

Fooled by Success: How, Why, and When Disclosures Fail or Work in Mutual Fund Ads

Joseph M. Johnson , Gerard J. Tellis, and Noah VanBergen

Abstract

Mutual fund advertisers often highlight their funds' past returns, albeit with a disclosure mandated by the Securities and Exchange Commission (SEC). To ascertain whether the SEC disclosure is effective and how it could be improved, the authors conduct seven experiments regarding individuals' choice of mutual funds with ads touting past success plus disclosures. These experiments lead to several findings: First, current SEC disclosures do not work because investors fall prey to the "hot hand" bias and believe that past performance trends will continue. Second, although investors comprehend the content of the SEC disclosure, they misapply it. Third, an alternate stronger, less ambiguous disclosure effectively attenuates investors' preferences for funds with longer (vs. shorter) performance runs. Fourth, only a disclosure that directly relates to the beliefs that give rise to the hot hand bias overcomes peoples' tendency to chase returns. Fifth, these findings generalize to the real estate context. This is the only research that shows that when the SEC disclosure found in mutual fund ads is pitted against the hot hand bias, the hot hand wins out. However, a strongly worded disclosure has some success at debiasing individuals. The authors also discuss implications for policy makers, practitioners, and consumers.

Keywords

hot hand, mutual fund ads, SEC disclosures

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Marketers of mutual funds and similar financial products frequently advertise the past positive performance of their offerings. For example, we conducted an informal survey of two years' worth of *Money* magazine issues, which indicated that ads for such products primarily emphasize each fund's performance over the past several years. Mullainathan and Shleifer (2005) find that past returns are mentioned in 62% of equity mutual fund ads appearing in *Money* over a nine-year period and in 59% of equity mutual fund ads appearing in *BusinessWeek* over and ten-year period. Huhmann and Bhat-tacharya (2005) find that almost 42% of mutual fund ads in *Barron's* and *Money* mention a fund's high or increasing returns over a two-year period. Web Appendix 1 gives an example of such ads. Clearly, a primary strategy that practitioners use to attract investors is to highlight how well their mutual funds have performed in the past. Ironically, all these ads have a disclosure at the bottom mandated by the Securities and Exchange Commission (SEC) that "past performance does not guarantee future results." If that statement is indeed true, then advertising information about past performance should be mostly meaningless. Recognizing this contradiction raises

several substantive questions: Why do many mutual fund ads emphasize past performance given that they must also state that past performance does not predict future performance? What are investors' lay beliefs about the predictive value of past performance? Is the SEC's warning effective at influencing potential investors' reliance on past performance or their beliefs about the predictive value of past performance? If not, is there an alternative disclosure that would be more effective? The present research sheds light on each question.

We suspect mutual funds advertise past performance because they believe investors base their choices on past performance and that the SEC's disclosure is ineffective at informing individuals about the value of past performance. Research in judgment and decision making supports this suspicion that individuals use information sequences to make decisions, even

Joseph M. Johnson is Associate Professor of Marketing, University of Miami, USA (email: jjohnson@miami.edu). Gerard J. Tellis is Neely Chaired Professor of American Enterprise, University of Southern California, USA (email: tellis@marshall.usc.edu). Noah VanBergen is Assistant Professor of Marketing, University of Cincinnati, USA (email: vanbernh@ucmail.uc.edu).

when the information in the sequence consists of independent random draws. In addition, the finance literature shows that investors chase trends in returns (Bergstresser and Poterba 2002, Ferreira et al. 2012, Ivkovic and Weisbenner 2009). The reliance on perceived patterns in sequential information leads to the well-known “hot hand” bias. The hot hand bias occurs when individuals wrongly project into the future the continuation of an observed trend in a process that is essentially random (Andreassen 1988; De Bondt 1993; Dhar and Kumar 2001; Hendricks, Patel, and Zeckhauser 1993). One example of the hot hand bias is individuals’ prediction of continued success for a “hot” basketball player who makes a string of successful baskets. However, Gilovich, Vallone, and Tversky (1985) show that basketball players’ shots are independent random draws and a belief in the hot hand leads to biased predictions.

The hot hand bias is based on the erroneous belief that small samples of a completely random process contain some pattern. In the context of mutual funds, the hot hand bias leads to investors preferring funds with long sequences of positive returns over those with short sequences (i.e., return chasing; Bohn and Tesar 1996). This bias can lead lay investors astray when choosing mutual funds because rising or falling patterns in returns of mutual funds rarely persist over time (Carhart 1997) even though lay investors may conclude otherwise (Johnson and Tellis 2005). For example, the overwhelming evidence from empirical research in finance shows that mutual fund managers’ past performance does not determine their future performance (Shefrin 2000). The dominant paradigm in finance asserts that stock prices follow a random walk and that price changes (i.e., returns) are white noise (i.e., “temporally independent;” Campbell, Lo, and MacKinlay 1997, p. 14). Thus, runs (beyond the single prior day) in returns are patternless and contain no information. So, active fund managers cannot consistently pick winning stocks and produce persistently high mutual fund returns (Carhart 1997). However, lay investors may not understand that prior periods of positive returns are the result of a random process, leading them to assume the positive returns will persist in the future. This concern contributed to the SEC’s decision to require a fair disclosure in ads for financial products indicating that “past performance does not guarantee future results” (SEC 2003). The extent to which individuals’ investment preferences are affected by disclosures is a primary focus of this research.

The key questions we address in five experiments are as follows: First, to what extent do individuals’ investment behaviors reflect reliance on the hot hand bias? Second, does the SEC disclosure influence investors’ beliefs about past performance and thereby debias their investment preferences? Third, if not, what alternate disclosure debiases these beliefs? Fourth, do these alternate disclosures mitigate the hot hand bias and diminish return chasing? Fifth, do these effects generalize to lay investors familiar with mutual funds through their retirement portfolios?

This is the only research that shows when the SEC-mandated disclosures found in mutual fund ads are pitted against the hot hand bias, the hot hand wins out. As a result,

individuals exposed to mutual fund ads touting past success prefer funds with longer (vs. shorter) performance runs, even when the ads include the SEC disclosure. However, an alternate disclosure with stronger, less ambiguous wording that directly relates to the beliefs that give rise to the hot hand bias attenuates investors’ tendency to chase returns. The present research thus contributes to the literatures in advertising, behavioral finance, behavioral decision making, and public policy by studying how potential investors are influenced by various disclosures in the face of past performance data. More specifically, we add to the advertising literature by showing how marketers induce a bias in the context of consumers purchasing financial products. We add to the public policy literature by showing that current disclosures do not work and by providing guidelines for disclosures that we find do work. With respect to the behavioral finance literature, we show how the hot hand bias induces return chasing in lay investors even in the absence of any other information such as a fund manager’s skills. Our process evidence reveals that these results are driven not by investors ignoring or misunderstanding disclosures but rather by a misapplication of the meaning of disclosures.

The rest of this article is organized in seven sections. First, we discuss how the hot hand bias relates to beliefs about past performance in the context of choosing mutual funds. Second, we test if the SEC-mandated disclosure debiases consumers when choosing mutual funds that extol past performance. Third, we test whether a strong disclosure is more effective than the SEC disclosure in debiasing consumers’ investment preferences by changing their lay beliefs about past performance. Fourth, we test the effect of the strong disclosure at attenuating the hot hand bias when investors are faced with an opportunity to engage in return chasing. Fifth, we generalize our results by conducting a study with real investors who are familiar with mutual funds. Sixth, we test an alternate strong disclosure to provide evidence for the critical elements of effective disclosures. Finally, we conclude with a discussion.

Conceptual Development

This section reviews the relevant literature to position our contribution and develop our hypotheses. Specifically, we discuss the literature on (1) the effect of the hot hand bias in the context of mutual fund advertising and (2) whether the SEC disclosures mitigate the effects of the hot hand bias on investors’ fund choices.

The Hot Hand Bias and SEC Disclosures

The hot hand bias is a judgmental bias that occurs when individuals face a sequence or string of consistent outcomes.¹ Gilovich, Vallone, and Tversky (1985) originally coined the

¹ In the context of mutual fund ads, consistent outcomes may take the form of either consistent positive returns or consistent negative returns. However, we do not consider negative sequences in our studies, as firms will not publicize negative performance runs.

term “hot hand” to describe observers’ beliefs about the shooting performance of basketball players. A player with a hot hand is one who has made a string of successful baskets (or winners). Gilovich et al. found that people believe that a player has a higher probability of making a basket after a streak of past successes. However, their empirical tests showed that players’ actual future performance was unrelated to the length of their past shooting streaks. Tversky and Gilovich (1989) show that individuals believe in the hot hand because they see patterns rather than independence in a string of random events. Because patterns do not appear to be representative of a random process, individuals behave as if the process is indeed nonrandom.

Mutual fund investors often fall prey to judgmental biases and see patterns in returns where none exist. The hot hand bias is therefore relevant to the mutual fund investment domain. In our investing scenarios, we use the term “run” to denote a sequence of positive outcomes. Thus, a sequence of returns (all numbers in percentages) of 2, 4, 6, for example, is a sequence of increasing positive earnings. We use the term “run length” to refer to the length or total set of numbers in the run.

How does the hot hand bias play out in the purchase of mutual funds, particularly in the presence of SEC disclosures? If individuals believe that a fund with a positive run will continue to grow due to a hot hand, then they will predict that funds with longer runs of positive returns are more likely to outperform those with shorter runs. In other words, observing a preference for funds with longer (vs. shorter) run lengths of positive returns indicates reliance on the hot hand bias. We predict that individuals’ investment preferences will reflect this bias because most individuals believe that past performance is relevant (vs. irrelevant) for predicting future performance. We test whether it is possible for a disclosure to change these beliefs and attenuate individuals’ reliance on the hot hand bias.

Do Disclosures Mitigate the Effect of Biases?

Presumably, the motivation for the SEC to mandate the use of disclosures for ads generically known as “performance ads” is to attempt to caution individuals about the use of past information in forming future expectations about a stock or mutual fund. Such warnings are common in other marketing contexts in which consumers’ naïve beliefs about a topic do not reflect the true nature of the topic. For example, warning labels that reveal the (often underestimated) dangers of drinking and driving and risks of smoking have been used for several years in product packaging. Likewise, labels on food packages displaying nutritional information induce individuals to make healthier food choices. Marketing and public policy has a rich literature on the effect of disclosures and warnings on individuals’ choices and preferences. For example, studies involving prescription drugs show that warnings about risks can have an impact on product evaluations (Morris, Ruffner, and Klimberg 1985). Research in television advertising shows that dual-modality warnings (e.g., visible text plus auditory voice-over) result in greater warning comprehension than single-modality formats (Murray, Manrai, and Manrai 1998). However, much

research also shows that warning and disclosure information is generally ineffective at influencing behavior (Balasubramanian and Cole 2002, Hankin, Sloan, and Sokol 1998; Mazis, Morris, and Swasy 1991; Popper and Murray 1989).

Such ineffectiveness could arise from both a lack of understanding of the characteristics of the message receiver (e.g., motivation, ability, and opportunity to process the message; prior beliefs; vulnerable populations) and message contexts (e.g., strength, mode, format, complexity) in which the warnings and disclosures are communicated. Combine this with the strength of individuals’ belief in the hot hand in many contexts, and it seems unlikely that a disclosure will be able to debias individuals’ beliefs. If this is the case, the SEC-mandated disclosure will be ineffective, and individuals will fall prey to the hot hand bias. Thus, we hypothesize:

H₁: Faced with an ad showing both a run of positive returns for a fund and the SEC-mandated disclosure, individuals’ preference for buying the fund increases as run length increases.

Behavior reflecting H₁, in which choices are based on judgmental biases, is at odds with experts’ claim that mutual fund returns are essentially random and mutual fund managers cannot consistently beat an index like the S&P 500 (Malkiel 1973/2007). Empirical finance research has long been concerned with the question of whether mutual fund managers can actively pick stocks that outperform the rest of the market. Some research shows that mutual fund returns can have persistent differences due to differences in costs (Carhart 1997), incentives (Del Guercio and Reuter 2014), and portfolio concentration (Kacperczyk, Sialm, and Zheng 2005). However, the dominant view, according to repeated large-scale studies (Jensen 1978, Malkiel 1973/2007, Malkiel 1995), is that managers cannot consistently beat the returns of an index like the S&P 500. Eminent finance scholars such as Richard Thaler from the behavioral camp and Eugene Fama from the nonbehavioral camp concur on one point: Lay investors do best if they behave as if the stock market is efficient (Chicago Booth Review 2016). This advice means that lay investors should hold index funds over long time horizons and not chase short-term winners in the mutual fund industry. How to convince investors of this using disclosures is a critical question tackled in our second and third studies.

This conclusion is consistent with the random walk theory of stock prices. The theory holds that stock market returns (i.e., changes in stock prices) behave as if each day’s returns come from a random draw. One proposed underlying cause of managers’ inability to outperform the market is Fama’s efficient market hypothesis (Fama and French 1998). The key proposition of this hypothesis is that stock prices adjust rapidly to information so that they fully incorporate past information and future expectation. Today, the dominant view in the financial profession holds that prices reflect all “public” information (Fama and French 1998; Jensen 1978; Malkiel 1973/2007). So, managers of mutual funds find it very difficult to

consistently beat a market index. In the long run, such managers do not outperform index-linked market returns. Thus, Carhart (1997) concludes that his results “do not support the existence of skilled or informed mutual fund portfolio managers.” Even if managers do succeed for a few periods in beating the market, they cannot do so consistently in the long run. Still, although stock prices may follow a random walk, humans often look for patterns in sequences like mutual fund returns (Barber and Odean 2011), especially when human performance is believed to contribute to sequence generation (Ayton and Fischer 2004; Burns and Corpus 2004; Roney and Trick 2009).

Following the theory of the random walk, individuals should not overweight recent information and underweight long-term tendencies when faced with a sequence of increasing returns. The efficient market hypothesis—the dominant hypothesis in finance—suggests that the past may not be an indicator of the future. Consistent with this, the SEC requires that mutual fund ads have a disclosure that past performance is not an indicator of future performance. Therefore, if individuals are economic decision makers and believe in the efficient market or the SEC-mandated disclosure in ads, then runs of past performance should not influence them.

To summarize, if the SEC-mandated disclosure leads investors to believe in the random walk hypothesis, then on average they will not show any systematic preference for buying funds on the basis of the run length of the funds’ past returns. Thus, the null hypothesis is that choices will be unaffected by lengths of past runs:

H₀₁: Individuals’ choices for a mutual fund’s shares are unrelated to various runs of past returns.

We conducted an experiment to study how advertising past returns of a mutual fund affects participants’ preference for it. Next, we present the design, results, and discussion of the experiment.

Study 1: Test of SEC Disclosure

Participants and Design

One hundred sixty-seven respondents (32.7% female; $M_{\text{age}} = 34.5$ years) recruited from Amazon’s Mechanical Turk (MTurk) participated in Study 1 for nominal payment. We randomly assigned participants to one of six cells in a 3 (run length: 4 vs. 7 vs. 11) \times 2 (SEC disclosure: present vs. absent) factorial between-subjects design in which 27–31 participants were included in each cell.

To test whether an MTurk sample was appropriate for a study of investment decisions, we first conducted a large pretest. Four hundred forty-five participants responded to a three-item quiz for financial literacy that probed their knowledge of how interest rates and inflation affect investments, as well as the relative safety of different investment strategies. The results revealed that over half of participants ($N = 257$, 57.8%) provided correct answers to all three items, demonstrating that the average MTurk participant possesses a basic working

knowledge of important investment concepts. Only 18 participants (4%) answered zero questions correctly, with 59 (13.3%) and 111 (24.9%) participants providing one and two correct answers, respectively. Thus, combining the representative age and gender of MTurk samples (52% of participants are female in our pretest, and ages range from 18 to 83 with a median age of 49 years) with our focus on responses to mutual fund advertising, we concluded that MTurk provides an appropriate population for the present research.

Respondents in our main study saw two ads for a mutual fund (see Web Appendix 2), one with an increasing sequence of returns (from 4, 7, or 11 previous quarters) and another with a nonpatterned sequence of returns (from the same number of quarters). These names of these funds were Mobar or Tunip. We counterbalanced whether the increasing pattern of returns was Mobar versus Tunip and whether the increasing pattern of returns were on the right versus left of the screen. In all conditions, the average returns for Mobar and Tunip were equivalent, and the only differences between the funds were the names and the pattern of past performance. Participants in the “disclosure present” condition saw ads with the phrase, “past performance does not guarantee future results” at the bottom of each ad. Participants in the “disclosure absent” condition evaluated ads without this information.²

Procedure

We asked respondents to imagine they received \$1,000 in a tax refund and that they decided to invest this money in a mutual fund. We then presented participants with the two ads for Mobar and Tunip. Depending on the condition to which respondents were assigned, they saw run lengths of 4, 7, or 11 for both the increasing and nonpatterned fund, displayed graphically.

After viewing the ads, participants indicated their preference for Mobar versus Tunip (“Which of the two funds would you prefer to buy?” –4 = “surely prefer Mobar/Tunip,” and 4 = “surely prefer Tunip/Mobar”). We recoded the results so that higher responses indicated a greater preference for the increasing pattern of returns. Responses to this question served as the main dependent measure in this study. We also asked participants, in two separate questions, how likely they were to buy Mobar and Tunip on nine-item scales anchored at “surely not buy Tunip/Mobar” and “surely buy Mobar/Tunip.” We recoded these questions to reflect participants’ likelihood of purchasing the fund featuring an increasing pattern of returns versus the fund featuring nonpatterned returns. Participants could view the ads while responding to these measures.

² We note that actual mutual fund advertisements take many forms and contain a variety of messages. Our stimuli are designed to provide a clean and conservative test of our hypotheses while also featuring information that potential investors are typically offered in mutual fund advertisements and prospectuses that tout the funds’ past performance (e.g., it is common for mutual fund prospectuses to provide annual returns from the previous ten years).

Following the dependent measure, participants responded to our manipulation checks. We designed these to test whether each manipulated factor had its intended effect. The run length manipulation aimed to present participants with less versus more past performance on which to base their preferences. The manipulation check for run length therefore asked, “please rate the amount of data about the mutual funds’ past performance that you felt the ads included” (1 = “very little,” and 9 = “a great deal”). Given that our conceptualization proposes the SEC disclosure may not effectively shift beliefs about past performance, the efficacy of the disclosure manipulation should not be assessed by measuring its impact on beliefs. Instead, the manipulation check for the SEC disclosure tested whether participants attended to the SEC disclosure. To do this, we presented participants with a list of statements and asked them to indicate what they recognize from the ads. This list comprised both statements that were actually in the ads (e.g., “Mobar/Tunip is the fund for you”) and statements that were not included (e.g., “the history of returns speaks for itself”). Critically, this list also included the SEC disclosure (“past performance does not guarantee future results”) and a statement with a similar meaning that was not included in the ads participants viewed (“previous fund performance should be interpreted with caution”). This allowed us to test whether participants actually read and recalled the disclosure from the ad, or whether participants were displaying a demand bias by asserting that they saw novel statements.

After the manipulation check, we included questions to test whether being exposed to ads that included the SEC disclosure made participants more likely to believe that the disclosure was true, while also investigating participants’ existing beliefs about mutual fund performance. Thus, we asked participants to agree or disagree with four statements regarding mutual funds (in random order): (1) “past performance does not guarantee future results” (i.e., the SEC disclosure), (2) “returns of mutual funds are essentially a random process,” (3) “past performance of mutual funds is highly relevant to future performance,” and (4) “mutual funds cannot perform any better than luck.” If the SEC disclosure changed participants’ beliefs, we would expect to see a main effect of disclosure presence on responses to these questions. By examining participants’ responses across these four questions, we may also examine individuals’ currently held beliefs about mutual funds.

To examine how participants interpreted the SEC disclosure, we next informed all participants that mutual fund advertisements featuring previous performance must disclose that “past performance does not guarantee future results.” We then told participants that we were interested in what this statement means to individuals. So, we asked them to agree or disagree with the following statements in relation to this disclosure (1 = “completely disagree,” and 9 = “completely agree”): (1) “the past performance of a mutual fund is a helpful but uncertain indicator of future performance,” (2) “the ad does not legally bind mutual fund companies to provide past levels of performance,” (3) “the past performance of a mutual fund is completely irrelevant to its future performance,” and

(4) “mutual fund performance is random.” Finally, participants responded to questions about their knowledge and experience with mutual funds, as well as their demographics.

Results

Manipulation checks. An ANOVA on responses to the run length manipulation check shows only a significant main effect of run length ($F(2,161) = 3.56, p = .03; \eta_p^2 = .042$). Simple effects tests show that participants perceived the ad to include significantly more data when it featured a run of 11 ($M = 6.13, SD = 1.77$) as opposed to a run of 7 ($M = 5.44, SD = 1.72; p = .05$) or a run of 4 ($M = 5.26, SD = 1.86; p = .01$).

Next, we tested whether participants were able to recognize the disclosure included in the ad. Results show that the vast majority of participants indeed attended to the ads well enough to recognize the disclosure: A chi-square on recognition responses for the disclosure is highly significant ($\chi^2(1) = 92.98, p < .001$). Recognition of the disclosure was higher for participants in the disclosure present condition (81.4%) than the disclosure absent condition (7.3%). We also tested whether run length interacts with disclosure presence through binary logistic regression, and the results do not reveal a significant main effect or interaction involving run length ($ps > .11$).

Main analyses. An ANOVA on respondents’ preference for purchasing the fund with the increasing pattern of returns shows that preferences are significantly affected by run length ($F(2,161) = 4.47, p = .013; \eta_p^2 = .053$) and that disclosure presence has no main effect or moderating effect on preferences ($Fs < 1$). Preference for the fund with the increasing pattern of returns was highest for the run of 11 ($M = 7.04, SD = 2.34$), which was marginally higher than when the ads included data from 7 quarters ($M = 6.13, SD = 2.55; p = .07$) and significantly higher than when the ads included data from 4 quarters ($M = 5.60, SD = 2.83; p < .01$). These results suggest that the hot hand bias guides investment preferences, and this is not affected by the presence or absence of the SEC disclosure: Even though half the participants read the SEC disclosure stating that previous performance does not guarantee future results, the amount of previous performance depicted in the ad significantly affected their preference for mutual funds.

To check whether our results were affected by forcing participants to prefer one fund at the expense of the other, we present the results of a 3 (run length) \times 2 (disclosure presence) \times 2 (likelihood of purchasing increasing vs. nonpatterned fund) mixed-design ANOVA, in which the two measures of likelihood of purchase are entered as a within-subject factor. Results show a main effect of this within-subject factor such that participants were highly significantly more likely to purchase the increasing ($M = 6.52$) than the patternless fund ($M = 4.41; F(1, 161) = 38.61, p < .001; \eta_p^2 = .193$). However, this effect was qualified by an interaction with run length ($F(2, 161) = 3.37, p = .04; \eta_p^2 = .04$), which we probed through separate ANOVAs on the two likelihood of purchase measures: for the fund featuring an increasing pattern of returns, results show

that likelihood of purchase increased with run length ($M_4 = 6.02$; $M_7 = 6.76$; $M_{11} = 6.8$; however, this main effect does not reach significance, $p = .12$). In contrast, likelihood of purchasing the fund with nonpatterned returns decreased with run length ($M_4 = 5.02$; $M_7 = 4.46$; $M_{11} = 3.71$; $F(2,161) = 4.2$, $p = .02$; $\eta_p^2 = .05$). These results provide further evidence that participants were vulnerable to the hot hand bias when evaluating the past performance of mutual funds and that the SEC disclosure did not mitigate this bias ($ps > .28$). Not only were participants more likely to purchase a fund with increasing patterns of returns, but this preference was also stronger when longer return histories are shown.

We also tested whether individual differences in participants' knowledge of, or experience with, mutual fund investments had an impact on any of the results reported previously. Neither knowledge ($ps > .23$) nor experience ($ps > .13$) significantly predicted fund preferences. The effects of run length reported previously were also unaffected by controlling for these individual differences. We also tested for interactions between our manipulated factors and these individual differences, and no significant interactions emerged ($ps > .15$).

Follow-up questions. To examine participants' beliefs about mutual fund performance, and to test whether the presence of the disclosure had any effect on these beliefs, we next examine responses to the questions asking participants to agree or disagree with statements relating to the performance of mutual funds. Neither the presence of the SEC disclosure nor run length significantly affected any of these individual questions ($ps > .18$). However, a mixed-design ANOVA³ provides insight into individuals' extant beliefs about mutual fund performance. We find only a main effect of the within-subject factor ($F(3, 159) = 99.89$, $p < .001$; $\eta_p^2 = .653$): Individuals were most likely to agree that "past performance does not guarantee future results" ($M = 7.53$). This suggests that the SEC disclosure did not necessarily provide individuals with novel or unexpected advice (though the analyses reported subsequently show what exactly this phrase means to individuals). Participants were next most likely to agree that "past performance of mutual funds is highly relevant to future performance" ($M = 5.66$), followed by "returns of mutual funds are essentially a random process" ($M = 4.15$) and "mutual funds cannot perform any better than luck" ($M = 3.76$). Each of these means is significantly different from the others ($ps < .01$). Moreover, the means for the first two measures are significantly higher than the midpoint of the scale (i.e., 5; $ts(166) > 4.40$, $ps < .001$), whereas the means for the latter two measures are significantly lower than the midpoint of the scale ($ts(166) < -5.55$, $ps < .001$).

Finally, we examined how individuals interpreted the wording of the SEC disclosure by asking participants to indicate how they interpreted the statement "past performance does not

guarantee future results" through their agreement or disagreement with four statements. As before, we analyzed these questions through a mixed design ANOVA in which we entered agreement with the four statements as a within-subject factor. Only a main effect of the within-subject factor is significant ($F(3,159) = 63.07$, $p < .001$; $\eta_p^2 = .338$). Participants were most likely to interpret the disclosure as meaning that "the past performance of a mutual fund is a helpful but uncertain indicator of future performance" ($M = 7.02$), followed by "the ad does not legally bind mutual fund companies to provide past levels of performance" ($M = 6.56$). Agreement with the former is significantly higher than the latter ($p = .04$), and agreement with both of these statements is above the midpoint of the scale ($ts(166) > 8.13$, $ps < .001$). Participants were significantly less likely to interpret the disclosure as meaning "the past performance of a mutual fund is completely irrelevant to its future performance" ($M = 4.29$; $ps < .001$) or "mutual fund performance is random" ($M = 4.16$; $ps < .001$). Average agreement with these latter two questions is significantly below the midpoint of the scale ($ts(166) < -3.96$, $ps < .001$). Thus, these results show that, although participants attended to and comprehended the disclosure, their interpretation of the disclosure did not reflect the actual nature of mutual fund performance—that returns follow a random walk. As a result, participants fell prey to the hot hand bias when considering ads of mutual funds featuring past performance, even when they were warned about it.

Summary

These results show that respondents' preferences when buying mutual funds differ depending on the length of past returns. Moreover, the SEC disclosure that past performance does not guarantee future results does not reduce participants' reliance on the hot hand bias. However, before concluding that disclosures are ineffective, we address two limitations of Study 1. First, the position of the disclosure (i.e., the bottom of the ad) may reduce its effectiveness: individuals may have already formed their opinions about the funds by the time they notice the disclosure and fail to revise these opinions. Study 2 addresses this limitation by manipulating whether the disclosure is at the top versus the bottom of the ad. Second, while the SEC disclosure is ineffective at reducing the hot hand bias, a stronger disclosure than the current SEC disclosure may be more effective. We test this possibility in Study 2.

Study 2: Test of Strong Disclosures

In Study 1, we show how individuals' beliefs bias their choices away from what the finance and investment literature recommends investors do. We find that the current SEC-mandated disclosure does not mitigate the effects of these biases on investor choice preferences. Our goal in Study 2 is to mitigate the effect of the hot hand bias on choices by systematically varying (1) the position of the disclosure and (2) the verbal components of the disclosure.

³ Where run length and disclosure presence are between-subjects factors, and the four mutual fund statements are levels of a within-subject factor.

Prominence

The current SEC disclosure appears at the bottom of the ad. To combat the ineffectiveness of such disclosures, researchers have experimented with more attention-getting disclosures (Bhalla and Lastovicka 1984). The reasoning behind such research is that the prominence of information is likely to affect individuals' processability and comprehension (Ward and Hill 1991). In particular, if a message were displayed more prominently at the top of an ad, it would better catch individuals' attention and thus more effectively mitigate the biases to which they succumb than if it were at the bottom.

Also, print media research finds that the placement of information in a print ad affects individuals' attention and depth of information processing (Tellis 1998). For example, the headline is the most effective position in a print ad to capture readers' attention and deliver a message (Leigh 1994). The location of information in an ad also affects readers' recall. Anecdotal evidence reports that five times more people read headlines than any text below it in the rest of the ad. Leigh (1994) also shows that information placed in the headline of an ad reinforces the material that follows. Moreover, the order in which individuals encounter information affects their processing of subsequent information (Bagchi and Davis 2012). As a result, a disclosure at the top of an ad may serve to "frame" the subsequent information about previous performance—effectively preventing the hot hand bias from forming—whereas a disclosure at the bottom of the ad can only affect preferences by revising an already-held opinion. A disclosure placed in a prominent position in an ad could therefore serve to alert individuals about the pitfall of the biases they may form when reading the performance runs that mutual fund ads display. Thus, we hypothesize:

H_{2a}: A prominent disclosure in a mutual fund ad mitigates the effect of the hot hand bias on individuals' likelihood of purchasing the mutual fund.

Wording Strength

In the context of ads for mutual funds, the SEC mandates verbal disclosures. Thus, the main method of improving disclosure efficacy is to utilize the cognitive and affective impact of words. To strengthen the effectiveness of disclosures, some parties, such as the U.S. Surgeon General, call for more explicit health warnings on labels. For example, rather than saying that alcohol may complicate pregnancy or smoking may cause cancer, the Surgeon General recommends that warnings say alcohol *will* complicate pregnancy and smoking *will* cause cancer (Lindstrom 2010). The assumption here is that the strength of the wording is a variable that makes disclosures more or less effective. Linguists hold that words define our reality by describing and creating meaning for the world around us. Words guide what we see and perceive, mold our cognitive schema, and help construct cause-and-effect relationships. Words also convey emotions (Goodson 2010; Minkler and Wallerstein 1997).

Building on these ideas, we expect that a more strongly worded disclosure than the current one may do better at achieving the SEC's goal of debiasing individuals' choices. Words affect both cognitive and affective components of mental processing. Changes to message wording can include framing messages either positively or negatively, citing credible sources, using warnings versus information, and providing descriptions of risk. Judging by the results of the follow-up questions in Study 1, we believe the main problem with the existing SEC disclosure is weak and ambiguous wording. That is, informing investors that past performance "does not guarantee" future results does not convey the true nature of past performance—that it is irrelevant and that future performance is *independent* of past performance. Thus, in Study 2, we test a disclosure that explicitly informs individuals that past performance is irrelevant for predicting a fund's future returns.

Another dimension of a disclosure's effectiveness is source credibility. Of particular interest for our goal of reducing the hot hand bias, prior research finds that credible sources increase risk perceptions in the context of financial decisions (Grewal, Gotlieb, and Marmorstein 1994). Perceived source credibility positively relates to message persuasiveness (Nan 2013); therefore, highlighting a credible source for the information described by the disclosure should increase its persuasiveness. We therefore test strong wording and references to credible sources in Study 2. By increasing the power of words, we expect to reduce the effect of the hot hand bias. Thus, we hypothesize:

H_{2b}: A strong disclosure in a mutual fund ad mitigates the effect of the hot hand bias on individuals' likelihood of purchasing the mutual fund.

Participants and Design

Participants in Study 2 were 120 MTurk workers ($M_{\text{age}} = 32.5$ years; 48.3% female) who completed the study for nominal payment. This study used a 3 (disclosure wording: SEC existing vs. SEC proposed vs. strong) \times 2 (position: top vs. bottom of ad) full factorial design. Web Appendix 3 shows our instrument for the condition in which we placed a strong disclosure at the top. As our goal was to find ways to mitigate the hot hand bias, we kept the run length of 4 for all our ads. We tested three disclosures in Study 2. First, as a baseline condition, we used the existing SEC disclosure tested in Study 1. Second, the SEC (SEC 2003) has proposed a revised disclosure that adds the following phrase to the existing disclosure: "Future performance may be lower or higher than the performance data quoted." In Study 2, we tested whether this disclosure is more effective than the existing SEC disclosure wording. Third, we developed a new "strong" disclosure aimed at reducing the hot hand bias. Our strong disclosure changed the wording in two important ways. First, rather than a nonsubstantiated statement that "past performance does not guarantee future returns," we added source credibility by beginning our disclosure with the statement, "scientific research has shown..." Second, rather

than stating what past performance does not do (predict future performance), we made the explicit positive statement, “past performance is irrelevant.” The full wording of the strong disclosure used in Study 2 reads, “scientific research has shown that mutual funds cannot perform any better than luck. So their past performance is irrelevant.” We selected these words and phrases from the works of leading financial researchers on mutual fund returns (Malkiel 1973/2007). To validate that this wording more strongly conveys the relationship between past performance and future results compared to the standard SEC disclosure, we measured participants’ interpretation of each disclosure.

Procedure

The procedure of Study 2 was identical to the procedure of Study 1 with the following exceptions. First, instead of viewing two ads simultaneously (i.e., an increasing pattern of returns and a nonpatterned sequence of returns), participants in Study 2 viewed only a single ad for Mobar displaying previous performance from 4 quarters. This change was based on a potential alternative explanation for the results of Study 1: Participants may prefer a fund with steadily increasing returns to a patternless fund, which may appear relatively volatile and risky. Measuring evaluations of a single fund also reduced the likelihood that participants engaged in hypothesis guessing, reducing the likelihood of demand effects. Second, given that only one fund was considered, our main dependent measure was likelihood of purchasing the advertised fund (“how likely are you to buy Mobar?” –4 = “surely not buy Mobar,” and 4 = “surely buy Mobar”). Third, Study 2 asked the same questions from Study 1 about the interpretation of all three disclosures. We randomly assigned half the participants to answer these questions in relation to the existing SEC disclosure, and the other half responded to these questions in relation to the proposed disclosure. Afterward, all participants responded to these questions in relation to our strong disclosure.

Results

Manipulation check. As in Study 1, we tested whether participants read the disclosure by showing them pieces of information from the ad (along with some information not included in the ad) and asking what they recalled seeing in the ad. We first tested whether the interaction of wording and position of the disclosure significantly affected recognition. We did so by running binary logistic regressions, predicting recognition of each disclosure with dummy-coded variables for the position and wording of disclosures. These analyses revealed no significant interactions ($ps > .17$). As expected, however, strong main effects of disclosure wording exist for recognition of each disclosure: A majority of participants recognized the existing SEC disclosure in the existing SEC disclosure (80.5%) and proposed SEC disclosure conditions (75.6%) but not in the strong disclosure condition (21.1%; $\chi^2(2) = 35.35, p < .001$). (Recall

that the proposed SEC disclosure includes the wording of the existing SEC disclosure.) Although recognition of the proposed disclosure is lower in its respective condition (31.7% vs. 0% in each of the other conditions), the main effect of disclosure wording is still significant ($\chi^2(2) = 28.09, p < .001$). Recognition of the strong wording is also significantly higher in the strong wording condition (60.5%) than other conditions, in which no participants indicated recognizing the disclosure ($\chi^2(2) = 61.40, p < .001$). The only significant main effect of position we find is for recognition of the existing SEC disclosure. Participants were actually more likely to recognize this disclosure when it was presented at the bottom (71%) versus the top (48.3%) of the ad ($\chi^2(2) = 6.43, p = .011$; other $\chi^2 s < 1$).

Likelihood of purchase. An ANOVA on participants’ likelihood of purchasing the advertised fund reveals only a significant main effect of disclosure wording ($F(2, 114) = 3.13, p = .048$; $\eta_p^2 = .052$; other $Fs < 1$). This main effect shows that only the strong wording significantly affected likelihood of purchase. Planned contrasts show that the proposed SEC disclosure ($M = 6.36, SD = 1.81$) does not significantly differ from the existing SEC disclosure ($M = 6.59, SD = 1.12$; $F < 1, p > .53$); however, likelihood of purchasing the fund is significantly lower in the strong wording condition ($M = 5.68, SD = 1.99$; $F(1, 114) = 5.84, p = .017$) than in the existing disclosure condition. The strong wording also results in marginally lower likelihood of purchase compared to the proposed disclosure ($F(1, 114) = 3.27, p = .07$).

We also tested for the robustness of these effects to individual differences in knowledge and experience. Consistent with Study 1, neither knowledge ($p = .17$) nor experience ($p = .85$) significantly predict purchase likelihood. The effect of the disclosure on purchase likelihood is unaffected by controlling for these individual differences ($ps < .052$). When testing for interactions with these individual differences, we find one marginally significant two-way interaction between the disclosure manipulation and knowledge of mutual funds ($F(2, 114) = 2.50, p = .087$). The pattern of results suggests that when knowledge is low or moderate (i.e., at or below the average level of knowledge), the effect of the strong (vs. SEC original and SEC proposed) disclosure is significant ($ps < .08$). These effects are attenuated at high levels of knowledge (at one standard deviation above mean knowledge; $ps > .21$).

Disclosure meaning. Next, we report the results of our analysis of participants’ interpretation of the various disclosures. Our procedure randomly assigned participants to first respond to questions about the existing versus proposed SEC disclosure. This allowed us to test whether individuals interpreted the existing SEC disclosure differently from the proposed disclosure. We also included disclosure position in the models. These analyses show that interpretation of the existing and proposed SEC disclosures never significantly differ, as no significant main

effects or interactions between the SEC disclosures and other factors emerged ($ps > .16$).⁴

We therefore collapsed across the factor regarding the existing versus proposed SEC disclosure and tested again for effects of disclosure position on disclosure interpretation. These analyses reveal only two main effects of disclosure position that approach significance. First, people were marginally more likely to believe that the SEC disclosure means that past performance is “a helpful but uncertain indicator of future performance” when the disclosure was at the bottom ($M = 7.52$) versus the top of the ad ($M = 6.90$, $F(1, 114) = 3.46$, $p = .065$; $\eta_p^2 = .029$). Second, people were significantly more likely to believe that the SEC disclosure means that “the ad does not legally bind mutual fund companies to provide past levels of performance” when the disclosure was at the bottom ($M = 7.06$) versus the top of the ad ($M = 6.02$, $F(1, 114) = 5.36$, $p = .022$; $\eta_p^2 = .3045$). No other effects are significant ($ps > .10$).

We next conducted a mixed-design ANOVA examining the pattern of responses across the four questions relating to the SEC disclosures by treating these questions as levels of a within-subject factor. Results reveal a main effect of the within-subject factor ($F(3, 112) = 25.36$, $p < .001$; $\eta_p^2 = .404$) and a two-way interaction between the within-subject factor and disclosure position ($F(3, 112) = 3.19$, $p = .027$; $\eta_p^2 = .079$). Consistent with Study 1, the main effect shows that (collapsing over disclosure position), respondents were most likely to believe that previous performance is a helpful but uncertain indicator of future performance ($M = 7.20$). Participants were next most likely to interpret the disclosure as meaning that the ad is not legally binding ($M = 6.53$), that previous performance is completely irrelevant ($M = 5.27$), and finally that fund performance is random ($M = 4.74$; all pairwise comparisons significant at $p < .02$). The two-way interaction with disclosure position reflects the main effects of position referenced in the previous paragraph, such that agreement with the first and second statements listed previously is higher when the disclosures are at the bottom of the ad.

We next turn to participants' interpretation of the strong disclosure. As before, we first report separate between-subjects ANOVAs on agreement with each of the individual phrases as they relate to the strong wording. These analyses revealed no significant main effects or interactions of the two manipulated factors ($ps > .08$). We next report a mixed-design ANOVA, treating each of the four phrases as levels of a within-subject factor. This analysis revealed only a significant main effect of the within-subject factor ($F(3, 112) = 3.12$, $p = .029$; $\eta_p^2 = .077$; other $ps > .40$). Critically, the pattern of agreement

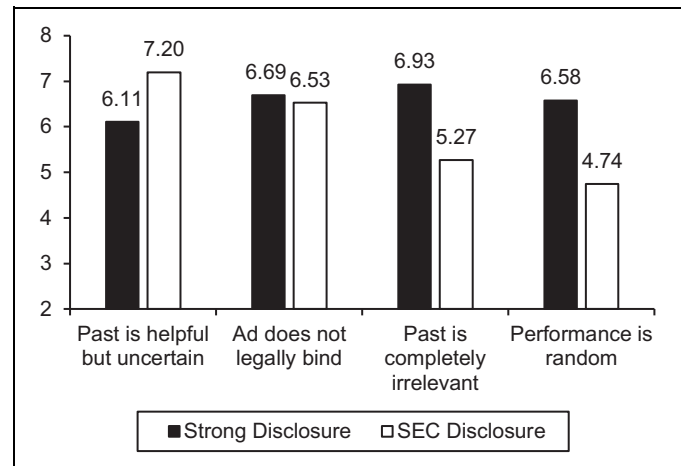


Figure 1. Disclosure interpretation (Study 2).

Notes: SEC = Securities and Exchange Commission.

with these four phrases was qualitatively different from the pattern of agreement described in Study 1 and the pattern described previously, as illustrated in Figure 1: previously (and in Study 1), agreement was highest with the phrase suggesting that past performance is helpful but uncertain. In contrast, this phrase shows the lowest mean agreement of the four phrases in relation to the strong disclosure ($M = 6.11$). In the strong disclosure condition, agreement with this phrase was significantly lower than agreement with the phrases suggesting that the ad does not legally bind the firm to fund performance ($M = 6.69$, $p = .044$) and that past performance is irrelevant ($M = 6.93$; $p = .017$). Indeed, of the four phrases, participants were most likely to indicate that the strong disclosure means that past performance is irrelevant. Agreement with the phrase suggesting that the disclosure means fund performance is random is not significantly different from the “helpful” or “legality” phrases ($ps > .16$) but is lower than agreement with the phrase suggesting that previous performance is irrelevant ($p = .021$). Consistent with our predictions, these results show that our strong disclosure is less ambiguous and more clearly informs individuals about past performance than the SEC disclosures.

Beliefs about mutual funds. Finally, as in Study 1, we tested whether the manipulated factors affected participants' beliefs about mutual funds. Of interest, we asked participants the extent to which they believed that “mutual funds cannot perform any better than luck, so their past performance is irrelevant,” which reflects our strong disclosure. An ANOVA on agreement with this question shows only a significant main effect of disclosure ($F(2, 114) = 3.12$, $p = .048$; $\eta_p^2 = .052$), showing that agreement was higher when participants viewed ads including the strong disclosure ($M = 5.06$) as compared with the existing SEC disclosure ($M = 3.71$, $p = .014$). The proposed SEC disclosure ($M = 4.30$) did not significantly affect agreement with this statement in relation to the existing SEC disclosure ($p > .26$).

⁴ We further tested for effects of disclosure position on disclosure interpretation after collapsing over the factor corresponding to the existing versus proposed SEC disclosure. Analyses reveal only two main effects of disclosure position that approach significance ($ps < .07$; other $ps > .10$). Given the nonsignificant effects of disclosure position on purchase likelihood, these effects cannot account for our primary results and are not discussed further.

Our theory proposes that a strong (vs. the SEC) disclosure reduces reliance on the hot hand bias by changing beliefs about past performance. Specifically, as shown in Study 1, the majority of individuals hold beliefs that past performance is highly relevant. We propose that the strong disclosure challenges this existing belief and increases individuals' tendency to believe that past performance is irrelevant. To test this aspect of our theory, we tested whether beliefs that past performance is irrelevant (vs. relevant) mediate the effect of the strong (vs. the SEC) disclosure on preferences. We combined the existing SEC and proposed SEC disclosure conditions in these analyses, but we note that equivalent results are found when they are treated separately. To capture participants' beliefs that past performance is irrelevant (vs. relevant), we computed the difference between participants' endorsement of the item stating that "past performance is irrelevant" and the item stating that "past performance is highly relevant for future performance." Positive values on this difference score indicate stronger beliefs that past performance is irrelevant rather than relevant. We used Hayes's (2013) PROCESS Macro for SPSS (Model 4) to test for mediation. Results support our conceptualization: the disclosure significantly predicted beliefs ($b = 1.58$, $t(118) = 2.31$, $p = .023$), and beliefs significantly predicted purchase likelihood ($b = -.18$, $t(117) = -4.49$, $p < .001$). Moreover, the indirect effect of the strong (vs. the SEC) disclosure on purchase likelihood, through beliefs, is significant ($b = -.29$, $SE = .17$, 95%CI $[-.723, -.045]$). The direct effect of the disclosure on purchase likelihood also becomes nonsignificant when beliefs are entered in the model ($p = .11$).

Summary

Study 2 shows that disclosures stronger than the current SEC disclosure reduce individuals' reliance on the hot hand bias when evaluating mutual funds featuring past performance. Results suggest that the effectiveness of the strong disclosure is due to participants having a clearer understanding of what the disclosure suggests regarding past performance. In other words, the phrase that "past performance does not guarantee future results" does not convey the irrelevancy of previous performance, whereas our stronger wording does.

Study 3: Effect of Strong Disclosure on Fund Preferences

Study 3 builds on Study 2 by directly demonstrating that our strong disclosure reduces investors' tendency to succumb to the hot hand bias in which they chase funds with longer runs of positive returns. That is, Study 2 demonstrates that the strong disclosure reduces investors' preference for funds with steadily increasing patterns of returns. However, as all the funds from Study 2 depict the same run length, Study 2 does not directly demonstrate that the strong disclosure influences mutual fund preferences by reducing investors' reliance on past performance (although we note that the results of our mediation analysis are consistent with this interpretation). We address this

in Study 3 by testing whether the strong (vs. the SEC) disclosure reduces investors' tendency to prefer funds with longer histories of positive returns over those with shorter histories of positive returns.

Participants and Design

Participants in Study 3 were 70 individuals ($M_{age} = 32.4$ years; 63% female) recruited from Prolific, a high-quality online research platform (Peer et al. 2017). This study used a single-factor design with two between-subjects conditions (disclosure: SEC vs. strong). Similar to Study 1, participants viewed two ads for mutual funds, one with a long run length (8 quarters) and the other with a short run length (4 quarters). The ads included a disclosure, and we manipulated whether the disclosure used the SEC wording or the strong wording from Study 2. As in Study 1, one fund was named Mobar and the other was named Tunip. We counterbalanced both the side of the screen on which the long-run-length fund appeared (i.e., left vs. right) and whether "Mobar" or "Tunip" was the name of the long-run-length fund.

Procedure

The procedure of Study 3 was identical to that of Study 2 with the following exceptions. First, because we conducted this study during the COVID-19 pandemic, the scenario asked participants to imagine receiving an economic impact stimulus check in the amount of \$1,000, which they decide to invest in a mutual fund. The scenario went on to describe that the participant's financial advisor sent information about two funds that fit their criteria. Participants viewed two ads simultaneously (as in Study 1), one depicting 8 quarters of past performance and the other depicting 4 quarters. To ensure that run length was orthogonal to information about the fund's quality or reputation, both ads informed participants that the fund was "managed by a team of brokers with over 50 years of combined experience," and that the chart in the ads depicted "the most recent" four or eight years of performance data (see Web Appendix 4).

Second, the dependent measure in Study 3 asked, "considering the information about each fund shown above, what would you tell your financial advisor regarding your preferences between the two funds?" (1 = "strongly prefer [Name1]," 4 = "no preference between the two," and 7 = "strongly prefer [Name2]"). Note that "Name1" corresponds to the name of the fund appearing on the left and "Name2" corresponds to the name of the fund appearing on the right. To simplify interpretation, we recoded responses prior to analysis such that higher (lower) values indicate a preference for the long-run-length (short-run-length) fund. We also included a secondary dependent measure asking how participants would allocate the \$1,000 investment across the two funds. We recoded results to reflect the amount allocated to the long-run-length fund.

Third, we omitted the questions about the interpretation of the disclosures from Study 2. Instead, we asked participants to

assess how much information the ads provided on two items: “which fund offered you more information on which you could base your preference?” (1 = “[Name1] provided much more information,” 4 = “both provided equal information,” and 7 = “[Name2] provided much more information”) and “did you feel you had less than enough information or more than enough information to form a preference?” (1 = “had much less than enough information,” 4 = “had just the right amount of information,” and 7 = “had much more than enough information”). The former item was recoded prior to analysis such that higher values indicate reporting that the long-run-length fund provided more information than the short-run-length fund. The purpose of these questions was to test (1) whether participants perceived the long-run-length fund to provide more information than the short-run-length fund and (2) whether the strong (vs. the SEC) disclosure reduced the tendency for participants to view a longer (vs. shorter) run of past performance as more (vs. less) informative. Our manipulation check for run length was also slightly different from Study 1, asking participants, “which fund seemed to have a longer track record of positive returns?” (1 = “definitely [Name1],” and 7 = “definitely [Name2]”).

Finally, we included a different set of statements to measure beliefs about mutual funds’ past performance after the dependent measures. Participants indicated their agreement with the following statements on nine-point scales anchored at “strongly disagree” and “strongly agree:” (1) “past performance usually predicts future performance, but not always,” (2) “returns of mutual funds are essentially a random process,” (3) “past performance of mutual funds is the best predictor of future performance,” and (4) “past performance of mutual funds is irrelevant when predicting future performance.”⁵

Results

Manipulation check. Responses on the manipulation check were recoded such that higher values indicate crediting the long-run-length fund with having a longer track record of positive returns. A one-sample t-test on this manipulation check reveals that our manipulation is successful, and participants correctly credit the long-run-length fund with having a longer track record than the short-run-length fund ($M = 5.50$, $SD = 1.45$; this mean is significantly higher than the scale midpoint, $t(69) = 8.64$, $p < .001$).

We next tested whether participants recognized the disclosure included in the ads. The majority of participants in both the SEC (32 of 35; 91.4%) and the strong disclosure condition (30 of 35, 85.7%) correctly identified the disclosure from the ads. The proportion of correct recognition does not differ

across the disclosure conditions ($\chi^2(1) < 1$, $p > .45$). For both disclosure conditions, participants were more likely to recognize the disclosure from the ads they viewed than to recognize the disclosure from the other condition ($\chi^2(1) > 44$, $ps < .001$).

Fund preference. An ANOVA on preferences for the long-run-length (vs. short-run-length) fund reveals only a main effect of the disclosure ($F(1, 66) = 5.50$, $p = .022$; $\eta_p^2 = .077$). Participants in the SEC condition preferred the long-run-length fund ($M = 4.89$, $SD = 1.05$), which is consistent with the hot hand bias. This mean is significantly above the midpoint, which signifies indifference between the short- and long-run-length funds ($t(34) = 4.99$, $p < .001$). In contrast, participants in the strong disclosure condition were indifferent between the two funds ($M = 4.23$, $SD = 1.29$), and mean responses do not differ from the midpoint ($t(34) = 1.05$, $p = .300$). This provides direct evidence that the strong disclosure reduced participants’ reliance on the hot hand bias.

We also tested whether these results were robust to individual differences in knowledge and experience. An ANOVA including covariates for each individual difference measure reveals only a significant main effect of the disclosure ($F(1, 62) = 5.00$, $p = .029$). None of the individual difference measures predict fund preferences ($ps > .48$), nor do they interact with the disclosure to affect preferences ($ps > .23$).

Investment allocation. An ANOVA on the amount participants indicated investing to the long-run-length fund revealed a non-significant main effect of the disclosure ($F(1, 66) = 2.09$, $p = .153$). Investments toward the long-run-length fund were slightly lower in the strong disclosure condition ($M = \$541.06$, $SD = \$158.47$) than in the SEC disclosure condition ($M = \$603.51$, $SD = \$194.25$). No other effects were significant ($ps > .38$).

Amount of information. An ANOVA on the question asking whether participants had less or more than enough information to form a preference shows that responses do not vary by condition ($ps > .37$). Overall mean ratings are 3.21 ($SD = 1.17$), which is lower than the scale midpoint, labeled “just the right amount of information” ($t(69) = -5.64$, $p < .001$).

In contrast, an ANOVA on the question asking which fund provided more information reveals a marginally significant main effect of the disclosure⁶ ($F(1, 66) = 2.81$, $p = .099$; $\eta_p^2 = .041$). Participants in the SEC condition were more likely to credit the long-run-length fund with providing more information than the short-run-length fund ($M = 4.94$, $SD = 1.19$) compared with participants in the strong disclosure condition ($M = 4.51$, $SD = .92$). These results are consistent with our

⁵ Note that the phrase corresponding to the belief that past performance is irrelevant is slightly different from the statement used in Study 2. This change was made to reduce the likelihood that participants in the strong disclosure condition would indicate higher agreement with this statement than participants in the SEC condition due to recognizing parts of the strong disclosure in the statement.

⁶ Results also revealed an unexpected main effect of the counterbalancing factor (i.e., whether the long-run-length fund was labeled “Mobar” or “Tunip”), revealing that the long-run-length fund was more likely to be credited as providing more information when it was called Mobar ($M = 4.97$, $SD = 1.10$) than when it was called Tunip ($M = 4.49$, $SD = 1.01$). The two-way interaction was nonsignificant ($p > .18$).

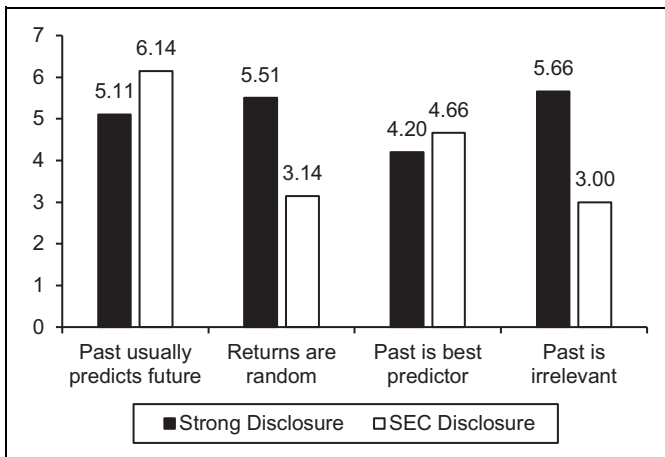


Figure 2. Mutual fund beliefs (Study 3).

Notes: SEC = Securities and Exchange Commission.

proposal that the strong disclosure reduces the tendency for prospective investors to perceive that past performance is diagnostic information for future performance.

Mutual fund performance beliefs. Next, we tested whether beliefs about mutual fund performance were affected by our disclosure manipulation. ANOVAs on the four individual statements corresponding to mutual fund performance beliefs reveal three findings of interest. First, the strong (vs. SEC) disclosure reduced beliefs that past performance “usually” predicts future performance ($F(1, 68) = 5.63, p = .021; \eta_p^2 = .076; M_{SEC} = 6.14, SD_{SEC} = 1.61; M_{strong} = 5.11, SD_{strong} = 2.00$). Second, the strong (vs. SEC) disclosure increased beliefs that returns of mutual funds are “essentially a random process” ($F(1, 68) = 22.23, p < .001; \eta_p^2 = .246; M_{SEC} = 3.14, SD_{SEC} = 1.87; M_{strong} = 5.51, SD_{strong} = 2.32$). Third, the strong (vs. SEC) disclosure increased beliefs that past performance is “irrelevant when predicting future performance” ($F(1, 68) = 30.24, p < .001; \eta_p^2 = .308; M_{SEC} = 3.00, SD_{SEC} = 1.68; M_{strong} = 5.66, SD_{strong} = 2.31$). The belief that past performance is the “best predictor of future performance” was not affected by the disclosure ($p > .31$; overall $M = 4.43, SD = 1.90$).

We next examined the pattern of responses across these statements in a mixed-design ANOVA, treating the four belief statements as a within-subject factor and the disclosure manipulation as a between-subjects factor. Results reveal both a main effect of the within-subject factor ($F(3, 204) = 7.42, p < .001; \eta_p^2 = .098$) and an interaction with the disclosure manipulation ($F(3, 204) = 16.57, p < .001; \eta_p^2 = .196$; see Figure 2). This interaction reveals that the pattern of agreement across the four statements differed according to the disclosure manipulation. Within the SEC disclosure condition, participants were most likely to believe that past performance “usually” predicts future performance ($M = 6.14, SD = 1.61$). This belief was higher than the belief that past performance is the “best” predictor ($M = 4.66, SD = 1.64; p < .001$), which was in turn higher than both the belief that performance is “random” ($M = 3.14, SD = 1.87; p = .004$) and that past performance is “irrelevant”

($M = 3.00, SD = 1.68; p = .004$). The latter two statements did not differ from one another ($p = .67$).

In contrast, within the strong disclosure condition, participants were most likely to indicate agreement with the statements that past performance is “irrelevant” ($M = 5.66, SD = 2.31$) and that performance is “random” ($M = 5.51, SD = 2.32$). These statements did not differ from one another ($p = .67$), nor did they differ from beliefs that past performance “usually” predicts future performance ($M = 5.11, SD = 2.00; ps > .31$). These participants were least likely to agree with the statement that past performance is the “best” predictor of future performance ($M = 4.20, SD = 2.13$), and agreement with this statement was lower than agreement with all three other statements ($ps < .02$).

Summary

Study 3 provides direct evidence that the strong disclosure is more effective than the SEC disclosure at mitigating the hot hand bias in mutual fund investments. Moreover, we provide supportive evidence for the differential effects of disclosures through participants’ ratings of the amount of information provided by a short versus long run length, as well as through their beliefs about the performance of mutual funds.

Study 4: Generalizability of Findings

Our prior studies use samples drawn from online populations to test how disclosures influence individuals’ reliance on the hot hand bias. Although scholars extensively use MTurk for “virtually any study” (Paolacci and Chandler 2014, p. 186) and participants on Prolific have been shown to be even more diverse than MTurk participants (Peer et al. 2017), it is difficult to know whether individuals on either platform actually have experience with mutual fund investments. This can affect our results because the disclosure may influence individuals lacking experience in mutual fund investments more than those who have greater experience. Study 4 corrects for this through a conceptual replication of our prior studies’ critical results using a random sample of participants from a population of university staff members. The university offers retirement options to its staff; therefore, Study 4’s sample is likely to have investment experience and represents a population targeted by mutual fund advertisers.

Participants and Design

Participants in Study 4 were 86 staff members ($M_{age} = 47$ years; 61.6% female) of a university located in the southern United States. The participants were recruited through the university’s staff listserv. All staff members were sent an email through the listserv asking for their help with a study related to financial decision making. The email included a hyperlink to the study. Periodic reminders were sent to the listserv over the course of approximately eight weeks until each condition in our experimental design had at least 20 individuals. This study used

a 2 (disclosure: SEC vs. strong) \times 2 (run length: 4 quarters vs. 8 quarters) between-subjects factorial design. The stimuli were identical to the stimuli used in prior studies, except that the performance data were updated to reflect the run lengths used in this study (see Web Appendix 5). As in Study 3, we used a run length of 8 quarters instead of 7 quarters in Study 4 so that both run length conditions depicted entire years of past performance (i.e., one full year vs. two full years).

Procedure

The procedure of Study 4 was the same as that of Study 3 with the following exceptions. First, we showed participants a single ad for a mutual fund (as in Study 2) rather than asking participants to indicate their relative preference between two ads. Second, we asked participants to respond to a slightly different set of dependent measures. Participants first indicated how likely they were to buy shares of Mobar (-4 = “surely not buy Mobar,” and 4 = “surely buy Mobar”) and whether they would be more likely to continue searching for a better mutual fund or purchase Mobar if they saw the ad (-4 = “surely continue searching,” 0 = “indifferent,” and 4 = “surely purchase Mobar”). In addition, we asked participants to imagine they were meeting with their financial adviser, who shares some mutual fund ads with them. One ad is the ad for Mobar. We asked, “how likely would you be to ask your adviser to transfer money away from your current investments and purchase shares of Mobar?” (1 = “not at all likely,” and 9 = “very likely”). This third question was included to increase the external validity of participants’ assessment of the mutual fund ad.

Third, we included a question assessing the extent to which participants were willing to believe the idea that the past performance of mutual funds is irrelevant. We asked, “if a certified investment adviser told you that the past performance of mutual funds is irrelevant for predicting future performance, how much would you believe them?” Participants responded on a slider scale anchored at 0 (“I’d not believe them at all”) and 100 (“I’d believe them completely”). This question was included to test whether participants would be more likely to accept or resist the content of our strong disclosure.

Fourth, after participants responded to the same set of questions used in Study 3 to measure their beliefs about mutual funds’ past performance, we asked participants to indicate their interpretation of the SEC and strong disclosures by agreeing or disagreeing with the following statements (1 = “completely disagree,” and 9 = “completely agree”) regarding each disclosure: (1) “the past performance of a mutual fund is a helpful but uncertain indicator of future performance,” (2) “the past performance of a mutual fund is completely irrelevant to its future performance,” and (3) “mutual fund performance is random.”

Finally, we included the same questions assessing participants’ knowledge of and experience with investing used in Study 3, in addition to a question asking, “if you have invested in mutual funds or similar investments, how much were your investment choices based on your opinions or preferences (as opposed to those of an adviser)?” (1 = “not at all based on me,”

and 9 = “entirely based on me”). Participants were also given the option to indicate “N/A” on the latter question.

Results

Knowledge and experience. The majority of participants were enrolled in a retirement plan (78 of 86; 90.7%) and had experience investing in mutual funds or similar investments (64 of 86; 74.4%). The mean self-reported knowledge of mutual fund investments was 3.71 ($SD = 2.48$) on the nine-point scale, and the mean self-reported experience with mutual fund investments was 3.76 ($SD = 2.46$). Although these means fall below the scales’ midpoints, there was also considerable variance in participant responses: Over 44% of participants provided a response at or above the midpoint on both questions. Finally, participants also exhibited variance in their reliance on adviser’s advice: The mean response on this final question was 4.52 ($SD = 2.83$), not considering 11 participants who indicated that the question was not applicable.

Manipulation checks. A 2 (disclosure: SEC vs. strong) \times 2 (run length: 4 quarters vs. 8 quarters) ANOVA on the same run length manipulation check from Study 1 reveals no significant main effects or interactions (all $ps > .43$; $M_4 = 3.80$, $SD_4 = 2.58$; $M_8 = 3.55$, $SD_8 = 1.85$). The nonsignificant effect of run length was unanticipated, so it may be that the population sampled in Study 4 had different expectations for the amount of information presented in investment advertisements than MTurk participants. Nevertheless, the primary purpose of Study 4 was to test whether the Study 4 population would respond to the disclosures in a way that is similar to the online participants from our prior studies.

We next tested for recognition of the disclosure present in the ad. The majority of participants in both the SEC condition (40 of 44; 90.9%) and the strong disclosure condition (39 of 42; 92.9%) correctly identified the disclosure shown in the ad, and few participants indicated recognition of the disclosure that was not present (no more than six individuals in a given condition provided an incorrect response). Chi-square tests for recognition of both the SEC disclosure ($\chi^2(1) = 50.71$, $p < .001$) and strong disclosure ($\chi^2(1) = 74.76$, $p < .001$) are significant.

Dependent measures. A 2 (disclosure: SEC vs. strong) \times 2 (run length: 4 quarters vs. 8 quarters) ANOVA on likelihood of purchasing the advertised fund reveals only a significant main effect of the disclosure ($F(1, 82) = 4.39$, $p = .039$; $\eta_p^2 = .051$; other $ps > .35$). Replicating our prior results, the strong disclosure ($M = 4.29$, $SD = 2.16$) led to lower purchase likelihood than the SEC disclosure ($M = 5.23$, $SD = 2.06$).

A similar 2 (disclosure) \times 2 (run length) ANOVA on the question asking whether participants would be more likely to continue searching for other funds or purchase Mobar also reveals only a marginally significant main effect of the disclosure ($F(1, 82) = 3.47$, $p = .066$; $\eta_p^2 = .041$; other $ps > .35$). Participants exposed to the strong disclosure ($M = 3.07$,

SD = 2.32) were more likely to continue searching for other funds instead of purchasing Mobar than those exposed to the SEC disclosure ($M = 4.02$, $SD = 2.35$).

A similar 2 (disclosure) \times 2 (run length) ANOVA on the likelihood of asking one's advisor to transfer funds away from current investments to purchase Mobar does not reveal any significant effects ($ps > .16$). The strong disclosure resulted in directionally lower likelihood of transferring funds to Mobar than the SEC disclosure ($M_{\text{strong}} = 3.43$, $SD_{\text{strong}} = 2.35$; $M_{\text{SEC}} = 4.11$, $SD_{\text{SEC}} = 2.24$; $F(1, 82) = 1.96$, $p = .166$). In addition, similar to Study 1, the run length of 8 quarters led to directionally higher likelihood of transferring funds than the run length of 4 quarters ($M_8 = 4.12$, $SD_8 = 2.36$; $M_4 = 3.45$, $SD_4 = 2.24$; $F(1, 82) = 2.00$, $p = .161$).

Finally, a 2 (disclosure) \times 2 (run length) ANOVA on the average of the three dependent measures ($\alpha = .79$) reveals only a significant main effect of the disclosure ($F(1, 82) = 4.53$, $p = .036$; $\eta_p^2 = .052$; other $ps > .29$). Participants evaluated the mutual fund less favorably when the ad included the strong disclosure ($M = 3.60$, $SD = 1.94$) than when the ad included the SEC disclosure ($M = 4.45$, $SD = 1.81$).

We also tested how participants' knowledge of and experience with mutual fund investments affects their likelihood of investing in the advertised fund. When the two continuous measures of these individual differences are included as covariates in the model using the average of the three measures reported previously, the main effect of disclosure remains the only significant effect ($F(1, 80) = 4.92$, $p = .029$; $\eta_p^2 = .058$), and neither knowledge ($p = .886$) nor experience ($p = .512$) significantly predicts purchase likelihood. These results are comparable to the results of Study 3. We also tested for two-way interactions between both manipulated factors and both individual differences, and all two-way interactions are non-significant ($ps > .38$). In addition, when we remove participants who respond "no" on the dichotomous measures of investment experience and retirement plan enrollment from analyses (leaving $N = 64$ and $N = 78$, respectively), we obtain the same pattern of results. However, the reduced power translates to weaker main effects of the strong disclosure ($ps < .14$).

Mutual fund performance beliefs. We next turn to participants' beliefs about the performance of mutual funds. A series of 2 (disclosure) \times 2 (run length) ANOVAs on agreement with the four individual statements reveals no significant main effects or interactions ($ps > .13$). A mixed-design ANOVA, in which we include agreement with the four separate statements as levels of a within-subject factor, reveals only a main effect of the within-subject factor ($F(3, 80) = 11.82$, $p < .001$; $\eta_p^2 = .307$; other $ps > .19$). Participants indicated strongest agreement with the statement suggesting that past performance usually, but not always, predicts future performance ($M = 5.31$, $SD = 2.31$). Agreement with this statement was higher than agreement with each of the other three statements ($ps < .001$), which do not significantly differ from one another ($M_{\text{random}} = 3.85$; $M_{\text{best}} = 4.14$; $M_{\text{irrelevant}} = 3.87$; $ps > .41$).

Disclosure interpretation. We next examine participants' interpretation of the SEC disclosure. First, we conducted a series of 2 (disclosure) \times 2 (run length) ANOVAs on agreement with the three separate statements. Participants did not differ in their interpretation of the statement implying that past performance is helpful but uncertain ($ps > .19$). However, we obtained significant effects of run length on the statement suggesting that past performance is completely irrelevant ($F(1, 82) = 4.77$, $p = .032$; $\eta_p^2 = .055$) and that performance is random ($F(1, 82) = 3.69$, $p = .058$; $\eta_p^2 = .043$). In both cases, agreement was lower when 8 quarters of past performance were displayed ($M_{\text{irrelevant}} = 3.29$, $SD_{\text{irrelevant}} = 2.00$; $M_{\text{random}} = 3.19$, $SD_{\text{random}} = 1.92$) than when 4 quarters were displayed ($M_{\text{irrelevant}} = 4.41$, $SD_{\text{irrelevant}} = 2.71$; $M_{\text{random}} = 4.14$, $SD_{\text{random}} = 2.53$). No other significant effects on these questions were found ($ps > .18$).

Results of a mixed-design ANOVA, treating the three statements as levels of a within-subject factor, reveal a significant main effect of the within-subject factor ($F(2, 81) = 63.52$, $p < .001$; $\eta_p^2 = .611$) and a marginally significant two-way interaction between run length and the within-subject factor ($F(2, 81) = 2.96$, $p = .057$; $\eta_p^2 = .068$; other $ps > .22$). The former reveals that participants were most likely to interpret the SEC disclosure as meaning that past performance is a helpful but uncertain indicator of future performance ($M = 7.22$; $SD = 1.60$), and agreement with this statement was higher than with both of the other two statements ($ps < .001$), which do not differ from one another ($M_{\text{random}} = 3.67$; $M_{\text{irrelevant}} = 3.86$; $p = .400$). The two-way interaction echoes the main effects of run length described previously: Displaying a run of 8 (vs. 4) quarters reduced agreement with the statements about performance being random and irrelevant for future performance. However, run length did not influence agreement that past performance is helpful but uncertain ($p > .19$).

Next, we conducted similar analyses on the statements corresponding to the interpretation of the strong disclosure. A set of 2 (disclosure) \times 2 (run length) ANOVAs on the individual questions reveals no significant main effects or interactions ($ps > .25$). When the three statements are treated as levels of a within-subject factor in a mixed-design ANOVA, no significant effects emerge ($ps > .13$). However, the pattern of agreement differs from the pattern of agreement in relation to the SEC disclosure ($M_{\text{helpful}} = 5.15$, $SD_{\text{helpful}} = 2.82$; $M_{\text{irrelevant}} = 6.09$, $SD_{\text{irrelevant}} = 2.93$; $M_{\text{random}} = 6.19$, $SD_{\text{random}} = 2.95$).

Believability. Finally, we examined participants' willingness to believe that the past performance of mutual funds is irrelevant for its future performance. A 2 (disclaimer) \times 2 (run length) ANOVA on responses to this question reveals no significant main effects or interactions ($ps > .26$). Average belief across all participants is 52.99 on the 100-point scale ($SD = 30.78$), which does not differ from the midpoint of 50 ($p > .37$).

Summary

Study 4 shows that the effects of presenting a strong (vs. the SEC) disclosure demonstrated in our former studies generalize

to a population for whom mutual fund investments are personally relevant. The majority of participants in Study 4 participate in a retirement plan and have experience with mutual fund investments. However, our results with these participants are similar to those obtained with online samples, although the participants in Study 4 were less susceptible to the hot hand bias. Nevertheless, this speaks to the practical importance and implications of our results: a strong and unambiguous disclosure about past performance in mutual fund advertisements is likely to have an impact on the preferences of the actual investors targeted by such ads.

Study 5: Test of Alternative Strong Disclosure

Although our previous studies show that the strong disclosure introduced in Study 2 attenuates the hot hand bias, readers may wonder whether other types of warnings may also effectively combat this bias. In particular, actively managed funds are based on the premise of continuous positive returns, and reliance on the hot hand bias may therefore increase preferences for managed funds touting past performance. However, the likelihood that managed funds will outperform index funds in the long run is very low (Shefrin 2000). Thus, Study 5 tests whether a disclosure that informs investors that index funds outperform actively managed funds in the long run is as effective as the strong disclosure at attenuating the hot hand bias.⁷ As the procedure of this study is very similar to our prior studies, we provide only the key elements of the procedure and results here for the sake of brevity. A full report of Study 5's procedure and results can be found in Web Appendix 6.

Two hundred individuals ($M_{\text{age}} = 39$ years; 51% female) recruited from MTurk were assigned to one of six cells in a 3 (disclosure: SEC vs. strong vs. index fund) \times 2 (run length: 4 quarters vs. 7 quarters) between-subjects factorial design. The index fund disclosure read, "scientific research has shown that index funds, such as the S&P 500, outperform managed funds over the long-term." The SEC and strong disclosures were the same as those in prior studies. By basing its content on "scientific research," the index fund disclosure had greater source credibility than the current SEC disclosure. However, the disclosure did not explicitly delink the long-term performance of managed funds from past performance trends. Comparing the index fund disclosure to the strong disclosure can therefore reveal the extent to which unambiguous wording regarding past performance reduces the hot hand bias. After viewing the ad, participants completed the dependent measures by reporting their likelihood of purchasing the advertised fund, their expectation for the fund's performance in the next quarter, their likelihood of purchasing the fund as opposed to searching for other funds, and whether they would sell shares or buy shares of the advertised fund if they already owned the fund.

Results reveal significant main effects of the disclosure manipulation on each dependent measure ($ps < .04$). Overall, the results suggest that the strong disclosure was more effective at mitigating the hot hand bias than both the SEC and index fund disclosures, which led to similar patterns of responses. More specifically, participants in the strong disclosure condition were less likely to purchase the advertised fund, had lower expectations for the fund's future performance, were more likely to continue searching for other funds, and were less likely to buy additional shares of the advertised fund compared with participants in both the SEC and index fund disclosure conditions (pairwise $ps < .06$). No significant main effects of run length or two-way interactions emerged ($ps > .14$).

Web Appendix 6 provides additional details of the procedure and results, including a discussion of how the three disclosures tested in Study 5 affect beliefs about mutual fund performance. Ultimately, we attribute the weaker effect of the index fund disclosure (vs. the strong disclosure) to its omission of explicitly stating the irrelevance of past performance in predicting future performance. In contrast, the strong disclosure directly states this. As a result, the strong disclosure results in less reliance on past performance than both the index fund disclosure and the current SEC disclosure.

General Discussion

Print ads in magazines such as *Money*, *Fortune*, and *Barron's* are an important means by which mutual fund firms communicate to individuals who invest their own or others' money in mutual funds. Such ads frequently provide information on the fund's past performance (Huhmann and Bhattacharya 2005; Mullainathan and Shleifer 2005). The ads also contain an SEC-mandated disclosure that past performance is no guarantee of future performance. Empirical evidence from the finance literature shows that these ads do succeed in increasing money flows to the advertised funds (Bergstresser and Poterba 2002; Ferreira et al. 2012; Ivkovic and Weisbenner 2009; Jain and Wu 2000), despite the SEC disclosure. This research examines how information about a fund's past performance influences individuals' choice of mutual funds when they see ads highlighting such information. Specifically, we examine the occurrence of the hot hand bias in the context of individuals' choice of mutual funds that highlight past performance. We test whether the SEC disclosure helps improve choices and, if not, which wordings mitigate investor biases. We show how reliance on the hot hand bias manifests in return chasing and how resistance to debiasing statements generalizes to investors familiar with mutual fund investments. The remainder of this section summarizes the results, clarifies the contribution, draws some implications, and discusses the limitations of our research.

Summary of Results

This research has five primary results. First, Study 1 shows that the hot hand bias causes individuals to believe trends in past

⁷ We thank an anonymous reviewer for this suggestion.

outcomes will continue. These results are consistent with hypotheses based on the representative heuristic and are contrary to the predictions of the random walk theory of mutual fund returns. Furthermore, Study 1 shows that the SEC-mandated disclosure does little to mitigate the effects of the hot hand bias. Second, Study 2 shows how increasing the strength of words makes disclosures more effective and can attenuate beliefs that give rise to the hot hand bias. Third, Study 3 directly shows that the strong disclosure mitigates the hot hand bias by demonstrating that ads featuring the strong (vs. the SEC) disclosure reduce the tendency to engage in return chasing. Fourth, Study 4 generalizes our findings by replicating the effects of the strong (vs. the SEC) disclosure with a sample of individuals familiar with mutual funds through their retirement portfolios. Finally, Study 5 shows that an alternate disclosure stating that index funds outperform managed funds in the long run is less effective than the strong disclosure at persuading participants that mutual funds' past performance does not predict future performance.

In addition to the five studies reported previously, we report two supplemental studies in the Web Appendix that add valuable insights. Study 6 (Web Appendix 7) tests the limits of the strong disclosure at mitigating the hot hand bias across different run lengths. Results suggest that the hot hand bias may strengthen as the amount of past performance being shown increases, and the strong disclosure may therefore become less effective in certain contexts. Study 7 (Web Appendix 8) generalizes the reliance on trends of past performance to the context of real estate prices. In addition, we demonstrate that a strong (vs. weak) disclosure, developed using similar considerations used to develop our strong disclosure in Study 2, reduces reliance on trends of real estate prices.

Contribution

This is the only research that tests how disclosures affect the prevalence of the hot hand bias in the context of mutual fund advertisements touting past success. Our findings contribute to the advertising, behavioral finance, and public policy literatures. Broadly, we further these literatures by demonstrating how various disclosures influence individuals' lay beliefs about mutual fund performance. Our specific contributions are as follows. First, we show that the advertising of past performance by the mutual fund industry induces biases in lay investors of mutual funds. Second, we show that current SEC-stipulated disclosures do not debias investors. However, strong disclosures that use explicit wording and high source credibility do debias individuals when choosing mutual funds. Third, we add to the behavioral finance literature by showing that consumers make biased choices in response to ads of mutual funds that extol past performance. Thus, our work provides one theoretical explanation for the behavior of chasing returns, which is widely reported in the finance literature. Finally, in a separate study (Study 7 in Web Appendix 8), we find that the hot hand bias also affects real estate purchases in the domain of rising or falling real estate prices.

Implications

Our research has implications for marketers of financial products and real estate, public policy makers, consumer advocacy groups, and researchers. First, ethics aside, profit-maximizing managers of mutual funds could advertise their funds by touting their past performance, even with the SEC-mandated disclosure. We find that the current disclosure is not effective in debiasing people's tendency to fall victim to the hot hand bias.

Second, from a public policy perspective, our results are troubling. To the extent that individuals focus on past performance (prominent in ads and prospectuses), they may well make suboptimal decisions. Thus, current advertising may easily mislead individuals into buying stocks or mutual funds on the basis of past performance, when future performance is not only not guaranteed but seems unsustainable and highly unlikely. Touting winners misleads unsuspecting investors. Current disclosures do not work. As a result, the SEC should seriously consider stronger action, such as using more strongly worded disclosures than the one they currently use (as in our Study 2) or even restricting use of past information to promote stocks and mutual funds.

Third, our study has a direct implication for consumer advocacy groups such as Americans for Financial Reform (<http://ourfinancialsecurity.org/>). Formed in the aftermath of the 2008 financial crisis, this watchdog on behalf of lay investors tries to protect the public from the harmful practices of financial institutions. We show that the advertising practices of mutual fund managers can lead lay investors to make suboptimal investment choices. In addition, we show that regulatory bodies like the SEC have failed to devise disclaimers that effectively protect lay investors.

Fourth, we test our thesis in the context of individuals' purchase of mutual funds (and real estate investments; see Study 7 in Web Appendix 8). However, we suspect the same phenomenon could occur in other financial and marketing contexts. In finance, hedge funds also tout past performance. Recently, the hedge fund Platinum Partners were charged in a \$1 billion scam for projecting stability and confidence to current and prospective investors, reporting (falsely) positive average returns of 17% from 2003 to 2015 (McCoy 2016). The effects found in our studies may also occur when fund managers present glorifying self-describing text. Our research also suggests that the increase in money flowing into advertised funds (Jain and Wu 2000) may be a result of the way investors process sequential returns information.

Limitations and Future Research

This study has some limitations that future research may address. First, subsequent research could extend this inquiry to other contexts and other runs of information such as commodity markets, new products, celebrity endorsers, and auctions.

Second, we have not found a suitable disclosure that can completely mitigate the hot hand bias, on which individuals

rely when processing ads that show runs of mutual fund returns. The strong disclosure introduced in Study 2 had some success but needs more research (see Study 6 in Web Appendix 7). Moreover, in some of our studies, the strong disclosure affected mutual fund preferences regardless of run length, whereas an ideal disclosure might have a more targeted effect at longer (vs. shorter) run lengths. By drawing on the extensive research on message and warning persuasiveness in the communications, psychology, and marketing literatures, researchers can design other wordings for disclosures.

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ORCID iD

Joseph M. Johnson  <https://orcid.org/0000-0001-9576-1045>

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