A systematic approach to maximize stock investors's rationality

Mingyuan Zhang[1*]

[1]School of Humanities and Social Sciences, Beijing Forestry University, 100083 Beijing, China

Abstract. When making investments, stock investors are always disturbed by various psychological effects, make irrational decisions, and feel dissatisfied with their decisions afterwards. Therefore, this paper integrates theories of behavioral finance and aims to propose a systematic approach to maximize investor's rationality.In this way, the investors are more able to achieve their objectives as well as avoid unnecessary losses. The research methods are as follows: first, define the definition and requirements of maximal bounded rationality under non-omniscient and non-omnipotent conditions; second, summarize the typical occurrence scenarios of various psychological effects and propose simple coping methods; finally, construct the above results into a system. This paper, in accordance with the principle of maximal bounded rationality and the general stock investment process, proposes coping methods for each psychological effect by destroying or preventing their occurrence scenarios in a system, letting investors make decisions that are most satisfying to themselves within the knowable range.

1 Introduction

People are boundedly rational and diverse, which leads stock investors to be disturbed by various psychological effects, make irrational decisions, and feel dissatisfied with their decisions afterwards. Behavioral finance, as a discipline that explains the investor decision-making process, can obviously provide help to investors and lead their decisions back to maximal bounded rationality.

Currently, behavioral finance has made significant progress in explaining market anomalies and investor behavior, allowing investors to understand the causes of anomalies and behaviors. However, research on psychological effects in behavioral finance has the problems of being refined but lacking system, being theoretically deep but lacking

* Corresponding author: Zmy230801105@bjfu.edu.cn

application. The number of psychological effects already discovered is large, their generation conditions are complex, and their direction of bias is complex. They make it difficult for investors to determine exactly which psychological effect is affecting them, and thus difficult to correct their investments. This paper aims to, according to the thinking sequence of rational investment, summarize the typical occurrence scenarios of various psychological effects that interfere with rational investment, and construct a systematic approach for investors to refer to during decision-making, helping investors realize which psychological effects are affecting them and correct them, helping investors make decisions that are most satisfying to themselves within the knowable range. For example: by referring to this system, the investor who has just succeeded in investing can realize the possibility that he has been affected by overconfidence and, according to the suggestions of the approach, minimize the impact of overconfidence on his subsequent investments as much as possible.

Since people are not omniscient and omnipotent, and are emotional, people cannot become the rational economic man defined in classical economics. However, psychological effects that affect the cognitive process can be intervened, so people can maximize bounded rationality. This paper refers to the rationality under this situation as maximal bounded rationality.

According to the general understanding of rationality, excluding the limitations of non-omniscience and non-omnipotence, this paper gets the requirements of maximal bounded rationality: when facing a problem, investors avoid becoming emotional due to the influence of psychological effects, but use the comprehensive and objective facts and systematic and rigorous logic to choose the solution that is most satisfying to themselves.

Among them, excluding psychological effects is the most important, because after excluding the limitations of non-omniscience and non-omnipotence, psychological effects are the only reasons making other requirements fail to be achieved.

2 Summarizing psychological effect occurrence scenarios and coping methods

Rationality requires the first step of decision-making is to determine a goal. However, maximal bounded rationality knows that investors cannot choose the optimal or maximum benefit solution, so it only requires investors to determine a satisfactory goal range. It generally includes: the maximum acceptable loss, the minimum acceptable profit, the probability of profit, the acceptable time required for profit, acceptable stock trading restrictions, etc.

The goal that satisfies investors is obviously personalized. Each investor's satisfactory goal depends on their own existing abilities. Therefore, investors with maximal bounded rationality will definitely collect, predict, and confirm their own state before stock investing, such as the maximum bearable loss, funds available for investment, minimum required profit, maximum time needed for profit, their own personality, their own risk preference, acceptable stock trading restrictions, etc.

After confirming the satisfactory goal and their own abilities, investors will collect information, make predictions and quantifications based on information, and compare predictions to choose the final investment strategy.

In summary, stock investment can be simplified into the following stages: collect information, make predictions and quantifications based on information, determine self-capability limitations and expectations, collect information, make predictions and quantifications based on information, compare predictions to choose the final investment strategy, buy or not buy, collect information, make predictions and quantifications based on information, compare predictions to choose the final investment strategy, sell or not sell.

Among them, "collect information, process information (by predicting or quantifying), compare predictions to choose the final investment strategy" is the stage that mediated by cognitive progress, is the stage where psychological effects will have an impact, and is also the stage that needs to be adjusted in stock investment.

Next, this paper will classify the common psychological effects that can influence cognitive progress into four categories (those affecting information collection, those affecting information processing, those affecting strategy selection, those affecting the whole process), summarize the typical occurrence scenarios of each psychological effect, and propose coping methods based on the principle of destroying or preventing the occurrence scenarios of psychological effects.

2.1 Psychological effects affecting information collection

Confirmation bias refers to the tendency that individuals with a prior belief beforehand can only accepts evidence that is beneficial to proving that belief, regardless of whether the belief is correct or not [1].

Current studies have found that confirmation bias always appears and interferes with information collection in the following three scenarios:

(1) Individual beliefs are threatened [2].

(2) Information can represent incentives or losses [3].

(3) Initial judgments only partially conform to facts.

Prior beliefs are the framework to interpret newly received contextual information. Their existence helps maintain an individual's mental balance. Questioning prior beliefs will break this balance [1]. Therefore, in the high-pressure financial market, facing questioning, investors will subconsciously collect more evidence to prove their beliefs and regain mental balance, falling in the confirmation bias. If information can represent incentives or losses, the result of loss will intensify the individual's psychological discomfort, and the result of incentive will make the individual develop preference biases. Thus, it can increase the probability of confirmation bias appearing [2].

According to the above viewpoints, to avoid confirmation bias. This paper suggests

investors:

Before searching for information, it is best not to make a prior judgment first.

Investors should adjust their physiological state to minimize the impact of mental imbalance.

When searching for information, investors should avoid linking information with profit and loss and determine that the worst result is always within their acceptable range before investing, which can minimize the impact of profit and loss on information collection.

2.2 Psychological factors affecting information processing

2.2.1 Overconfidence

Overconfidence refers to the tendency that investors overestimate their own judgment, knowledge, or ability, overemphasizing the information they collect or the results of their thinking, leading investors to ignore risks or overestimate investment returns [1].

Current studies have found that overconfidence often appears in financial markets with slow and noisy feedback [4]. It often appears when investors are young, have lower education levels, or have less work experience [5-9]. It often appears when investors over rely on professional skills and ignore public information. It often appears when investors are extroverted or narcissistic personality; it often appears when investors' views are reinforced by the environment or society. Additionally, investors often mistakenly overestimate the possibility of low-probability events occurring and underestimate the possibility of medium-to-high probability events occurring, believing that events with a probability above 90% will definitely happen [6].

In financial markets, short-term feedback is rapid but contains a lot of noise. This noise makes it difficult for investors to determine their own investment ability, thus they are unable to adjust their confidence level in time. Besides, long-term feedback is clear but takes a long time to appear, which means investors may need a long time to recognize the true effect of their decisions. Therefore, in financial markets, investors are prone to fall into overconfidence. Furthermore, only successful investors can remain active in the market. This survivorship bias will reinforce the overconfidence of surviving investors in the market [4].

Due to their own personality, character, experience, ability, and strengths, some investors often over focus on their own inferences and mistakenly ignore public opinions, falling into overconfidence [5-9].

According to the above viewpoints, to avoid overconfidence, this paper suggests investors:

Analogous to students' mock exams. By comparing past predictions with corresponding results, judge investors' own investment ability; not just rely on short-term investment experience and actual investment experience to judge their own investment ability.

Ask elders, seniors with higher professional ability or more professional experience, other

relevant professionals, people with different personalities or characters, professional and disinterested persons, or people from different social environments for help to point out flaws in their logic or information.

Focus on considering the reasons why low-probability events and events with over 90% probability do not happen; focus on considering the reasons why medium-to-high probability events happen.

Overconfidence phenomenon appears both in the link of reasoning to get inferences and in the link of comparing and selecting solutions. It has been explained in detail here and will not be repeated again.

2.2.2 Availability heuristic

Availability heuristic refers to the tendency that people often judge based on the frequency of its appearance in perception or memory, rather than searching for relevant information, while predicting the probability [1].

Therefore, this paper suggests that investors should search for information and predict the occurrence probability according to probability theory before processing the information; if it is unable to predict scientifically and rationally, this prediction should not be used.

2.2.3 Representativeness heuristic

Representativeness heuristic refers to the tendency that people often compare information with known similar models or concepts while judging. If the deviation is small, individuals will ignore other preconditions and quickly confirm the information represents that model or concept [1].

Current studies have found that when inferring population characteristics from too small samples, when ignoring unconditional probability (the probability of an event occurring without considering any other events or conditions), and when investors lack understanding and analytical ability of the problem, the representativeness heuristic will interfere with investor decision-making [1, 5].

In some cases, different inferences may have the same manifestation. Therefore, the inference obtained from existing information is not necessarily correct; the obtained inference may only be one of the results that the information can represent [1].

Based on the above findings, to avoid the influence of the representativeness heuristic, this paper suggests that when processing information, investors should use the rival causes argumentation to determine as many inferences as possible, and confirm the most plausible inferences through further information collection.

2.2.4 Conservatism

Conservatism refers to a kind of inertia in human thinking that people are not used to

changing original beliefs and are difficult to use new evidence to revise original beliefs [1].

Current studies have found that conservatism often appears when the latest information is not obvious enough in proving inferences, when the model is unclear, when investors overly rely on existing experience and beliefs but consider new information or data less [6].

To save energy and maintain mental balance, people have strong cognitive inertia and laziness. If information cannot obviously overturn the original belief, investors will unconsciously maintain the original belief rather than revise it; and when investors consciously rely on original experience and beliefs, this effect is more obvious [6].

Therefore, to avoid being affected by conservatism, this paper suggests investors give larger thinking weight to immediate information. Every time new information is obtained, combine it with existing information to derive new inferences.

2.2.5 Information cascade

Information cascade refers to the tendency that people unintentionally ignoring their own existing, obtainable information during decision-making, and overemphasizing others' information or choices [10].

Current studies have found that investors are prone to be affected by information cascades when they are in a camp holding a viewpoint, when they encounter high-attention information, when in information overload situations, in special information environments (e.g., information cocoons), when individual emotional states resonate with certain information content, and when individuals selectively avoid certain information [10-14].

Within an expressive camp holding viewpoints, the originally similar views among group members will be further reinforced through discussion and exchange, leading to convergence and polarization of views; additionally, members may tend to express or accept views consistent with the group to gain a sense of belonging or avoid group exclusion. In this case, it is difficult for individuals in the group to receive opposing views, while the group's views will repeatedly appear in the individual's consciousness. Finally, this view will be subtly accepted by the individual [10].

Furthermore, emotional resonance and individual selective avoidance also affect the frequency of information appearing in individual consciousness, thereby generating information cascades [13].

According to the above viewpoints, to avoid the influence of information cascades, this paper suggests investors in expressive camps, when processing information, request people from other camps to point out flaws in logic or information. And pay attention to ensure that the proportion of high-attention information in reasoning is not too high.

2.2.6 Herd effect

Herd effect, commonly known as conformity behavior. Refers to the phenomenon where

individuals in a group imitate and infect each other, eventually being controlled by emotions and losing rationality [15].

According to research, individuals lack a sense of security in uncertain or complex environments and tend to imitate others' opinions or behaviors. Under information asymmetry, individuals may tend to follow others' behaviors, especially when others are perceived to have more information or higher status [10]. Individuals in groups choose to conform with the majority to avoid isolation or gain social acceptance.

Therefore, to avoid the herd effect, this paper suggests collecting more information, reasoning independently, and trying to see if others' viewpoints can be integrated into logic; if not, one should ask for others' logical reasoning process to form a closed loop between their own logic and others' logic; if others' logic is not rigorous, then others' opinions or behaviors should not be imitated.

Herd effect appears both in the link of reasoning to get inferences and in the link of comparing and selecting solutions. It has been explained in detail here and will not be repeated again.

2.3 Psychological factors affecting solution selection

2.3.1 Ambiguity aversion

Ambiguity aversion refers to people's aversion to subjectively perceived uncertainty exceeding their aversion to objectively perceived uncertainty [16].

According to current research, ambiguity aversion often appears when the probability of an event cannot be estimated through experience or reasoning, after experiencing decision-making errors, and when other collaborators or competitors are more capable [6, 17, 18]. In gain scenarios, ambiguity aversion is more obvious; in loss scenarios, ambiguity seeking is more obvious [16]. High self-esteem individuals are more likely to be ambiguity averse when bearing responsibility for decision consequences, and may be ambiguity seekers when not needing to bear responsibility [19].

When probability cannot be estimated through experience or reasoning, an individual's cognitive ability is insufficient to cope with an ambiguous environment. In this case, to avoid the complexity and uncertainty of decisions, and the psychological burden caused by ambiguity, people tend to avoid ambiguity [17].

When an individual experiences decision-making errors, the individual may become more sensitive to potential uncertainty and ambiguity due to fear of failure. This sensitivity may lead investors to choose low-ambiguity solutions with less psychological burden to reduce the possibility of future failure [18].

When an individual perceives that other collaborators or competitors are more capable, their own decision-making errors may appear more prominent, exacerbating anxiety caused by uncertainty. For example, seeing better decision-makers or higher success cases,

individuals may be more inclined to choose more certain options to avoid disadvantage in comparison, and thus choose low-ambiguity solutions. Similarly, therefore, high self-esteem investors also tend to choose low-ambiguity solutions when bearing responsibility [19].

Therefore, to eliminate the influence of ambiguity aversion, this paper suggests investors understand their own personality, calculate expectations based on reliable inferences and compare them, and within their acceptable range, choose the solution with higher expectation to invest.

2.3.2 Reflection effect, house money effect, hot hand fallacy, and umbrella effect

Reflection effect refers to the tendency that when investors anticipate possible gains, they tend to choose lower-risk investment methods, trying to avoid possible losses as much as possible and when anticipating possible losses, they may choose higher-risk investment methods, trying to recover losses through high-risk investments [20].

House money effect refers to the tendency when investors have made profits in the early stage, they tend to choose high-risk, high-return trading behaviors [21].

Hot hand fallacy refers to the tendency that investors may judge early profits as a positive signal for future profits, mistakenly believing that early profits are sustainable, which will prompt investors to tend towards risk-seeking in subsequent trades [22].

Umbrella effect. The accumulation of early profits improves their ability to withstand losses. At this time, investors may be more inclined to bear uncertainty [23].

Reflection effect has the opposite effect to house money effect, hot hand fallacy, and umbrella effect. To avoid their influence, this paper suggests investors understand human risk preferences in different situations, recognize the impact of their early profits on themselves; calculate expectations based on reliable inferences and compare them, and within their acceptable range, choose the solution with higher expectation to invest.

Additionally, the combined influence of overconfidence, the representativeness heuristic, and the herd effect may all cause investors to momentum chasing in stock investment, which also has the opposite effect to the reflection effect. Therefore, when preventing the reflection effect, one should simultaneously refer to the coping methods above to prevent overcorrection.

2.3.3 Behavioral portfolio

Behavioral portfolio is a kind of asset allocation method that, compared to traditional portfolios, is closer to the actual decision-making behavior of real investors.

The main characteristics of behavioral portfolios include:

Investors will construct a pyramid-like multi-layer asset portfolio according to different investment goals and risk preferences.

Each layer of assets depends on specific investment goals and risk attitudes. For example, the bottom layer may be conservative investments to avoid poverty and bankruptcy; the top layer may be risky investments to pursue high returns.

The correlation between the assets of each layer is usually ignored by investors.

When constructing behavioral portfolios, investors comprehensively consider factors such as expected wealth, investment safety, appreciation potential, aspiration level, and the probability of reaching the aspiration level.

Asset allocation is inefficient. For example, investors may over-concentrate on low-risk assets (such as savings deposits or real estate) while ignoring the potential returns of high-risk assets (such as stocks or bonds), thereby reducing the overall investment return rate. Limits the risk diversification ability of the asset portfolio [24].

The behavioral portfolio itself is just a model and has no negative impact; investors with maximal bounded rationality will not put themselves in unbearable risks to maximize investment efficiency, because their purpose is not to profit but to satisfy themselves; and the key lies in referring to traditional portfolio theory, reducing risks by allocating different asset classes and regions, emphasizing diversified investment, regular rebalancing, and a long-term perspective.

2.4 Psychological effects affecting the whole process

2.4.1 Situational influence

Situational influences means investors need to interpret new information based on past experience and context. Under different circumstances, the same stimulus may produce different perceptions. In short, the surface form of things also affects people's views on the essence of things.

To avoid the influence of situational influences, this paper suggests investors interpret information from different angles, express as completely as possible, and make decisions suitable for themselves.

2.4.2 Context effect

Context effect refers to the fact that society-specific factors have an important impact on people's beliefs and decisions; people from different backgrounds may form several groups with different beliefs. There are no significant differences within groups, but systematic differences exist between different groups. People's cognition is influenced both by factors of the entire system and by factors of the group they belong to [1].

To prevent the influence of cognitive system bias, investors should refer to others' opinions, ask for others' logical reasoning processes, and make decisions suitable for themselves.

3 Systematic approach to help investors achieve maximal bounded rationality

Based on the above research and summarization, below this paper will construct a thinking system for investors to refer to during decision-making; help investors realize which psychological effects are affecting them and correct them.

In the three links of collecting information, processing information, and comparing and selecting solutions, investors need throughout the whole process:

(1) Alone or with the help of others, interpret information, inferences, and solutions from different perspectives.

(2) Request other assistants to provide their understanding of information, logical reasoning process, and reasons for solution selection. Here, "other assistants" importantly include elders, seniors with higher professional ability or more professional experience, people with other viewpoints, people with other stances, other relevant professionals, people with other personalities, professional and disinterested persons, people from other social environments or cultures (pay attention to understand the limitations of the assistants and treat their suggestions rationally).

(3) The collection of information should be comprehensive even if relevance is low; the logical reasoning process of inferences must be rigorous and systematic; the selection of solutions must be most satisfying to the investor and not overly emotional; do not guess, do not blindly, all actions should be reasoned and justified.

(4) Before decision-making, adjust one's physiological state well, methods such as deep breathing can be adopted to minimize the influence of anxiety and stress.

(5) Before investing, determine that the investment result is always within one's acceptable range, not afraid to face any consequences of investment, understand that investment itself carries risks. In simple terms, investors must ensure they participate voluntarily in the "game" of investment, ensuring they are willing to win or lose the bet.

When searching for information, the key is to ensure information is comprehensive. Special attention needs to be paid to:

(1) Do not make a prior judgment in the heart first and then prove it.

(2) When searching and processing information, reduce the association with inferences or solutions beforehand.

(3) After obtaining information, first think about whether there are other different scenarios that can lead to the same information; do not rush to the next step of reasoning or comparison.

When making predictions and quantifications, the key is to ensure the logic of inferences is rigorous and systematic. Special attention needs to be paid to:

(1) Analogous to students' mock exams. By comparing past predictions (predictions for actual investments and non-actual investments) with corresponding results without looking at the outcomes, judge their own investment ability; not just relying on short-term investment experience and actual investment experience to judge their own investment ability.

(2) Focus on considering the reasons why low-probability events and events with over 90% probability do not happen; focus on considering the reasons why medium-to-high probability events happen.

(3) Predict the occurrence probability according to probability theory; if unable to predict scientifically and rationally, then this prediction should not be used.

(4) Use the alternative causes argumentation method to determine as many inferences as possible (because in some cases, multiple different causes can lead to the same result, so the inference obtained from existing information is not necessarily correct), and confirm the most plausible inferences through further information collection.

(5) Give relatively slightly larger thinking weight to immediate information, combine with existing information or inferences for rigorous reasoning.

(6) When predicting and quantifying, pay attention to whether the source of information is reliable, pay attention to whether the logic of inferences is rigorous.

(7) Pay attention that the proportion of high social attention information or social hotspot information in prediction and quantification should not be too high.

(8) First conduct prediction and quantification independently, then try to see if others' viewpoints can be integrated into one's own logic; if not, one should ask for others' logical reasoning process to form a closed loop between their own logic and others' logic; if others' logic is not rigorous, then others' opinions or behaviors should not be imitated.

When comparing and selecting solutions, the key is to ensure the choice satisfies the investor and is not overly emotional. Special attention needs to be paid to:

(1) Low-probability events and events with over 90% probability are less likely to happen than expected; medium-to-high probability events are more likely to happen than expected.

(2) Estimate expectations based on reliable inferences and then compare them. Within one's acceptable range, choose the solution with higher expectation to invest.

(3) Understand one's own personality. Within one's acceptable range, choose the solution with higher expectation to invest. Understand the personality of assistants and treat their suggestions rationally.

(4) Understand human risk preferences in different situations, recognize the impact of one's own early profits on oneself; calculate expectations based on reliable inferences and compare them. Within one's acceptable range, choose the solution with higher expectation to invest. When investors anticipate possible gains, they tend to choose lower-risk investment methods, trying to avoid possible losses as much as possible; when anticipating possible

losses, they may choose higher-risk investment methods, trying to recover losses through high-risk investments; when having made profits in the early stage, investors tend to choose high-risk, high-return trading behaviors; blind investors are prone to chase rising prices and kill falling prices.

(5) Investors with maximal bounded rationality will not put themselves in unbearable risks to maximize investment efficiency, because their purpose is not to profit but to satisfy themselves. The key lies in referring to traditional portfolio theory: reduce risks by allocating different asset classes and regions, emphasizing diversified investment, regular rebalancing, and a long-term perspective.

(6) Determine the value trend of stocks through information collection and rigorous logical reasoning, and then decide to buy or sell.

4 Conclusion

Through research, this paper first derived the definition of maximal bounded rational decision-making for investors under non-omniscient and non-omnipotent states based on the mainstream definition of rational decision-making; then, according to the limitations of the definition and the general stock investment process, summarized the typical generation backgrounds of various psychological effects that interfere with rational investment, and accordingly attempted to propose theoretical methods to reduce the impact of corresponding psychological effects; finally, gathered all the theoretical coping methods together to construct a thinking system for investors to refer to during decision-making.

As a tool, this system contributes to the application field of behavioral finance. This system can help investors determin

Due to space limitations, this paper cannot conduct rigorous arguments on the theoretical coping methods for psychological effects. Additionally, the principle of the coping methods proposed in this paper is to destroy or prevent the occurrence scenarios of psychological effects, which leads to the coping methods proposed in this paper being extremely incomplete. Future research should propose more targeted and comprehensive coping methods for psychological effects from the principle level of psychological effects, and provide rigorous theoretical and experimental arguments.

References

1. D. Kahneman, P. Slovic, & A. Tversky (Eds.), Judgment under Uncertainty: Heuristics and Biases. Cambridge University Press. 3–20 (1977)
2. A. Kappes, A. H. Harvey, T. Lohrenz, P. R. Montague, & T. Sharot, Confirmation bias in the utilization of others' opinion strength. Nature Neuroscience. **22**(12), 2137–2146 (2019)

3. Z. Grossman, & D. Owens, The Good News-Bad News Effect: Asymmetric Processing of Objective Information about Yourself. American Economic Journal: Microeconomics. **14**(3), 33 – 69 (2022)

4. T. Odean, Volume, Volatility, Price, and Profit When All Traders Are Above Average. The Journal of Finance. **53**(6), 1887 – 1934, 1890 – 1892 (1998)

5. J. M. Griffin, F. Nardari, & R. M. Stulz, Do Investors Trade More When Stocks Have Performed Well? Evidence from 46 Countries. Journal of Financial Economics. **70**(3), 495 – 550 (2003)

6. C. Heath, & A. Tversky, Preference and Belief: Ambiguity and Competence in Choice under Uncertainty. Journal of Risk and Uncertainty. **4**(1), 5 – 28 (1991)

7. M. Puri, & D. T. Robinson, The Economic Psychology of Entrepreneurship and Family Business. Journal of Economics & Management Strategy. **20**(2), 423 – 483 (2011)

8. J. D. Foster, D. E. Reidy, T. A. Misra, & J. S. Goff, Narcissism and Stock Market Investing: Correlates and Consequences of Cocksure Investing. Personality and Individual Differences. **50**(6), 816 – 821 (2009)

9. D. Hirshleifer, & S. H. Teoh, Systemic Overconfidence in the Market. Journal of Financial Economics. **118**(2), 337 – 354 (2015)

10. S. Bikhchandani, D. Hirshleifer, & I. Welch, A Theory of Fads, Fashion, Custom, and Cultural Change as Informational Cascades. Journal of Political Economy. **100**(5), 992 – 994 (1992)

11. P. Persson, Attention Manipulation and Information Overload. Behavioural Public Policy. **2**(1), 78 – 106 (2018)

12. D. Saxena, & M. Lamest, Information Overload and Contradictory Social Media Influences in Online Information Cascades. Online Information Review. **42**(6), 1 – 20 (2018)

13. L. R. Anderson, & C. A. Holt, Information Cascades in the Laboratory. American Economic Review. **87**(5), 847 – 862 (1997)

14. M. J. Eppler, & J. Mengis, The Concept of Information Overload: A Review of Literature. Information & Management. **41**(5), 623 – 633 (2004)

15. K. A. Froot, D. S. Scharfstein, & J. C. Stein, Herd on the Street: Informational Inefficiencies in a Market with Short-Term Speculation. The Journal of Finance. **47**(4), 1461 – 1484, 1463 (1992)

16. N. Barberis, Thirty Years of Prospect Theory in Economics: A Review and Assessment. Journal of Economic Perspectives. **27**(1), 173 – 196 (2013)

17. D. Ellsberg, Risk, Ambiguity, and the Savage Axioms. The Quarterly Journal of Economics. **75**(4), 643 – 669 (1961)

18. J. H. Kagel, & A. E. Roth (Eds.), Handbook of Experimental Economics. Princeton University Press, 587 – 590 (1995)

19. F. Zhang, Q. Yang, Z. Hu, & S. Luo, Self-esteem and decision-making preferences in ambiguous situations. Studies of Psychology and Behavior. **10**(6), 460 – 461 (2012)

20. D. Kahneman, & A. Tversky, Prospect Theory: An Analysis of Decision under Risk. Econometrica. **47**(2), 263 – 292 (1979)

21. R. H. Thaler, & E. J. Johnson, Gambling with the House Money and Trying to Break Even: The Effects of Prior Outcomes on Risky Choice. Management Science. **36**(6), 643 – 660 (1990)

22. T. Gilovich, R. Vallone, & A. Tversky, The Hot Hand in Basketball: On the Misperception of Random Sequences. Cognitive Psychology. **17**(3), 295 – 314 (1985)

23. H. Shefrin, & M. Statman, The Disposition to Sell Winners Too Early and Ride Losers Too Long: Theory and Evidence. The Journal of Finance. **40**(3), 777 – 790 (1985)

24. H. Shefrin, & M. Statman, Behavioral Portfolio Theory. Journal of Financial and Quantitative Analysis. **35**(2), 127 – 151 (2000)