A LINE ON LIFE

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Figuring Your Odds *

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It helps us to make decisions if we can figure the odds that certain events will occur. However, if we try to make decisions without using statistics, sometimes we fool ourselves. Let's look at some examples.

1. As the manager of a professional baseball team, you need to hire one of two new players. One has only played professional baseball for two weeks and is batting .360. After two years of professional experience, the other is batting .300. Which is the best prospect?

2. In choosing a college, you have read from several different sources that most students are happier at small colleges than larger ones. You just spent the day at a large state university, and it seemed very nice to you. Assuming you are like most other students, which would be best for you?

3. You know that the odds slightly favor the casinos. While on a trip to Las Vegas, you decide "*blow a few dollars*" to try your luck at the dollar slot machines. Unexpectedly, you hit a large jackpot. Should you quit while you are ahead or try to continue your "*lucky streak*"?

All of these choices can be answered better if you know one rule – *a larger sample of events is always a better estimate of the true situation than a small one*. In each of the situations above, the choice has been between a small sample and a larger one.

1. The better choice is the player with two year's experience. Although the first player's average is better, the sample time frame for the batting average is too short to have much confidence that he will be able to keep this average.

2. Since the one-day sample at the university is more personal and recent, it may seem like the best choice for you. However, most other people over long periods of time have preferred small colleges. Since you are like most other people, it would be a mistake to ignore the information gained from them.

3. With the odds in favor of the casinos, the longer you play, the more closely your experience will fit these odds. Rather than being greedy, your odds are better to stop gambling, take the money, and gloat. (How many of us do that?)

Shown below, the **gambler's fallacy** is another problem in figuring the odds.

1. You have information that an average of 1 out of every 350,000 passengers of a particular airline has been injured or killed. You are passenger number 350,000 since the last injury has occurred. What are your chances of being injured or killed?

2. You are betting on coin tosses with a friend. The coin – an honest one – has come up heads five times in a row. Your friend is willing to bet on heads the next time. However, since it is very unlikely to get six heads in a row, he wants you to give him two-to-one odds on the next throw. Should you make the bet?

3. In playing an honest roulette wheel in Las Vegas, you notice that red has not come up in a long time. Would it be a good idea to bet heavily on red?

If previous events occur by chance, they do not change the probability of whatever occurs next.

The gambler's fallacy is evident in these three situations. Many gamblers falsely assume that the previous events have a determining influence on what will occur next. As long as the events are determined solely by chance, this is not true.

1. Since the odds were determined by a combination of chance factors, the rate of injuries should stay same. In other words, just because no injuries have occurred with the previous 349,999 passengers, this does not mean "*your number is up*." Your chances of being injured or killed are still 1 in 350,000.

2. The probability getting a head on the next toss is the same as any toss – one-half. If you want to bet, don't give him any odds. To understand this, it helps to know how to calculate some probabilities. To calculate the probability that several events would *all* occur, you need to *multiply the probability of each of these events*. The probability of getting six heads in a row is one-half times itself six times – 1 chance in 64. The probability of "*six heads in a row*" is different from the "*sixth head*." Once the first five heads have been tossed, since they do not influence the next toss, heads still has a 50% probability.

3. Since the only colors on a roulette wheel are red and black, the chance of getting red on any spin is always one-half. The chances of getting black six times in a row are the same as the heads on a coin (above). Once the other spins have been completed, they have no influence on the probability of the next spin.

You might want to try these problems out on your friends to see how well they will do. After that, if any of you have to make a decision, the above information should help in figuring your odds.

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* Adapted from David L. Watson's *Psychology,* Brooks/Cole Publishing, 1992, pages 270-271.