1000 ($800 for the win plus their original $200).

When they collect the $700 instead of the $1000, they really don't care because they won. They then prance around telling anyone that will listen how frickin smart they were, though real gamblers know they should be prancing around as the dumb asses that they really are.

Unfortunately for them their natural human reaction to winning prevents them from developing systemic success. That sounds crazy doesn't it? Nevertheless, it is true in all things. When you win or are ahead, you never think you acted incorrectly. The basketball coach that gets well ahead in the first half of a basketball game, rarely questions their offensive or defensive strategies at halftime. They instead focus on more of the same in the second half, because they were winning in the first half.

In the racing example, the genius dumb ass who won only $700 instead of $1,000 never waited to see if the final odds were good enough to make their bet a legitimately good bet. They only remember that they won, locking that memory up in the moronic recesses of their minds. They fail to realize that their relative return dropped from 400% to 250%, in a matter of minutes. Probability handicappers know that the horse the dumb ass won on might have been a good bet at 4 to 1, but a bad bet at 5 to 2. On the other hand if these knuckleheads lose, they are so dam stupid that they think the changing odds didn't matter. In their deluded risk taking minds, they would have lost anyway.

This is exactly why foolish gamblers perpetuate their lifetime cycle of not learning how to increase their bankroll. They can brag on occasion and delude themselves into thinking they are smart, but they will never be a good gambler. Their delusion will assure mediocrity!

Now let's think about this scenario for just a little bit, okay? What winning investor, in any field, wouldn't have the discipline to patiently wait a few minutes to fully understand the reward side of a risk equation? You will never be a good gambler without fully comprehending the entire risk/reward equation? In the coin flip scenario, or any risk taking adventure in life for that matter, you need to have a reasonable understanding of both your predicted winning and payoff probabilities to be successful over time. You do not have to have "perfect" understanding of probability to become a winner over time.

My winning desire and probability bias served me well most of my life. Even as a kid, simply deciding to spend a buck to see a matinee movie, I weighed the probability of a payback for my $1 gamble. One dollar was once a hell of a lot of money to me and as crazy as it sounds, I

intuitively established the probability of me getting a few laughs, or scares, at a movie. I would then decide whether I would invest my money for an entertainment reward.

Things have changed a lot from those buck movie days. My decisions now involve luxuries I could have never imagined growing up in Chicago as the son of a milkman. Now my choices involve buying horses, vacation getaways, and meaningful risk investments. However, the underlying probability concepts I utilize today are exactly the same as they were when I was a kid. I combine known factors to determine a reward probability, and then decide if my “gamble” will yield a winning return.

My predilection with probabilities and winning may sound crazy to a lot of folks, but "real" winning gamblers who are reading this are likely shaking their heads up and down saying, "I get it". They know that by treating almost every decision with some form of a probability analysis, they win a lot more than they lose. I also know that some folks may ask, "Is this really the way you want to go through life"? Well the answer for me is yes, but only because I wanted to be successful and create the economic wealth I needed to live the way I wanted to.

I now go through my probability analysis process in split seconds. The process may even appear intuitive to many people, but it’s not. After years of having percentages and probabilities rattle around in my head, they simply come quit easily now. For example, I know that if I think a horse has a 20% probability of winning, I need 4 to 1 odds just to break even. I also know it’s not a good bet unless it's at least a 25% "odds overlay", or near 5 to 1 on the board. A horse with a 16% probability of winning needs to be near 6 to 1, and a 5% winning probability horse requires a minimum of 24 to 1 odds for me to bet, or I walk away. I want the “overlays”, and margins on those overlays, because my predictions are reasonably good but not perfect.

HORSE RACING ODDS PERCENTAGE TABLE							
Odds	Win %	Odds	Win %	Odds	Win %	Odds	Win %
1/10	90.91	7/5	41.67	4/1	20.00	11/1	8.33
1/5	83.33	3/2	40.00	9/2	18.19	12/1	7.69
2/5	71.42	8/5	38.46	5/1	16.67	15/1	6.25
1/2	66.67	9/5	35.71	6/1	14.29	20/1	4.76
3/5	62.50	2/1	33.33	7/1	12.50	25/1	3.85
4/5	55.56	5/2	28.57	8/1	11.11	30/1	3.23
1/1	50.00	3/1	25.00	9/1	10.00	50/1	1.96
6/5	45.45	7/2	22.22	10/1	9.09	99/1	1.00

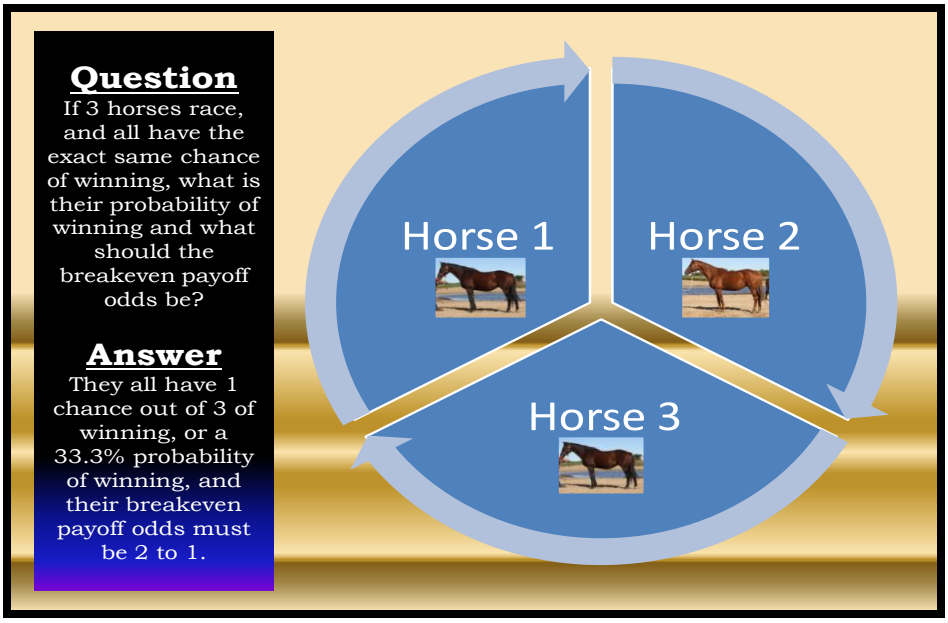
Basic understanding of probabilities is core to gambling success. This is not an opinion; it is an absolute fact…….but here's something you may not know. **Only 5% of the people you or I bet against at the racetrack know what the hell I am talking about in the prior paragraph!** Yes, this core basic element of gambling is not applied by 95% of the racetrack bettors. In fact, most college graduates who have had their heads filled with tons of useless crap in school, have to reread the prior paragraph, use the calculator function on their phones to try to figure out what I am talking about, are entirely confused by the chart and if they aren't confused, they don't have the mental discipline to apply the concept. Many will never get it, yet it's so simple that good gamblers can make these calculations in seconds in their heads!

Now imagine the dumb ass old schoolers who go to the racetrack with their racing past performance charts, pencils and magnifying glasses to see what the hell they are reading. Do you really think they have a method or spreadsheet to calculate probabilities? Do they know how to factor in the minute by minute odds movement, so they can secure solid overlays? Do they even know what a probability is or how the odds define the public's exact perspective on the probabilities of horses winning?

Years ago I realized that most of the bettors at the race track do not understand the underlying nature of the risk they are taking. Today I find this still hilarious as I watch numbskulls, many of which are owners by the way, think they know what they're doing when they gamble. In truth, they don't even understand the basics. I quietly listen to them ramble on incessantly about a horse or two they won a bet on during the day. Of course, they are dumber than a box of rocks.

What I find even more humorous are horse race handicapping experts. People actually pay attention to these shills and their arcane theories. Their "selections" for the public are rarely related to the odds required to secure a profitable bet. Do you really think “expert” media personalities in any field will help you make a profit? It doesn’t matter if you’re watching some idiot retired NFL defensive lineman telling you who’s going to win the Super Bowl, or a racetrack announcer confusing racetrack patrons about today’s daily double. Most of them have the predictive probability and data analysis skills of rabbits. On second thought, make that a gerbil!

With all of this said, let me attempt to illustrate more detail on the basic probabilities involved in racing, starting with a simple three horse race example.

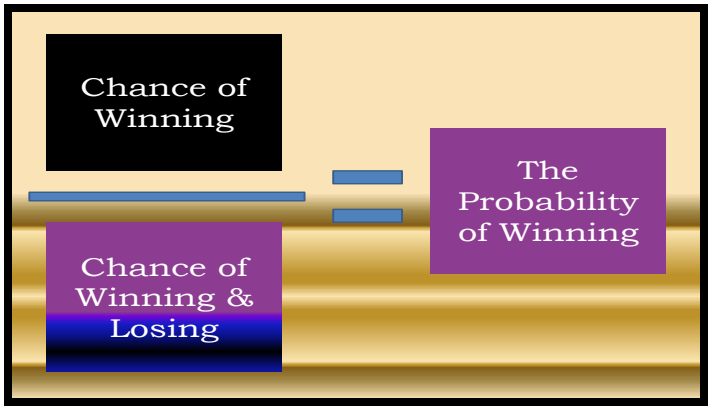


Now of course this example seems quite simple, but is it? If all three horses are perfectly equal, and you know or believe that based upon your handicapping, each horse should win one time every three races, right? If you bet $1 each race, you need to win $2 every time your horse wins, or you will lose money over time. Pretty easy isn’t it? You simply need 2 to 1 odds or better to make a bet, and make money over time. Now if someone, or the racetrack, gives you 3 to 1 odds you will be making a good bet and win money, right? If someone, or the racetrack, gives you 1 to 1 odds you shouldn’t bet and will lose money over time, correct?

The illustration should help make both the odds and probabilities fairly easy to understand. Anyone should be able to see that 3 equally

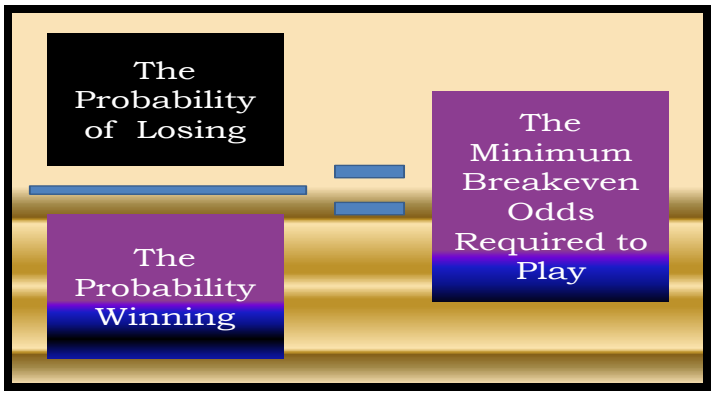
performing horses each have a 1 out of 3 chance of winning. Of course that means they each have a 33.3% (1 divided by 3) probability of winning. What should also be obvious is that you should never bet on any of these three horses unless you get those breakeven odds of 2 to 1 or better.

The mathematical formula for calculating the probability of winning any event is:



Now let's translate this Simple Simon example so you can see how probabilities of winning dictate breakeven odds.

Assuming I have a method to predict the probability of a horse winning a race, the mathematical formula to calculate the odds I must get to make that horse a good bet is simple. **To calculate the required breakeven odds for making any bet IN THE WORLD**, the formula is:



So again let's use our simple three horse example. The probability of any one of the three horses winning is one out of three or 33.33%, so the probability of losing is clearly two out of three or 67.67% (100% minus 33.33%). So using the formula to calculate the breakeven odds you need to make a bet if your prediction system is perfectly accurate, we divide the probability of losing (67.67%) by the probably of winning

(33.33%). The result is 2, which means the breakeven odds are 2 to 1. Again, the 2 to 1 breakeven odds do not factor in a margin for error and there is no such thing as a perfectly predictable result so that's why you need a margin to create a betable overlay.

Now here's the thing. I have conducted risk taking sessions and executive seminars for years in Fortune 100 company environment. I had millionaire executives working for me, and spent years teaching them about statistical variation, underwriting, probabilities and risk taking so they could be more effective in their positions. Even today, I occasionally dust off my 3 ring binders and PowerPoint slides to conduct sessions. As a result, I know there are three distinct groups of people reacting to the handicapping basics I have just explained.

1. **The Arrogant Asses**: There are readers who are immensely bored by these simple explanations. To them, explanations like this are a foolish waste of time. These folks are the math majors, actuaries, the college grads, kids with master's degrees, and others who are so frickin arrogant that they can't believe there are people in this world stupid enough to not understand these basics. They want to know why I am talking about this stupid probability crap instead of explaining my system for handicapping horses. If you are in this group, you might be surprised to know you are in the great minority, and that most of you know next to nothing about variation.

2. **The Delusional Mediocre**: The second group of people contains thousands of folks who never took the time in their life to understand how these basic risk taking equations actually work. They make good gambles but also make bad gambles, and take bad risks every day. They may also be bored by these simple probability explanations because they don't want to waste their time with this formula crap. They think they get by just fine doing what they have been doing and don't even realize their mediocrity. However, they wouldn't mind knowing how to pick a few more winners.

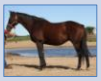
3. **The Tell Me Mores**: Lastly, there is one other group of people. Some of these folks are very intelligent, though they don't have to be. They are a bit intrigued by the probability explanations and wonder what they will lead to. They may even be self critical enough to realize that there is something about these basic elements of intelligent risk taking they have never considered

quite this way before. They see these simple probability concepts to be profound, in a weird sort of way. They are the "tell me more" group.

Of course there's the forth group. They never even attend seminars or stopped trying to gain knowledge years ago. They are simply too stupid or lazy to comprehend these concepts, but such is life. Regardless of which group you fall into, and after attending horse racing seminars for years; rarely do the knuckleheads who conduct them explain these basics equations related to probabilities and odds. Nevertheless, no one should ever gamble without understanding how to increase their bankroll, and it's is next to impossible to do so without probability basics. As a result, the racing industry churns through the "fresh meat" supply of new players and owners year after year.

Now to create better understanding of these concepts, let's evaluate the odds you may actually see in a race. The following simple four horse example turns the odds into breakeven probabilities:

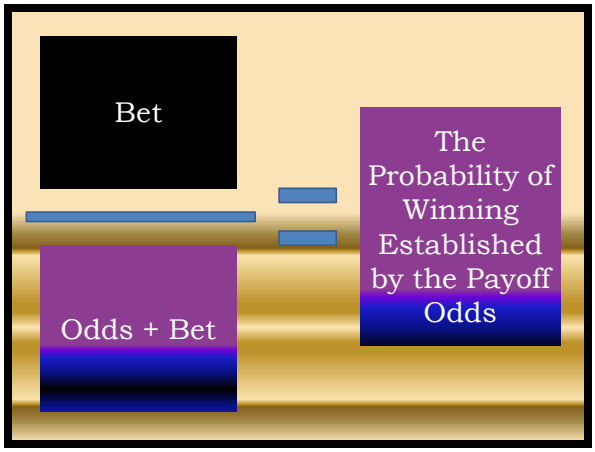
Racing Probability Illustration
Assuming a simple 4 horse race

Horse Number	Final Odds	Breakeven Probabilty
 1	15/1	6.3%
 2	2/1	33.3%
 3	6/5	45.4%
 4	3/2	40.0%

Here I illustrated sample final odds you might find on horses at any racetrack. You will see that the odds range from the favorite at 6 to 5, to the long shot sitting at 15 to 1. By looking at the last column, you will also find the breakeven winning probability on each horse, as defined by the odds.

To explain this better, the final odds advertised on the tote board represent the "payoff" odds for a win bet. In my four horse example, if you bet on horse number 1, you will win $15 for every $1 bet if horse number 1 wins. If you bet on horse number 4, you will win $3 for every $2 bet……or $1.50 for every $1 bet.

What many folks don't understand is that the final odds you get at the racetrack represent a probability. In other words, based upon the final payoff odds, I can calculate what the racetrack is offering me as a gambling payoff probability. To calculate that breakeven probability, I simply use the following formula:



In the illustration, horse number 1 goes off at 15 to 1 odds. You will win $15 for a $1 bet if horse number 1 wins. That means that you will collect $16 because they will pay you the $15 winning amount plus your $1 bet back. So, $1 (your bet) divided by $16 (the odds offered plus your bet) yields a factor of .063. Low and behold, the odds indicate that the racetrack is paying out based on horse number 1 having a 6.3% probability of winning. How about that!

In other words, since the racetrack will pay the public $15 in winnings for a $1 bet, you should expect horse number 1 to have a 6.3% or higher probability of winning the race for you to make a win bet! Now let's assume I have a decent system for handicapping the probability of horse number 1 winning the race. I am an idiot for betting on the 1 horse if I really think it only has say a 5% chance of winning, right? If on the other hand, I think the 1 horse has a 15% chance of winning, even if my system of estimating probabilities is not perfect and off some margin, it may still be a great bet. (In fact, it is a solid overlay.)

Do you now see why I believe horse race gambling, and sports betting by the way, are solid gambling propositions compared to other gaming options? The payoff odds are clearly established! You can find

bets where your belief or handicapping system establishes a probability of winning that is higher than the payoff probabilities dictated by the payoff odds.

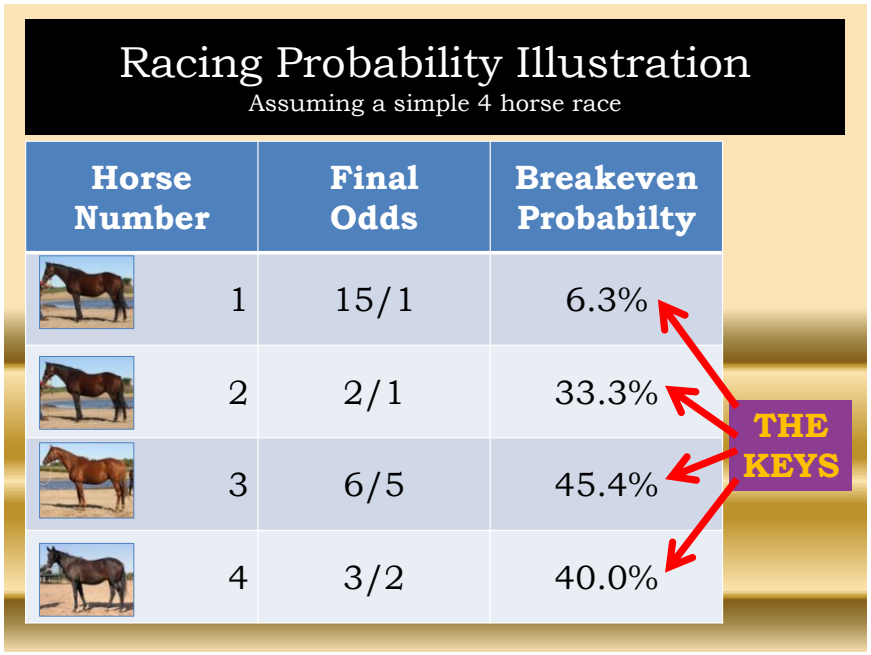
I am of course a statistical nut. During my first trip to Vegas in my early twenties, I sat down and calculated the probabilities associated with every casino bet. I knew the casino always had a mathematical advantage, but I wanted to learn exactly where I could get the best bang for my buck. The closest I could come to a breakeven bet, unless I counted cards at the blackjack table, was at the craps table. By playing craps where they allowed 10 times odds on the pass/come lines, I would only lose 0.18% of my money per bet as long as I played the full 10 times odds bet. In other words, after betting $10 on the pass or come lines, I could put an additional $100 down (10 times odds) to make or miss the point. Of course this was still a loser proposition, allowing me to collect only $99.82 per $100 bet over time. Nevertheless, it was the closest I could get to breaking even in a casino, without counting cards at the blackjack table.

Since this article is not about casino games, I realize the craps references may be Greek to you. Nevertheless, at those same crap tables where I was playing the lowest loss percentages available, I watched dumb as hell "big rollers" bet on things like any seven, one roll 2 or 12's, or one roll 3 or 11's. I knew these dip sticks would lose 16.67% per bet, but they thought they were smart gamblers and occasionally their numbers would come up and they would win. The only worse bets in the casino in those days were a few Big Six propositions or Keno, where the built in 30% mathematical loss was as bad a proposition as existed.

Many gamblers gamble where they cannot win overtime but they may get lucky in the short term. Craps is just one example but it's also

an example of why racing and sports book gaming can make sense to knowledgeable risk takers. **Racing and sports betting give smart gamblers the best option for actually improving their bankrolls because they only need to bet when they think the probabilities are in their favor.**

Now let's take another look at the following theoretical four horse race illustration:



In racing, I can understand exactly how my probability predictions relate to the payoff. For example, if I think that horse number 4 in this theoretical illustration is so superior to the other three horses that it has an 80% probability of winning, and the racetrack is going to pay me as if it has only a 40% probability of winning (3 to 2 odds), I am nuts not to take that bet.

Remember I said I think horse 4 has an 80% probability of winning. I divide the probability of losing (20%) by the probability of winning (80%), and I get a factor of 0.25. This means based on my belief that horse 4 has an 80% probability of winning; I believe the breakeven odds should be 0.25 to 1. The actual 3 to 2 odds the racetrack is giving me are the equivalent of 1.5 to 1 odds. In other words, the payoff odds are 6 times (1.5/.25) greater than what I think they should be. This is a substantial overlay.

This example coincidentally illustrates another common myth that many people have related to never betting big favorites. It's one of the silliest myths at the track, proliferated by idiots too dumb to understand

probabilities. They say something like “Horse number 4 should win but the odds are so low there is no value”. Some of your biggest and best overlays can exist on favorites and if I can get just a 50% return on my money in the time it takes a race to be run why wouldn’t I? You see the 3 to 2 favorite in the previous illustration is a 6 times (500%) overlay.

Looking again at the four horse example, if I think horse number 2 only has a 10% probability of winning, and the racetrack will pay as if it has a 33.3% chance of winning (2 to 1 odds), I am nuts for making such a bet. My 10% probability would dictate that the actual final breakeven odds would have to be 9 to 1 (90% chance of losing divided by the 10% chance of winning).

Simply put, when the payoff odds are in your favor, you can bet as much as you want. When the odds are not in your favor, you do not have to bet a single penny. Because variation exists in all things, every horse has a chance to win and every horse has a chance to lose. Knowing that every bet can be a winner or loser, the issue is to define the risks you are taking in meaningful terms, not to just try and pick a winner.