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## INFORMATION SOURCES OF TRADING DECISION MAKING AS DETERMINING FACTORS FOR COGNITIVE BIASES

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In the article the issues of trading decision making are being discussed in the lights of cognitive biases in uncertainty. The process of trading stocks requires buy/sell decision making in uncertain conditions under extreme time constraints. In ever-changing market decisions are made momentarily and cognitive biases and heuristics determine the speed and quality of decisions. Information and expectations are the core of cognitive component of the process and can influence biases.

**Keywords:** *Trading; decision-making; biases; heuristics; uncertainty; financial instruments; expectations; information-seeking behavior.*

## ИСТОЧНИКИ ИНФОРМАЦИИ ПРИ ПРИНЯТИИ ИНВЕСТИЦИОННЫХ РЕШЕНИЙ КАК ОПРЕДЕЛЯЮЩИЕ ФАКТОРЫ КОГНИТИВНЫХ ПРЕДУБЕЖДЕНИЙ

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В статье обсуждаются вопросы принятия инвестиционных решений с точки зрения когнитивных предисловий в условиях неопределенности. Процесс торговли акциями требует принятия решений о покупке/продаже в неопределенных условиях и экстремальных ограничениях по времени. На постоянно меняющемся рынке решения принимаются мгновенно, а когнитивные предубеждения и эвристики определяют скорость и качество решений. Информация и ожидания являются основой когнитивного компонента процесса и могут влиять на предубеждения.

**Ключевые слова:** *инвестиция; принятие решений; предубеждения; эвристика; неопределенность; финансовые инструменты; ожидания; поведение, направленное на поиск информации.*

## ՆԵՐԴՐՈՒՄԱՅԻՆ ՈՐՈՇՈՒՄՆԵՐԻ ԿԱՅԱՑՄԱՆ ՏԵՂԵԿԱՏՎԱԿԱՆ ԱՂԲՅՈՒՐՆԵՐԸ ՈՐՊԵՍ ՃԱՆԱԶՈՂԱԿԱՆ ԿՈՂՄՆԱԿԱԼՈՒԹՅԱՆ ԳՈՐԾՈՆՆԵՐ

*Արևիկ Հերոյան (Երևանի պետական համալսարան, Երևան, Հայաստան)*

Հոդվածում քննարկվում են անորոշության իրավիճակում ներդրումային որոշումների կայացման հարցերը ճանաչողական կողմնակալության լույսի ներքո: Բաժնետոմսերի առևտրի գործընթացը պահանջում է գնելու/վաճառելու որոշումներ կայացնել անորոշ և ծայրահեղ ժամանակային սահմանափակումների պայմաններում: Մշտապես փոփոխվող շուկայում որոշումներն ընդունվում են ակնթարթորեն, և ճանաչողական կողմնակալությունները և էվրիստիկաները պայմանավորում են որոշումների արագությունն ու որակը: Տեղեկատվությունը և ակնկալիքները գործընթացի ճանաչողական բաղադրիչի առանցքն են և կարող են ազդել կողմնակալության վրա:

**Հանգուցային բառեր`** ներդրում; որոշման կայացում; կողմնակալություն; էվրիստիկա; անորոշություն; ֆինանսական գործիքներ; ակնկալիքներ; տեղեկատվություն փնտրող վարքագիծ:

Relevance: Stock trading is the buying and selling shares of publicly traded companies with the aim of making a profit based on fluctuations in their market prices. Day trading is a short-term trading strategy where traders buy and sell financial instruments, such as stocks or cryptocurrencies, within the same trading day, aiming to profit from intraday price movements. The number of traders worldwide fluctuates between 13,8-50 million, with 5 million new traders emerging after 2017 with internet financial tools giving access to trading stocks and cryptocurrencies to general public. Based on market sentiment, economic events, global markets can capture millions to billions trading transactions daily. As of 2022 fourth quarter, 58200 companies are traded publicly worldwide [2]. As an example, General Electric captured daily average of 7.39 million shares traded between 294000 entities and individuals, meaning daily decisions were made by some traders to either sell, buy, or hold their part of 7.39 million shares to make the maximum profit of their decision. The decisions of buying, selling, holding is the essence of trading [6]. These decisions are the product of market analysis, risk management, timing, and execution. Besides previously known earnings reports and financial analysis channels, internet also created countless sources of information on stock movements and suggestions on trading strategies in social media, through newsletters, videos on YouTube, live trading actions on websites, etc.

Traditional finance and neoclassical economy tend to view decision-makers as rational agents who optimize behavior for maximum profitability [5]. Studies from

1970-s and on have proven that rationality is limited as decision-makers have a fraction of information at given moment with impossibility of knowing every piece of data and our abilities of processing given information are limited [1]. Market changes can somewhat be predicted, never certain. Risk factors and expectations of stock price movement cannot be known due to number of transactions per minute. Research in behavioral finance and further dive into psychological aspects of cognition and decision-making have proven that prospect of decision has the key role in the process and our brains have developed useful mental shortcuts or practical rule-of-thumbs that allows individuals to make decisions or solve problems quickly and efficiently. It is a cognitive strategy or approach that simplifies complex tasks by using easily understandable, approximate, or "good enough" methods to reach a solution, even if it may not be the most accurate or optimal one [4]. They help individuals make reasonably informed decisions or judgments without having to engage in exhaustive analysis or computation. However, because heuristics rely on simplifications and generalizations, they can sometimes lead to errors or biases, known as heuristic biases, in specific circumstances. Some of known heuristics in financial decision making are: Availability Heuristic: Estimating the likelihood of an event based on how easily instances or examples of it come to mind; Representativeness Heuristic: Making judgments or decisions based on how well something matches a prototype or preconceived stereotype; Anchoring and Adjustment Heuristic: Starting with an initial reference point (anchor) and adjusting subsequent judgments based on that anchor; Confirmation Bias: Focusing on information that confirms existing beliefs or hypotheses while ignoring or downplaying contradictory evidence[3].

**PURPOSE AND HYPOTHESIS:** The purpose of research is to understand how information-seeking mechanisms and sources determine heuristics and biases in trading decision-making process. The hypothesis of research states that sources of information chosen by the individual can validate and further deepen heuristics and determine cognitive and emotional components of decision-making.

**DESCRIPTION OF THE SAMPLE:** The preliminary research survey has been conducted with 50 individuals who are trading stocks and participated in the research on voluntary bases. Trading individuals had various trading experience, had a global geographical location and participated in the survey based on online participant search announcement via social networks as LinkedIn and Facebook

**RESEARCH METHODS AND TECHNIQUES:** The survey was prepared by the author and aimed to illuminate the most used and trusted information sources for trading decisions, the least trusted sources for participants. This preliminary research prepared a base for content analysis, which was the following step of our research. Since there are close to infinite sources of information for trading decision

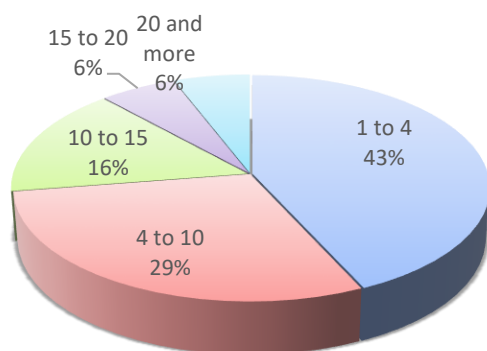
making, our goal was to identify main trusted sources and continue conducting content analysis of these sources to identify possibly mechanisms of activation of biases and heuristics among decision-makers.

Questions for preliminary research were regarding trading experience, the use of additional sources of information and trust in specific sources such as official media outlets, financial institutions, social media platforms like Facebook, Twitter, Instagram, TikTok which give a space to people for sharing their knowledge and experience of trading, as well as some demographical information.

#### RESULTS:

##### Trading Experience

Among 50 participants the trading experience breakdown is presented below:



**Figure 1.** Trading Experience in YRS.

The majority of participants, 43%, had 1 to 4 years' experience. As provided in the introduction, with SARS-COVID-19 pandemic influence on trading technology development and influx of cash-on-hand among general public and spare time, apps/software of trading of non-professionals had an exponential rise. The second largest group had the trading experience of 4 to 10 years. Groups of

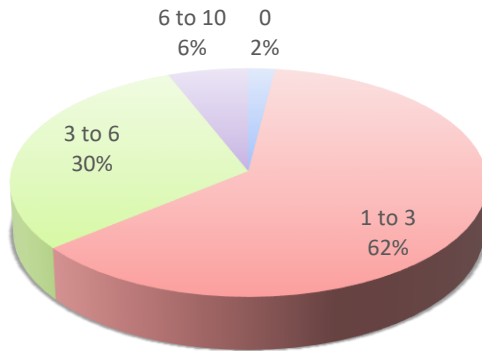
15-20 & more than 20 years of trading experience had 6% representatives respectively.

In regard to age and gender breakdown of participants, our sample had below picture: 62 % of participants were male and 38% were female. Based on research conducted by the experts of finmaster.com 90% of all active day traders are male. 66.3% of all day traders are white. Our preliminary research doesn't have a race breakdown. Half of all participants were between age of 30-40, which represents the high interest of young professionals in trading (short-term day trading or long-term trading). The second largest group is in 40-50 group. The interesting fact is that in USA considering contributions to pension funds and 401K funds, some "traders" become traders not voluntarily, their employers are providing 2-3 options of utilizing their contributions in ETF funds (which consolidated largest publicly traded companies). This may be a specific point in our further research, as motivations in

this form of investing and day trading, for example, may be completely different, hence cognitive factors and biases work differently in these groups.

**Influence of information on decision making process:**

40 of research participants, 80% of all participants indicated that they are using additional sources of information when making decisions on trading. 20% indicated that they normally do not utilize additional sources of information. However further research is needed with participants to identify methods and mechanisms of decisions in “vacuum” as they self-assessed.



**Figure 2.** Rating of outside information influence on trading decisions.

98% of participants rated some sort of influence of outside information sources on their trading decision-making process. Only 2% of participants indicated that outside information has no influence on their decision-making process. 2/3 of participants indicated that additional sources of information had minimal ( 1 to 3 rating) influence on them and 1/3 rated moderate influence. Only 6% of participants indicated that additional sources of information do actually have high impact.

On question on the most used sources of information, our preliminary research has shown below table:

**Table 1.** The most used sources of information.

	Choice	Totals
•	News/mass media	10
•	Financial Institutions/Bloomberg	22
•	Facebook groups	19
•	Twitter	6
•	Instagram	9
•	TikTok	4
•	Newsletters	16
•	YouTube	12

•	Other	6
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Half of the participants, regardless of trading experience, gender and other variables, indicated the use of well-known financial institutions analytical tools such as Bloomberg financial, Yahoo finance, etc. which give generalized overview of markets and movements of individual stocks. 84% of participants answered YES to the question of trust in official channels of information and only 16% didn't trust official sources of information. Company earnings reports, dividend announcements, official news released by companies and financial institutions and experts' ratings are combines into "official information" sources by the financial experts. Another utilized source is the newsletters such Seeking Alpha, Barron's etc., which provide brief market movements and analysis, individual stock movements and suggestions daily to email addresses of participants. In our opinion, both these methods are more passive information seeking sources, as the participants have more passive role in information seeking and filtering, as general information is being delivered to them via email and websites. Another source that had a very high utilization is the social media platform Facebook, which has dedicated groups for investing, investing for individuals whoa re just starting, groups dedicated to movement and analytics of individual stocks, providing decision-makers a platform to discuss, share personal experience, explain opinions and decision-making process and is more personal than other 2 sources mentioned higher. A quick Facebook group search shows groups with 500.000-800.000 participants, smaller groups of 500-1000 and even more niche groups for people located in a very specific geographical location and interested in very specific stocks. Facebook groups allow participants to receive more diversified information. It allows participants to initiate discussions and provide explanation/logic of decisions. In contrast, social media platforms like Instagram, TikTok, YouTube provide more one-sided interaction with very specific sender and receivers, hence sharpening the idea of influence, influencers and passive receivers of information. When provided with various and relatively popular sources of information and opinions/influences, the participants provided below trust rating:

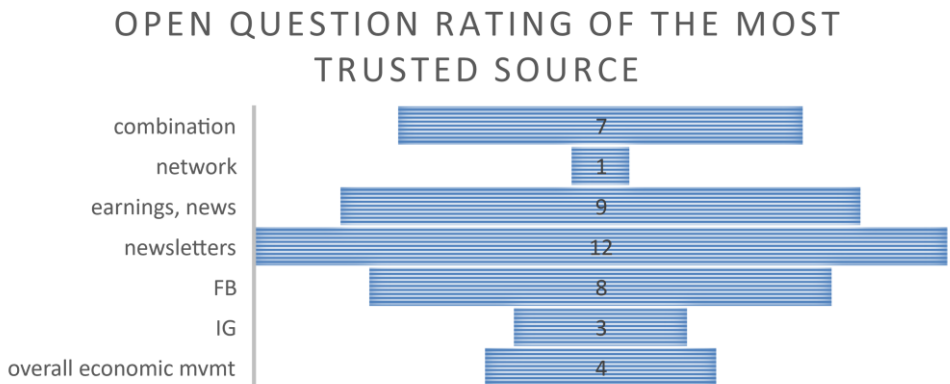
**Table 2.** Trust rating results.

RATING of TRUST	Mass media	YouTube	Facebook	TikTok	X(formerly Twitter)
0	4%	0%	0%	4%	0%
1 to 3	58%	60%	58%	86%	74%
3 to 6	32%	38%	34%	8%	26%
6 to 10	6%	2%	8%	2%	0%

When reviewing the rating of trust of specific sources, we can see that with Facebook being the most used source, it also has a relatively the highest rating as the most trusted source. TikTok is the least trusted source, possibly determined by short-

span video format and overall trust to this application among general public and trust in content creators. YouTube personalities have average trust rating, possibly determined by longer video format, where the influencing person has more ways of reasoning and wider audience, but still being one-sided interaction of influencer with his influences/followers. X (formerly known as Twitter) also has a low trust rating.

This comparison allows us to hypothesize, that information sources and platforms that are more personal, allow two-sided interaction and allow influencers to reason/explain their thinking, have higher trust among decision-makers and are more preferred as sources.



**Figure 3.** Open question rating of the most trusted source.

When asked on sources the participants prefer, allowing them to answer it as an open question and elaborate on their thinking, we have below picture: newsletters and earning reports are highly trusted, from social media platforms Facebook is the most trusted, but participants combine sources for decisions, such as social media and earning reports, news and peer discussions. Open questions reflect similar results as rating questions.



**Figure 4.** Most important trading skills (OQ).



Another open question for our research was the most important question of trader for successful trading and we have noted below answers which were in some cases contradictory, such as speed and patience, risk and ability to stop losses. The most important skills are considered to be patience and overall knowledge of market. Assume that such a contradictory image is caused by different types of traders and their expectations and goals, as day traders maximize their investments within very short periods bidding on minimal changes within opening and closing of markets and long-time traders who invest in stocks for years and bid on the quality and reputation of the company, hoping that they purchased stocks at the dawn when company is undervalued and their potential can be bought for less than they value. Our future research is to understand and define how different sources of information may activate one or another bias/heuristic and influence us to skew our thinking. We hypothesize that below mechanisms may determine out decision-making.<sup>3</sup>

**Table 3.** The possible impact of possible biases.

Bias/Heuristic	Explanation	Possible impact
Availability Heuristic	The tendency to overestimate the likelihood of events having greater "availability" in memory may be influenced by how recent the memories are or how unusual or emotionally charged they may be.	Social media and fin. Institutions reports repetition may activate bias
Illusory Truth Effect	The tendency to believe a statement to be valid if it is easier to process or if it has already been said several times, regardless of its actual truth content.	Social media and fin. Institutions reports repetition may activate bias
Mere-Exposure Effect	The tendency to express undue liking for things merely because of familiarity with them.	Para-social influence of content creators may activate this bias
Base Rate Fallacy	The tendency is to ignore general information and focus on information only about the specific case, even when the available information is more important. Base rate fallacy, also called base rate neglect or bias is a form of fallacy.	Para-social influence of content creators may activate this bias

**DISCUSSION AND CONCLUSION:** The current state of information distribution and wide range of trading platforms allowed professional and amateur traders be part of ever-changing global markets transactions. Countless information sources and platforms allows virtually anyone to generalize and produce and spread information. Based on trading experience, the sources and trust in them fades and decision-making style with main cognitive components are determining factors in

heuristic activation. Heuristics are also activated by the influences traders choose to subject themselves to while seeking information.

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