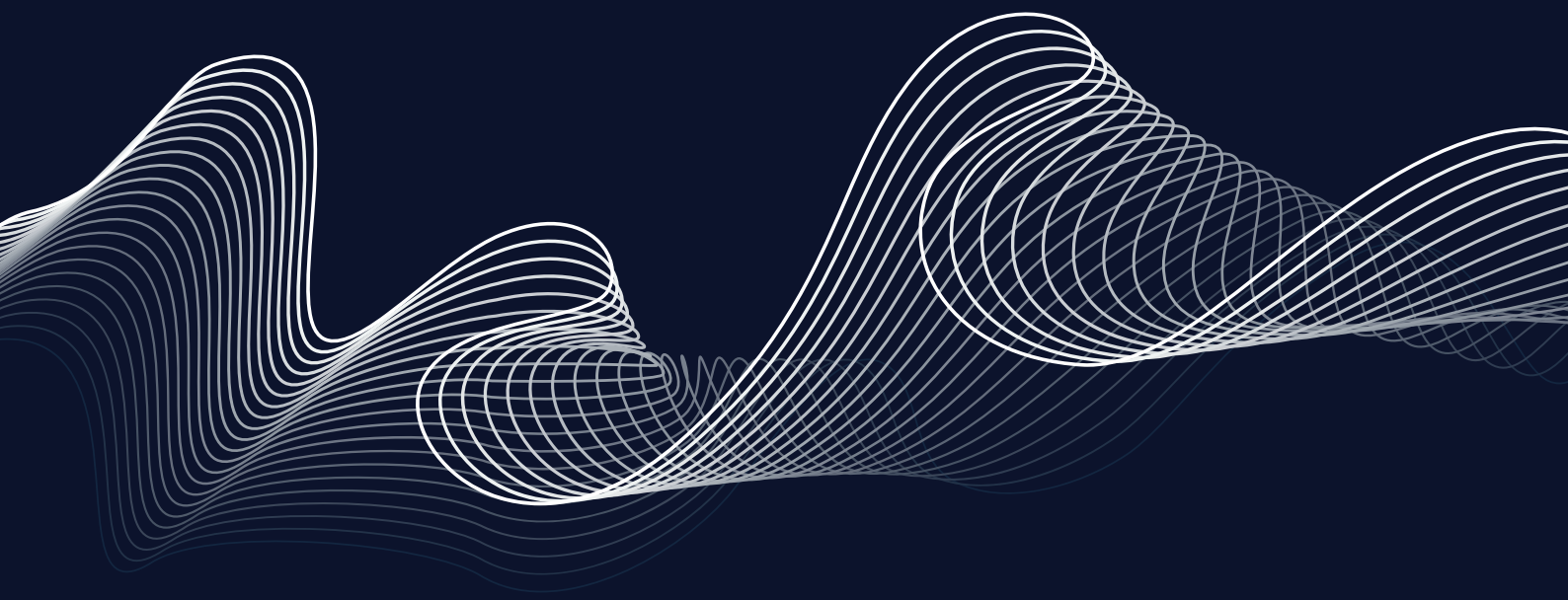




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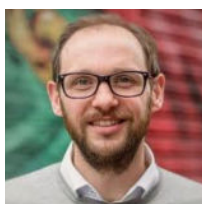
HOLDING THE LINE

How Winning and Losing Streaks
Affect Fund Manager Behavior



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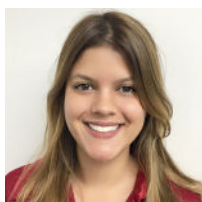
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ABOUT ESSENTIA

Essentia Analytics is a human-technology hybrid solution that leverages behavioral data analytics to help professional investors make measurably better investment decisions.

The Essentia Insight service enables both hedge and traditional active fund managers to capture richer data about their own behavior and its context, to understand where their individual skills and weaknesses lie, identify patterns, and apply that enhanced self-awareness to achieve improved performance.

Investment excellence demands a feedback loop. Essentia supplies one.

Learn more about us, request a demo and subscribe to our white paper series at www.essentia-analytics.com.



FOREWORD

*If you can meet with Triumph and Disaster
And treat those two impostors just the same*

Rudyard Kipling

We all know what it feels like to be “on a roll”. And likewise, we all have weeks when we feel like everything keeps going wrong - we’re on a losing streak. It’s very difficult to avoid the emotions that accompany sustained periods of either winning or losing. Indeed, most psychologists would agree that avoiding emotions is a dangerous endeavor, and would point to the research into the [role testosterone plays](#). But they’d also agree that the more important task is to avoid acting on those emotions - and while that is eminently doable, it’s much easier said than done.

In the context of investing, our emotions only matter insofar as they affect our actions. They contain information, some of which is worth acting upon, and some of which isn’t. These days, wealth advisors - having seen the data that shows how much value can be destroyed by selling low and buying high - are increasingly focused on helping their clients to avoid panic selling when their portfolios experience a string of losses. Professional investors have generally learned not to panic in such situations, but that doesn’t mean that they don’t act on the emotions that arise when they’re on a losing streak. For the most part, they receive daily information on their performance, and - once known - this information cannot be unknown.

If you ask most fund managers or traders whether they behave differently, vis-a-vis investment decision-making when they are on a winning or losing streak, they will say “probably”. But very few could tell you exactly how their behavior changes, or whether the quality of their decisions actually improves or deteriorates.

As you will see in the research below, an unskilled portfolio manager (whose performance is essentially a random walk) can expect to experience a five day streak of either winning or losing 16 times in any given year. That’s 16 opportunities for biased behavior associated with being on the streak to affect them in a predictable way. Some people are more susceptible to it than others - and for the ones who are susceptible, the alpha cost is significant.

Do you know how your own investment decision-making behavior changes when you’re on a winning or losing streak? Can you quantify it? Moreover, can you do something to claw back the alpha you’re unconsciously giving up through biased behavior?

Essentia is in a privileged position, when it comes to access to the requisite data, because we work very closely with a large number of active equity portfolio managers, on an ongoing basis. In this case, our data set spans a very interesting 10 year period in which the world changed dramatically, but market volatility was relatively low.

We have conducted this study with statistical rigor, but as ever, we're coming at it from a practical point of view, looking for insights that our portfolio manager clients can put to work in real life. Our quest to help human investors make measurably better decisions always starts with a simple question, in this case:

Do portfolio managers behave differently when they're on a winning or losing streak, and what is the impact of that behavioral change on performance?

The detail behind the answers is interesting enough to stem a plethora of ideas for extension of this work. But these initial findings already warrant that portfolio managers - and the people who allocate to them - pay attention.

Happy reading,



Clare Flynn Levy

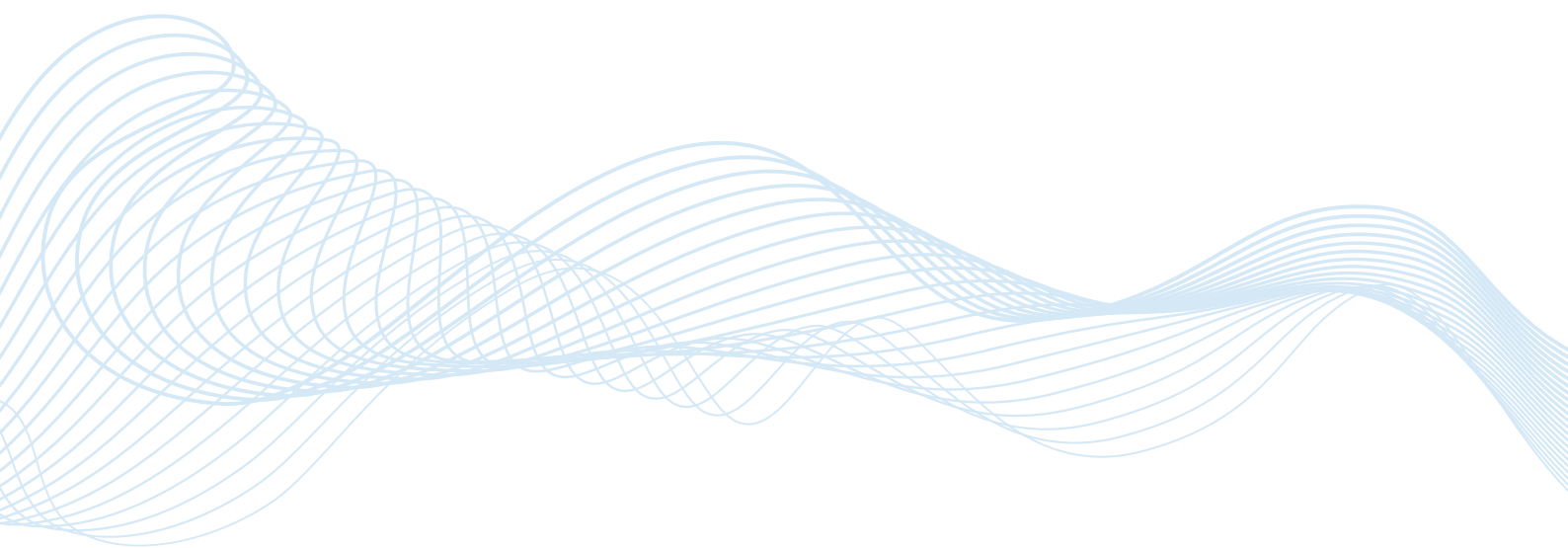
Founder and CEO
Essentia Analytics



HOLDING THE LINE

Summary of findings

- To explore the effect of performance streaks on manager behavior, we used trade and holdings data from 29 active equity portfolios across 21 different firms (five of which were hedge funds), located in North America, Europe, and Asia.
- Half of the portfolio managers in our sample showed some (significant) change in behavior after experiencing a winning or losing streak.
- When managers were on a winning streak, the majority of them traded less often and made fewer decisions. That's just as well, because the decisions they make when on a winning streak tended to destroy value.
- When they were on a losing streak, managers typically traded more often, and in larger size, increasing portfolio turnover. Those decisions tended to destroy even more value.
- The 35% of managers that trade significantly more when losing, destroyed 35bps of alpha each year by doing so, on average.
- These empirical results suggest support for prior behavioral research, including the *Illusion of Control* and increased risk seeking behavior in the domain of losses (Kahneman & Tversky's [Prospect Theory](#))



Half of the active equity portfolio managers in our sample showed some (significant) change in behavior after experiencing a winning or losing streak.

Methodology and assumptions

- The broad goal of this study was to determine if behavior changed depending on the background conditions of the manager's recent performance - i.e. whether there was a relationship between being in a "winning" or "losing" frame of mind, and the manager's subsequent investment behavior. Furthermore, we looked at whether the outcomes of those decisions were better, worse, or equivalent to decisions made outside of a streak.
- Drawing from [behavioral research](#), particularly in the areas of sports and gambling, we chose to define a **winning streak** as any sequence of five days in which fund profit was positive on each day, and a **losing streak** as any sequence of five days in which fund profit was negative on each day. For clients with a specified benchmark, we considered profit relative to that benchmark. For the purposes of this study, we then looked at the trading decisions made on the fifth day of the winning or losing streak and for all days until the streak was broken.
- To explore the effect of performance streaks on manager behavior, we used trade and holdings data from 29 active equity portfolios across 21 different firms (five of which were hedge funds), located in North America, Europe, and Asia. This data, spanning 2008 to the present day, equated to 250,000 trades and 3.5 million individual data points overall.
- In looking at behavior during a streak, we considered three dimensions:
 - Turnover (in portfolio currency terms)
 - Average trade weight (what might be termed average 'clip')
 - Number of trades per day

To determine the impact of any changes in behavior, we considered the return on investment (ROI) of those trades and the profit contribution of those trades to the overall portfolio value ("impact") over a forward time period, the **Performance Horizon**. The Performance Horizon is established by the Essentia system for each manager individually as a function of their average holding period; it typically falls between three and six months. We looked for statistically significant changes in behavior along those dimensions for winning and losing relative to 'neutral' frames, and for winning relative to losing.

WHY IS A STREAK 5 DAYS?

Academic literature on the Gambler's Fallacy and hot hand tend to focus on, and find effects related to, streak lengths of between three and six days*. Combined with the professional money management experience of multiple members of the Essentia Analytics team, we settled on five days as a hypothesis for when we might see the effects of behavior change.

* See [Xu and Harvey](#)¹, [Studer et al](#)², the classic paper from [Tversky et al](#)³ and, of course, its [recent rebuttal](#)⁴, for more details.



WHAT ABOUT THE "HOT HAND"?

The "hot hand" is the purported phenomenon that a person (commonly an athlete) who experiences a successful outcome at a random event has a greater probability of success in further attempts.

Research on the hot hand tends to focus on serial correlation of streaks: namely, does the presence of a winning streak increase the likelihood of 'success' on the subsequent play/throw/toss?

This is specifically **not** our approach. We assume, for the time frame being covered here, that fund profit is essentially independent of the manager's actions. We focus instead on whether there is any evidence that profit streaks influence how a manager behaves next.

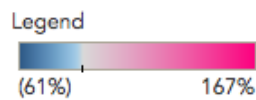
In the case of day traders or some especially active hedge funds, it may be possible to take the hot hand approach, but for Essentia's client base, which consists largely of investors (rather than traders), the degree to which managers can influence portfolio profit on a given day is negligible, making it especially pertinent to understand if short term streaks nevertheless affect their behavior.

Observations

- Over half of PMs changed their behavior in one way or another when on a streak
- Nearly one in four changed it when winning, and 41% changed it when losing
- Those who changed their behavior while winning tended to reduce turnover via making fewer decisions
- Managers on winning streaks made worse decisions but it didn't have a major impact on performance because they traded less
- Those who changed their behavior while losing tended to increase turnover. In fact, over one third of all managers increased their turnover, through a combination of bigger clips and more trades, when they were on a losing streak
- Managers on losing streaks made worse decisions and that had a significant impact on performance
- The 35% of managers who traded significantly more when losing tended to destroy 2.3bps of portfolio value per streak (on either type of streak). Assuming the average PM has 16 streaks a year, that's 35bps of relative performance they are giving up to bad decisions made while on streaks.

Figure 1: Change from median when winning and losing, across several measures, for each fund in our study

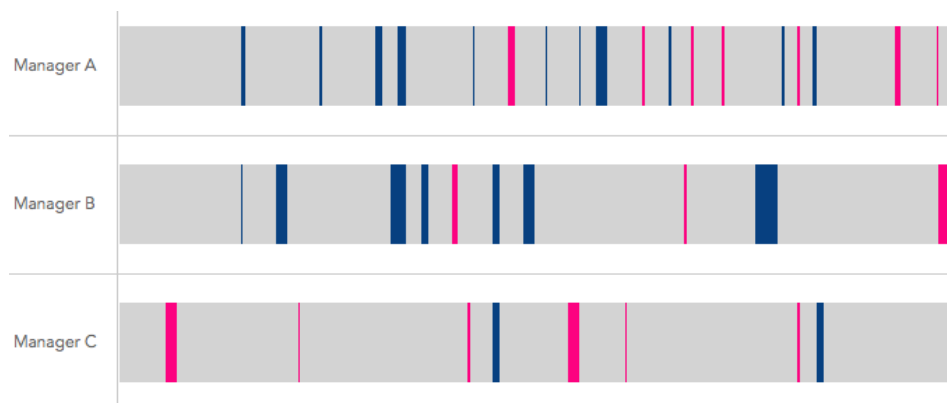
Winning			Losing		
Turnover	Trade Size	Trade Count	Turnover	Trade Size	Trade Count
(42%)	(46%)	(50%)	149%	162%	50%
(32%)	(41%)	(33%)	(36%)	(38%)	0%
(38%)	(36%)	(50%)	128%	134%	50%
(44%)	(32%)	(40%)	66%	167%	40%
(23%)	(27%)	(25%)	(25%)	(14%)	(38%)
(16%)	(17%)	(11%)	77%	82%	26%
(8%)	(11%)	(9%)	66%	52%	59%
(8%)	(9%)	(17%)	25%	25%	0%
1%	(6%)	14%	30%	24%	27%
0%	0%	0%	100%	100%	100%
(11%)	0%	0%	(31%)	(13%)	0%
0%	0%	0%	100%	100%	100%
4%	0%	0%	6%	22%	(13%)
0%	0%	0%	100%	100%	100%
0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%
20%	1%	0%	(17%)	(11%)	(13%)
(3%)	2%	0%	29%	49%	0%
(1%)	2%	0%	(61%)	(61%)	(50%)
5%	5%	0%	22%	22%	(33%)
29%	9%	20%	(9%)	(2%)	0%
16%	18%	25%	20%	29%	(50%)
33%	31%	0%	(42%)	(45%)	0%
57%	45%	50%	22%	21%	0%
80%	100%	100%	34%	36%	0%



The table shows how each manager's median behavior changes along the dimensions measured. Pink cells show a positive change (increase) and blue cells show a negative (decrease) change. Each manager in the study is represented by a single row.



Figure 2: A year in streaks



Each grey row represents a 12 month performance period for a single portfolio manager. Three managers are shown. Pink bars represent cold (losing) streaks that are five days or more in length. Blue bars represent hot (winning) streaks that are five days or more in length. Bars grow wider as a streak continues beyond five days.

Portfolio turnover

21% of the fund managers we analysed changed their daily portfolio turnover behavior (as measured in base currency) meaningfully when on a winning streak. Two-thirds of those managers reduced it, by 16% at the median.

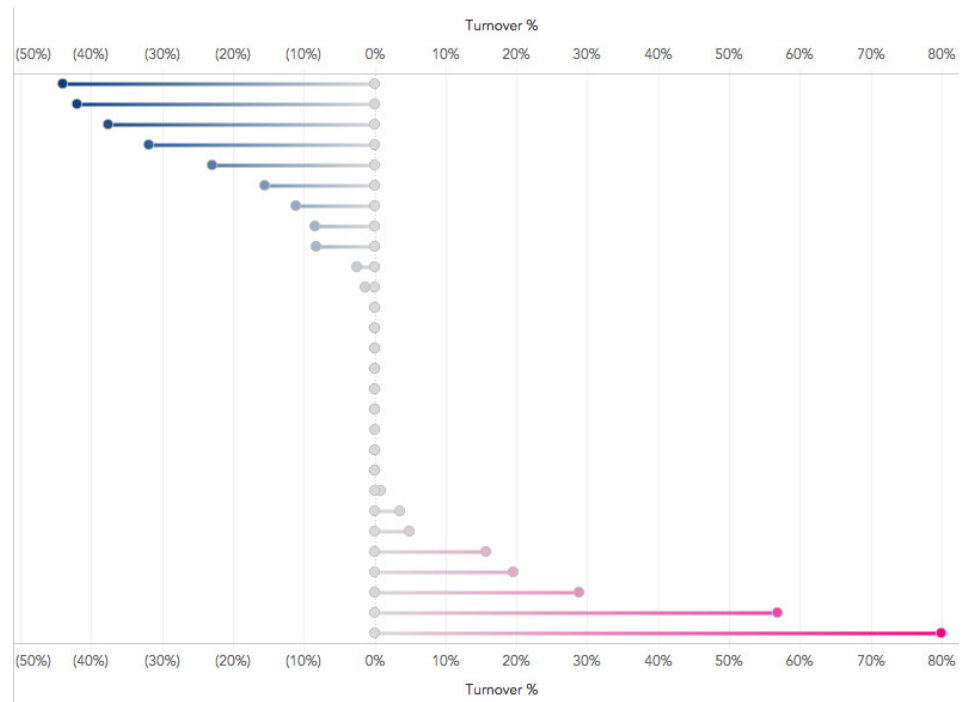
Figure 3: Turnover on streaks, relative to fund average



Each dot represents the portfolio turnover behavior of a manager when on a winning or losing streak. Pink dots represent turnover behavior when on a losing streak; blue dots when on a winning streak. Dots above zero on the y-axis represent trading above the portfolio average; dots below zero represent trading below average. The data has been normalized and transformed using the logarithm function to better represent data points below average.

The remaining one third, who **increased** their turnover, did so by a much larger amount: 69%, on average. Those two portfolio managers can clearly be seen in the chart below (figure 4). This behavior is consistent with Thaler and Johnson (1990)'s *House Money Effect*. Taking a term from poker, this bias describes the tendency to take more risk in response to recent gains. It also alludes to the *Victory Effect*, which describes the tendency to take more risk after a significant win.

Figure 4: Median change in turnover when winning



Shows, for each manager in the dataset, how much their turnover (as a percentage of AUM) changed when on a winning streak, relative to their own average turnover on a non-streak day.

21% of the fund managers we analysed changed their portfolio turnover behavior meaningfully when on a winning streak.

Probably more intuitive to anyone who has been a PM, though, is the idea that our behavior changes when we're on a losing streak. [Brown, Harlow and Starks \(1996\)](#)⁵ found that mutual fund managers whose compensation was tied to performance tended to increase volatility in the second half of a year in which they had reached the half year point as "losers". [Brown, Goetzmann and Park \(1999\)](#)⁶ found a similar phenomenon amongst hedge fund and CTA managers.

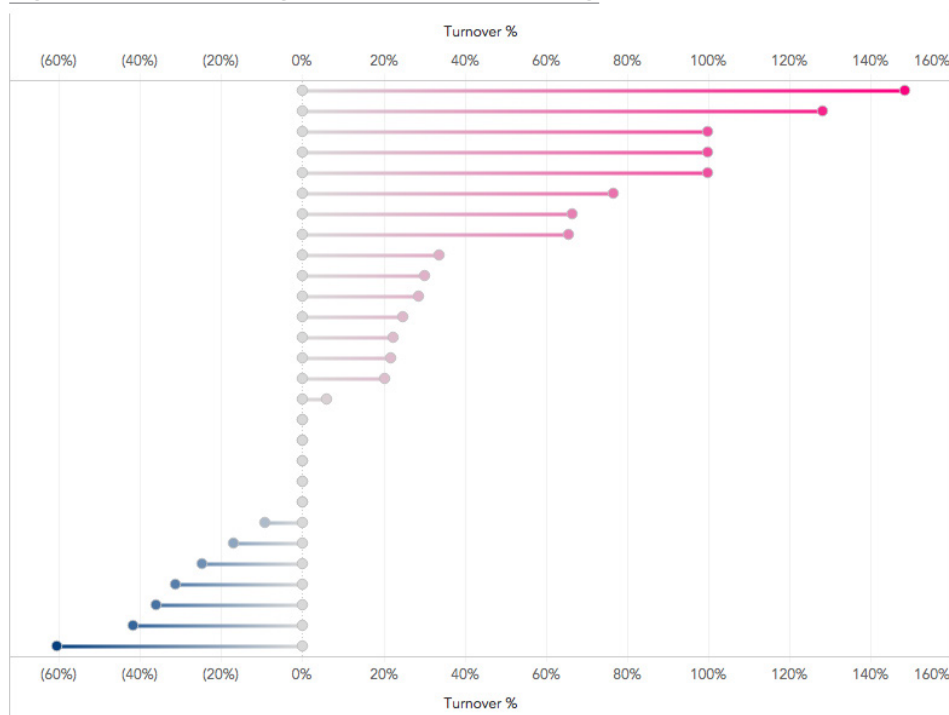
In this study, we consider the fund manager's behavior over a shorter period. Ignoring whether performance for the year has been positive or negative at the point when the manager experiences a five-day (winning or) losing streak, we look at whether the manager's behavior changes when the streak takes place.



Indeed, we found that **nearly 35% of PMs changed their turnover behavior when they were experiencing a losing streak**. In fact, of those that showed a significant difference, all generated higher daily turnover during a losing streak - on average, a considerable 88% higher. In other words, they made much bigger decisions, in aggregate, when they were on losing streaks. Overall, there was a 34% increase in turnover: a strong argument for brokers to be extra kind to investors who are in a rut!

A manager on a losing streak was nearly twice as likely to change behavior as a manager on a winning streak - and almost certain to change it by trading more.

Figure 5: Median change in turnover when losing



Shows, for each manager in the dataset, how much their turnover (as a percentage of AUM) changed when on a losing streak, relative to their own average turnover on a non-streak day.

A manager on a losing streak was nearly twice as likely to change behavior as a manager on a winning streak - and almost certain to change it by trading more. One in four managers in our study showed significantly different behavior when losing versus when winning. Every one of those managers traded more when they were losing, with a median increase of 110% - a doubling of turnover. Some managers traded three to four times as much when losing.

When on a losing streak, they were instinctively acting as though the likelihood of the decisions they were taking being right was somehow significantly greater than usual (see [Overconfidence](#)), as though taking the view that not only is "it broke" but that they could "fix it" (see [Illusion of Control](#)).

Having established how portfolio turnover (as measured in portfolio base currency) changes when fund managers are on winning and losing streaks, we looked deeper: was it down to them doing more/fewer trades, trading in larger/smaller “clips” or both?

Number of Decisions

For the most part, managers showed no significant change in the number of decisions they were making when they were on a winning streak. 10% of managers who were on a winning streak significantly changed their behavior around the average number of trades they did per day, and all of those made fewer decisions.

It was a different story for losing streaks, however, with 31% of managers changing their behavior significantly, all but one of whom increased the number of trades they did when under pressure (losing). The median increase in decision burden was almost 50%.

The real story here is when we benchmarked each manager against him or herself, and looked at the differences in decision (trade) count during winning streaks vs losing streaks, for each manager. Again, one in four showed differences in behavior, all of whom increased the decision burden when losing. The median manager more than doubled his or her decision burden when losing versus when winning.

Trade Size

When it came to trade size, we saw glimmers of overconfidence amongst the winners - of the 15% showing a significant change, three out of four increased their average clip. The median increase was to double the size of the average trade when winning.

Yet there were 30% of managers who also traded in bigger clips when losing versus their own behavior when winning - these were a completely distinct group from the ‘overconfident winners’. This group increased their clips by a remarkable 200%, perhaps demonstrating classic [Loss Aversion](#), with bigger bets in the losing domain than the winning domain.

The median manager more than doubled his or her decision burden when losing versus when winning.

Decision Quality

Of course, the most important question to answer in all of this is the “so what?": **did the quality of the PMs’ decisions improve or deteriorate during winning vs losing streaks?**



In the chart below (figure 5), we show the average for each of these measures, split by streak type, across the managers in our study.

We found that the majority (62%) of managers saw the quality of their decisions deteriorate when they were on a winning streak: and not by an insignificant amount. On average, and based on a forward-looking view (based on each manager's customized Performance Horizon) the average ROI on the trades done when on a winning streak deteriorated by 66bps. Fortunately for these managers, because they were trading so much less when winning, the impact on their portfolios was manageable - they gave up less than a basis point for every day they were on the winning streak.

The average ROI on the trades done when on a winning streak deteriorated by 66bps.

Figure 6: Hit Rate and Payoff on all trades (all managers)

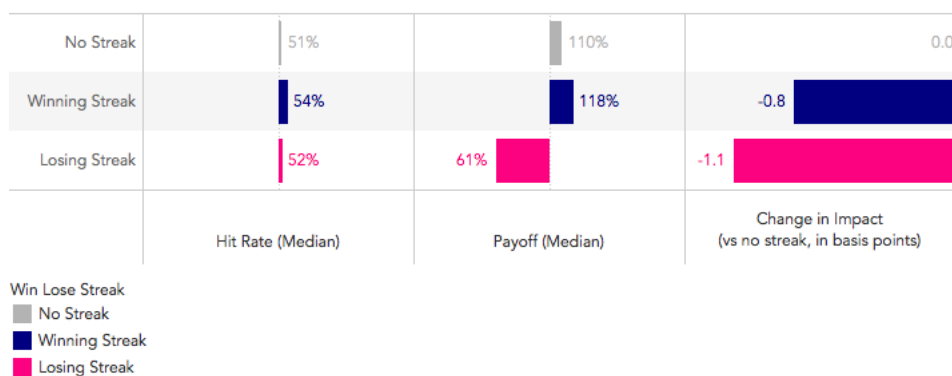
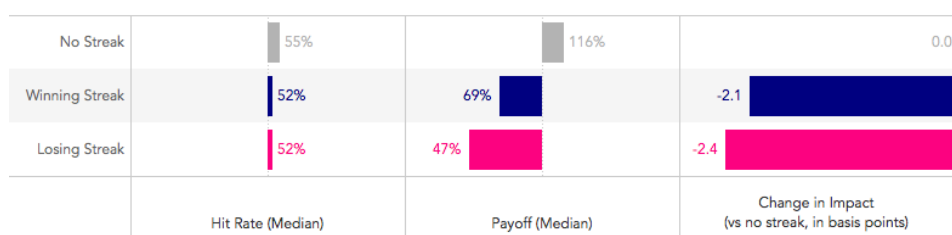


Figure 7: Hit Rate and Payoff on trades (those managers who trade significantly more when losing)



Figures 6 and 7: Hit Rate and Payoff are two of our core metrics when dissecting manager behavior. In this case, *Hit Rate* is the number of trades that turned out well divided by the total number of trades (ie how likely is a good outcome); *Payoff* is the average profit of trades that turned out well divided by those that turned out poorly (sometimes called the win/loss ratio). *Impact* is the contribution of the trade to the portfolio, in other words the profit divided by the fund size. Each bar represents the median across the managers in the table.

In the context of a losing streak, the results are more intuitive: those who traded more under pressure made worse quality decisions. Based on a forward-looking view (their customized Performance Horizon), their average Hit Rate stayed steady (actually improving from 51% to 52%), but their average Payoff fell from 110% to 61%. In other words, the likelihood of a decision made during a losing streak turning out to be profitable was marginally better than chance, but the positive P&L impact of the average profitable decision was only 61% as large as the negative P&L impact of the average loss-making decision.

At the end of the day, the impact of those poorer decisions could prove to be significant at the portfolio level. Whilst across all managers the impact was only -1bp, on average, those who reacted significantly when losing - either by trading more, making more decisions or trading in bigger clips - gave away 2 to 2.5bps, on average. This aligns with [Fenton-O’Creevy, Nicholson, Soane, and Willman’s \(2003\)](#)⁷ finding that there is a negative correlation between a trader’s propensity toward the *Illusion of Control*, and their investment performance.

What is more, it turns out managers who traded significantly more when losing also tended to make worse quality decisions when winning. No matter what type of streak they were on, these managers gave up an average of 2.3bps per streak, at the portfolio level. That might not sound like a lot, but chance says that, in any given year, a manager can expect to hit a five-day streak of some kind on 16 different occasions. **Those PMs - and remember they accounted for 35% of our sample - can therefore expect to give away over 35bps of their alpha every year, just because of their own reactions to winning and losing.** Anyone who has been a portfolio manager (or marketed one!) knows just what a difference 35bps of alpha can make to the attractiveness of the fund.

Conclusion

This inquiry showed us that while every active equity portfolio manager’s behavior is unique, 50% of them react to being on a winning or losing streak. Those on a winning streak are likely to trade less, in smaller size, and making fewer decisions. Those decisions tend to destroy value, but they don’t do as much damage as decisions made while on a losing streak.

We learned that when portfolio managers are on a losing streak, they typically trade more, making more decisions, in larger clips. Those decisions tend to destroy even more value.

Finally, we learned that 35% of managers have been giving up over 35bps of alpha per year due to their own reactions to both winning and losing.

Of course, at the same time, it would be remiss not to point out the other 50% of managers who - to their great credit - show no apparent reaction to winning and losing streaks.

**35% of
managers have
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Nevertheless, these empirical results reinforce core ideas in the classic behavioral science canon. A significant subset of managers appears to be vulnerable to the *Illusion of Control* when on a losing streak (by trading more), whilst there was support for Kahneman & Tversky's *Prospect Theory* across the study, with managers showing increases in risk seeking behavior in the domain of losses ("doubling down" to avoid having to crystallize losses), and risk aversion in the domain of gains (preferring the certainty of keeping their existing gains to the risk of betting more and reducing the pot).

So what can you, as a manager, do with this information? Despite the above conclusions, it is also clear that there is a distribution of possible reactions to winning and losing streaks. Practically speaking, this warrants a targeted approach at the individual level: do this analysis on your own investment behavior every time you hit a streak. Also, consider designing a Nudge that reminds you of any streak-driven tendencies you may have, and that helps you to deliberately change that behavior. If you'd like help with these, please get in contact with the Essentia Research team (info@essentia-analytics.com).

In any given year, a manager can expect to hit a five-day streak of some kind on 16 different occasions.

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Performance volatility is something that all portfolio managers will experience through their careers. But a significant proportion of them are giving up alpha purely through the way they react to winning and losing.

In this research paper, Essentia Analytics explores how a range of professional investors respond to performance success or failure. The results reaffirm the importance of understanding and measuring individual behavior when seeking sustainable investment performance.



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