Backgrounder: Finology

Behavioural FINance & Investor PsychOLOGY

January 2021

Portfolio Construction **Forum**

Investing biases and behaviours and the investment implications

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PREFACE

Finology is where investing meets investors™. Finology is the interesting and unique mix of behavioural finance ("**FIN**") and investor psychology ("**OLOGY**") as it relates to giving investment advice to individual investors. Both behavioural finance and investor psychology are necessary – but neither is on its own sufficient – to ensure quality advice. Together, they are the "whole that is greater than the sum of its parts". The finology discipline complements the continuous development of your investment philosophy by focusing on identifying investing biases, beliefs and behaviours and the investment outcomes. Finology is the connection of behavioural finance and investor psychology - encompassing "know the markets", "know yourself" and "know your clients".

All of us, through our professional and social interactions, build up a set of "rules of thumb" to understand how people behave in different situations. Successful investment advisers use their experience and people skills to build strong, meaningful client relationships. As a result, much of finology may seem like common sense. But that misses the point. Finology is important because it allows us to formalise and systematise our rules of thumb, providing a broad structural framework for our already developed understanding of human nature – so that we may identify the "why", as well as the "how". Attaining this deeper level of comprehension of why investment markets are behaving how they are, of ourselves and of our clients is crucial, given the ever-changing nature of investment portfolio construction and the growing regulatory oversight of financial advice.

Nonetheless, it should be noted that finology is an emerging domain, and that the underlying research and academic literature is evolving. The aim of this Backgrounder is therefore to provide a practical framework for the implementation of behavioural finance and investor psychology principles, to summarise some of the key concepts, and to outline how these ideas may be applied to managing client portfolios and clients and to financial planning more broadly. It does not attempt to extend the current research, but it does offer an extensive bibliography. We'd welcome feedback and/or suggestions of additions to the bibliography.

Finology is relevant to all wealth management professionals involved in the giving of investment advice, because we all have a responsibility to better understand how our own and other people's different investing biases, beliefs and behaviours impact investment markets and portfolio construction practices – and, therefore, investment outcomes – to enable better quality investor portfolios.

Therefore, we trust this Finology Backgrounder enhances your understanding of the finology domain. Particular credit for researching and drafting this Backgrounder belongs to Rob Hamshar, our finology subject matter specialist, and a member of our specialist academic research unit, the Investment Management Research Program.

We believe that finology knowledge and skills will substantially enhance your ability to communicate with clients, and to manage their portfolios more effectively, thereby improving their financial wellbeing.

Graham Rich
Managing Partner & Dean, Portfolio Construction Forum

1. INTRODUCTION

> "The economist may attempt to ignore psychology, but it is a sheer impossibility for him to ignore human nature… If the economist borrows his concept of man from the psychologist, his constructive work may have some chance of remaining purely economic in character. But if he does not, he will not thereby avoid psychology. Rather, he will force himself to make his own, and it will be bad psychology."
>
> \- John Maurice Clark

Academic studies and financial media abound with stories of investors behaving badly due to cognitive errors, emotionality, ignorance, or a blend of each. Financial literacy studies show that people often struggle with financial concepts, including relatively simple ideas such as interest rates, while simultaneously over-estimating their level of financial knowledge (Naim, 2014; Asaad, 2020). Apparent anomalies in financial markets are often attributed to "noise traders" and "dumb money" who behave badly, move in herds, and are easily misled and prone to swinging between fear and greed.

Wealth management professionals therefore face an important and challenging task as they seek to develop a modern, evidence-based understanding of how financial markets function (i.e., one that sufficiently accounts for "human factors") and to guide clients in understanding and improving their investment decision-making.

Finology and the 5 Knowledge Domains

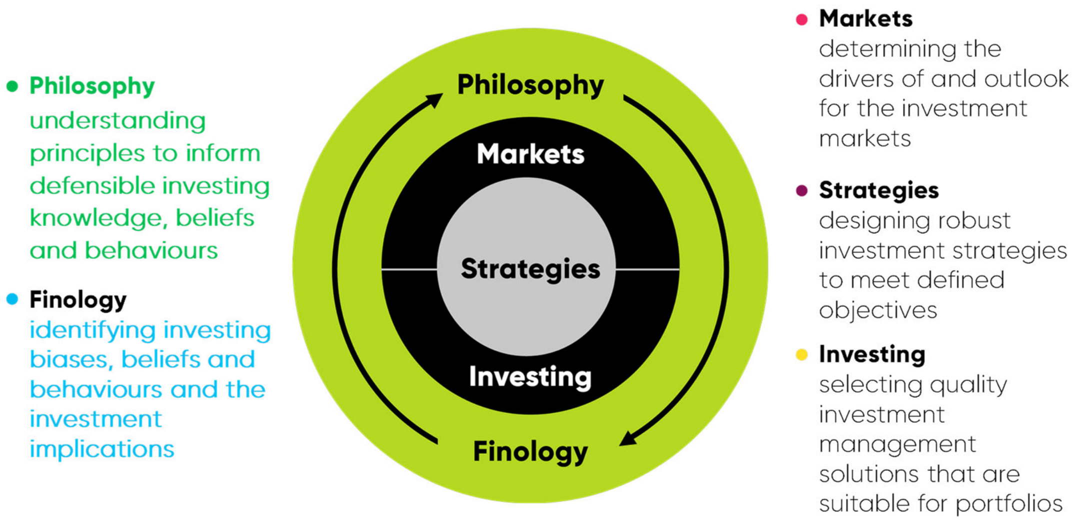
In Portfolio Construction Forum's curriculum, the finology domain is focused on the human factors of investing and wealth management. Finology is interrelated with four other knowledge domains – namely philosophy, strategies, markets, and investing – which collectively represent a comprehensive, "whole brain" perspective.

The strategies, markets, and investing domains emphasise more technical and analytical investing competencies. They focus on approaches for constructing portfolios (strategies), understanding the drivers of markets (markets), and evaluating investments (investing).

Encircling these three core analytical domains are finology and philosophy, which tend to be more qualitative and related to human factors. Philosophy is focused on identifying and curating the beliefs underlying portfolio construction. Finology is focused more broadly on understanding and recognising biases, beliefs, and behaviours present in individuals (including oneself), and among investors in aggregate in the context of financial markets, and using that knowledge to improve investment outcomes and client relationships.

The Forum's 5 Knowledge Domains represent a whole-brain holistic perspective of portfolio construction that encompasses the complete ecosystem for quality portfolio construction. The 5 Knowledge Domains are inextricably interrelated. Together, the 5 Knowledge Domains form the pillars for building better quality investor portfolios.

Figure 1: Portfolio Construction Forum's 5 Knowledge Domains



The aim and scope of this Backgrounder

The purpose of this Backgrounder is to curate and organise the basic ideas and findings that are central to the finology domain. For practitioners who are new to finology or curious to explore the scope of the domain more fully, this Backgrounder can serve as an introduction or "crash course."

It is important to note that Portfolio Construction Forum does not intend to take a strong stance on any academic debates within the research or to develop original findings. Rather, the aim is to present a balanced and evolving perspective of the most promising findings and ideas related to finology and to encourage discussion and exploration of the practical applications in wealth management.

2. DEFINING FINOLOGY

Behavioural FINance and Investor PsychOLOGY

The finology domain is interdisciplinary, drawing from several fields of study, with the goal of helping practitioners become more informed about the full set of human factors in wealth management, both at the micro-level (e.g., individual investors, including our clients and ourselves) and the macro-level (e.g., markets).

A central pillar of the finology domain is behavioural finance, which over recent years has famously explored and popularised such ideas as behavioural biases, heuristics, irrational behaviour, and anomalies. However, Portfolio Construction Forum believes that behavioural finance is a necessary, but not sufficient, basis for understanding human factors in investing and for giving and receiving quality investment advice; a rich understanding of individual investor psychology is also required. Finology represents this union of behavioural finance and investor psychology at its core, while also drawing insights from the broader social sciences, including economics, sociology, and consumer psychology. Finology aims to develop a complete picture of investors as individuals and as market participants and co-creators. Finology is where "investing meets investors™".

The Forum strongly believes that that the finology domain is fundamental to best practice in the giving of investment advice. However, initial and ongoing practitioner education typically focuses on developing technical skills (e.g., in the fields of investment, tax, social security and superannuation). Little time is spent focused on the client engagement and interpersonal skills needed to ensure best practice decision making – skills such as how to best help clients to consider holding higher risk/return assets or increase their contributions to achieve agreed objectives, or to help them to change their objectives or extend their time horizon (or a mix of all of these). Finology continuing education focuses on developing knowledge and skills in this knowledge domain.

A commitment to developing finology knowledge and skill delivers benefits across several fronts.

For the Adviser

- Understanding your client (Know the Client) is the foundation of professional financial advice – and you can't understand your client unless you first understand your own biases and beliefs
- Regulatory compliance and CE/CPD accreditation

For the Practice

- Better adviser satisfaction, resilience and retention
- Improving client understanding leads to better client satisfaction and retention, more client referrals (more profitable)

For the Client

- Stronger alignment of advice with client's beliefs, biases and behaviours leads to better quality portfolios and advice
- Stronger trust in advice given leads to better financial decisions

Many of the research findings in the finology domain contrast with the ideas and frameworks of conventional finance, such as expected utility theory and modern portfolio theory, that are based on a highly simplified view of human psychology that assumes "economic rationality." An important objective of finology study is to explore the nature of conventional rationality and the well-documented limitations and risks of relying too heavily on such conventions. Additionally, finology aggregates insights from several fields in pursuit of more complete, psychologically realistic, frameworks for understanding human factors in wealth management that can be applied by forward-thinking practitioners with a holistic perspective of the relationship between investing and individual investors.

The following section offers a brief summary of the different streams of research that have come to comprise the Forum's core finology body of knowledge.

A note on historical context

Throughout history, scholars and investors have recognised the complexity and importance of individual behaviour in influencing market outcomes. Themes such as psychology, morality, and crowd behaviour were explored in the context of investing in the 19th century and earlier (Ackert, 2014). In recent decades, research into the "human factors" of investing has proliferated, and several frameworks and diverging schools of thought have emerged in the effort to more precisely identify how psychology and behaviour influences markets.

The portmanteau word "finology" – part behavioural finance and part psychology – can be directly attributed to Richard Wagner, JD, CFP (1949-2017), a past president of the global Institute of Certified Financial Planners. Dick Wagner lived in Denver, Colorado, USA, and has become increasingly recognised as a pioneer in the concept of formalising and recognising the blending of human factors with technical factors, in the giving of investment advice.

Wagner defined "finology" as the study of our personal relationships with reciprocity, money and what money means in our lives – or "the umbrella term for the various aspects of our personal relationships with money" (R. Wagner, Financial Planning 3.0, p.15). Wagner went further to state:

> "Finology is:
> The study of people exchanging value.
> The study of money and people exchanging value.
> The study of the relationships between people and money.
> The study of money and the forces it generates.
> The study of minds, brains, customs and behaviors with respect to money and money forces.
> The theories or systems of "Finology."
> Finology was created to address the profound and personal nature of money's role [in] our modern lives. Finology opens [a] new frontier for exploring and understanding our relationships with money, bolstering our capacity to cultivate health in these relationships and to use money to help navigate life with grace."
>
> \- Richard Wagner

Regular member of the Portfolio Construction Forum faculty, US-based author, speaker and analyst, Michael Kitces, has regularly presented to Forum members on different aspects of finology over the years. Michael also knew Wagner and wrote an appraisal of Wagner's views which can be found at:

> https://portfolioconstructionforum.edu.au/article/2649/finology-and-finding-the-higher-purpose

The Forum has taken Wagner's initial work and concepts, and developed a framework for thinking about finology that more extensively, systematically and academically connects behavioural finance and investor psychology.

Although a robust history of all aspects of the finology discipline is outside the scope of this Backgrounder, it provides a brief review of key themes essential for an understanding of finology. The intention of this review is to highlight important concepts and clarify limitations and applications for practitioners by putting them into a structured framework. The Forum's finology framework in turn provides the basis for further personal investigation and learning.

2.1 Conventional finance and rational agents

In colloquial summary, "conventional finance" is about what rational investors *should* do.

> "All precise theories are wrong, so all good precise theories are wrong. Indeed, a core goal of precision in new theories is to help see their limits that can guide us in further improvements."
>
> \- Matthew Rabin, 2013

Conventional finance frameworks share several underlying assumptions about individual human behaviour, generally summarised by the notion of the "rational agent." In commonplace usage, the term "rational" refers to a person whose beliefs reasonably reflect the information available to them, whose goals and values seem reasonable in their particular environment, and whose actions seem reasonably effective for realising their goals and values. In the sense used in conventional finance, the term "rational" is used to describe a simplified, hypothetical decision-maker (e.g., the "rational agent" or "rational economic person") and simplified decision situations (Hansson, 2005).

Typical rational agent assumptions include the following:

- Rational agents want to maximise their utility (e.g., wealth) within their constraints; a rational person would never "leave money on the table";
- Rational agents always know what they want, now and in the future (i.e., they have a complete and consistent set of preferences);
- Rational agents are risk averse (that is, an individual requires greater rewards in exchange for taking on more risk);
- Rational agents quickly assimilate all newly available information; a rational person would never hold beliefs that are contradicted by available information; and,
- Rational agents are able to judge the probabilities for different outcomes; a rational person would never misperceive probabilities.

All of these assumptions have been questioned or challenged by researchers as psychologically unrealistic and potentially misleading to those who do not understand their limitations (Maki, 2000).

2.2 Behavioural finance and irrationality

> "I often cringe when my work with Amos is credited with demonstrating that human choices are irrational. In fact, our research only showed that humans are not well described by the rational agent model."
>
> \- Daniel Kahneman, 2011

> "Anomalies exist as 'anomalies' only by reference to a model that was constructed without regard to its descriptive validity, and which has no compelling normative basis."
>
> \- Frederick et al., 2002

Thousands of studies have been performed, performed often by psychologists, to identify behavioural deviations from rational agent assumptions. These studies have yielded numerous insights, including:

- rather than seeking to maximise utility, decision-makers often seek to satisfice (e.g., by selecting the first available option that exceeds a minimum utility threshold)
- conventional notions of utility may not adequately account for many decision variables that are relevant to "reasonable" humans (e.g., sequencing of consumption experiences, expressing personal or cultural values, avoiding regret)
- decision-makers may display inconsistent preferences based on subtle differences in situation features, such as how a decision is framed or the order in which options appear
- decision-makers have important cognitive constraints (e.g., limitations in processing capacity) and have different levels of knowledge and sophistication at their disposal
- decision-makers are often slow to assimilate information and may form distorted beliefs (e.g., a person may unknowingly or knowingly ignore or underweight information that conflicts with current beliefs) (Nickerson, 1998)

Researchers have often used the term "irrational" to refer to instances when observed behaviours deviate from the expectations for a rational agent. Over time, this specialised usage of the term irrational became conflated with the more commonplace notion of irrational, which is more associated with unreasonableness and foolishness. Today, the term irrational is in widespread use and tends to be associated with both meanings (Erhard & Jensen, 2015).

Many researchers argue that although people frequently deviate from rational agent assumptions, only some of these deviations can justifiably be called flaws or errors. Many deviations may be due to oversimplifications in the assumptions of rational agents; normal people may consider a broader and more complex set of decision criteria and constraints than those reflected in rational agent assumptions.

A key focus in finology study is distinguishing true errors and flaws in judgement and decision-making from more psychologically complex, real world decision situations faced by normal people (Statman, 2019; Gigerenzer, 1999).

2.3 Behavioural Finance

In colloquial summary, “behavioural finance” is about what normal investors *actually* do.

In giving investment advice, it is critically important that advisers understand how investment markets work in theory and in practice - and why there is a difference between “rational investors” and “normal investors”, resulting from an individual’s and a group’s biases.

Finology therefore encompasses behavioural finance in the following way:

- the process of price formation in investment markets – conventional finance theory (“the rational investor);
- the concepts and impacts of biases, beliefs and behaviours – that is, distortion of rational prices resulting from economic decisions of individuals and groups expressing (consciously and unconsciously), values, ethical, cultural, cognitive, and emotional biases. (“the normal investor”);
- the consequences for market prices, returns, and resource allocation; and,
- the investment implications and exploitable investment opportunities.

2.4 Modern finance and psychological realism

“Intelligent decision making entails knowing what tool to use for what problem.”

- Gerd Gigerenzer, 2014

“My favourite fallacy is the fallacy. It’s the fallacy of thinking that something is a fallacy when it isn’t.

- Brian Hedden, 2019

In contrast to using the theoretical “rational agent” as the starting point for evaluating behaviour, many researchers and practitioners focus more explicitly on understanding the psychology of “normal people.” Many “irrational” behaviours may seem more normal and well-adjusted when viewed within their appropriate “ecological” context. Some researchers use the term “ecological rationality” to describe this viewpoint. (Gigerenzer & Todd, 1999; Heyes, 2012; Statman, 2019).

Decision-making by “normal people” in realistic situations can be defined by such assumptions as:

- Normal people have normal wants that guide their decisions; normal wants include the desire for functional or utilitarian benefits (e.g., improvements to health, wealth) as well as emotional, social, and expressive benefits;
- Normal people vary in their knowledge, skills, and sophistication across domains (e.g., math, finance, self-regulation) and make reasonable errors based on their strengths and weaknesses;

- Normal people differ in their values, ethics, and cultural background;
- Normal people naturally use cognitive and emotional shortcuts because they are fast, efficient, and lead to good judgments and decisions in many, but not all, contexts; and,
- Normal people differ in their personalities and personal identities, both in terms of who they believe they are and who they wish to become.

2.5 Investor Psychology

In colloquial summary, psychology is about why people behave as they do.

In colloquial summary, "investor psychology" is about what normal investors *could* do, with appropriate behaviour change.

In giving investment advice, in addition to having specifically relevant behavioural finance knowledge, it is also critical that advisers practically and literally identify and understand their own and their clients' biases, beliefs and behaviours when it comes to investing, to help clients understand their biases, beliefs and behaviours and the investment implications – and to identify where and how behaviour change is needed in order to achieve goals.

Finology therefore applies behavioural finance models and investor psychology approaches to help explain "the real person" including:

- theories of individual behaviour change;
- your specific investing behaviours, by identifying the underlying factors that influence them;
- ways to identify investing biases and beliefs at an individual level, and:
- ways to help clients approach and implement behaviour change.

2.6 Finology Framework

> "Study the science of art. Study the art of science. Develop your senses – learn how to see. Realise that everything connects to everything else."
>
> \- Leonardo Da Vinci

As already noted, Portfolio Construction Forum believes that behavioural finance is a necessary, but not sufficient, basis for understanding human factors in investing and for giving and receiving quality investment advice - a rich understanding of individual investor psychology is also required.

Finology seeks to draw together the breadth of research that can inform our understanding of the human factors in investing and how individuals make investment decisions.

Outlined below is Portfolio Construction Forum's Finology Framework. It aims to acknowledge the potential value of conventional finance in providing a reference point based on "rational agent" assumptions. It also seeks to acknowledge the growing contributions of behavioural finance, investor psychology, and related fields, as they continue to develop and integrate diverse research programs aimed at improving our understanding of human factors and increasing the psychological realism of finance frameworks.

The main interrelated threads of human factors research are reflected in horizontal rows, with a particular emphasis on the centre row - Biases, Beliefs, and Behaviours. Section 3 of this Backgrounder goes into more detail about biases, beliefs, and behaviours.

The main applications of finology are outlined as vertical column headings, namely "Know the markets," "Know yourself", and "Know your clients." Section 4 of this Backgrounder goes into more detail about these applications of finology.

Figure 2: Portfolio Construction Forum's finology framework

	Know the markets	Know yourself	Know your clients
Principles	Conventional Finance ("the rational person")		
Realities - Biases - Beliefs - Behaviours	Behavioural finance Investor psychology		
Principles	Psychology ("the real person")		

Figure 3: Principles and realities

- **Conventional Finance** — Knowledge
  - what rational investors "should" do

Realities
- Biases
- Beliefs
- Behaviours

- **Behavioural Finance** — Knowledge
  - what normal investors "actually" do
- **Investor Psychology** — Knowledge & Skills
  - what normal investors "could" do (with behaviour change)

- **Psychology** — Knowledge
  - why real people behave like they do

It should be noted that the Forum's Finology Framework is just that - a framework. It is not without weaknesses if dissected to death.

With that caveat, use the Finology Framework as a working tool to establish and remember your conclusions, as you work through this Backgrounder.

3. FINOLOGY CONCEPTS – BIASES, BELIEFS & BEHAVIOURS

This section discusses human factors and realities in three broad categories - biases, beliefs, and behaviours. Although we find it useful to distinguish biases, beliefs, and behaviours as separate concepts, in reality, many - if not all - of these factors occur simultaneously and influence one another.

We highlight how each human factor can influence the main categories of investor decisions and outcomes:

- Saving, consumption, and distribution - planning future consumption or distribution, setting financial goals and timelines, and making planned and unplanned decisions about how to allocate resources outside the portfolio;
- Portfolio construction and management - decisions associated with portfolio strategy and management, analysis of investment markets and opportunities, and making asset allocation and security selection decisions; and,
- Trading - decisions associated with moving money from one investment option to another and the timing of those choices (Clark et al., 2019).

This section concludes with a discussion of investors from the perspective of personality and identity development across the lifespan.

3.1 Biases

Systematic patterns of departure from "rationality" (as depicted in conventional finance theory's "rational person") due to the influence of the Big 5 Bias Types – that is, our Values, Ethical, Cultural, Cognitive and Emotional biases.

We further define biases as tendencies in decision-making and behaviour that deviate from the typical assumptions of economic rationality in conventional finance. This definition intentionally adopts a broad view of biases. Rather than necessarily indicating an error or distortion, we view biases as also reflecting differences in how individuals view and make decisions depending on their values, ethics, culture, cognition, and emotions. For the sake of providing a memorable framework, we describe these five bias groupings as "The Big 5 Bias Types".

There are (at least) two points of disagreement in how researchers and practitioners think about the concept of biases that are worth clarifying upfront.

Universal Biases versus Individual Biases

There are often competing claims among researchers and practitioners about whether biases are universal (i.e., systematic and present in all humans) or whether they tend to reflect individual variation (i.e., present or strong in some humans and absent or weak in others). We do not take a strong stance on this issue, although many biases are likely better described as reflecting individual differences – particularly those that can be modified or eliminated by education and training.

Errors and behavioural risks versus individual preferences

Some tendencies may be described as errors or behavioural risks (e.g., making an emotionally reactive decision, misperceiving a tail risk) whereas other biases could easily be described as a personal preference (e.g., a preference for taking on more or less risk).

Often the two are intermingled and it's difficult to know whether someone is acting from a "bias" or simply a preference. We do not take a strong stance on how such complex relationships can or should be untangled, but it is worth keeping in mind that this overlap exists.

The Big 5 Bias Types

3.1.1 Values biases

Personal judgements of purpose and what is important in life, as influenced by personal ethics.

> "When we think of our values, we think of what is important to us in life. Each of us holds numerous values (e.g., achievement, security, benevolence) with varying degrees of importance. A particular value may be very important to one person but unimportant to another."
>
> \- Shalom Schwartz, 2012

> "We want more from our investments than the utilitarian benefits of wealth. We want the expressive and emotional benefits of hope for riches and freedom from the fear of poverty, nurturing our children and families, being true to our values, gaining high social status, playing games and winning, and more."
>
> \- Meir Statman, 2017

The term "values" has been used to refer generally to one's interests, pleasures, likes, preferences, duties, moral obligations, desires, wants, goals, needs, and numerous other concepts (Rokeach, 1979). Portfolio Construction Forum uses the term "values" to refer to one's personal judgements and feelings about what is important, meaningful, and motivating in life.

Several researchers have set out to define what values are and how values compare across human cultures. Summarised below are some of the key features[1] (Schwartz, 2006; Schwartz, 2012; Hanel et al., 2018a; Warren, 2011):

- Values are beliefs infused with emotion;
- Values are a motivational construct – they refer to desirable goals people strive to attain;
- Values are abstract and can apply to many different actions and situations (as opposed to an attitude, which usually refers to something specific);
- Values serve as standards or criteria and guide selection and evaluation (e.g., of actions, people, events);

[1] See Section 5 for a list of values based on the work of Schwartz.

- Values often enter awareness only when there is a conflict or trade-off (e.g., the actions one is considering have conflicting implications for different values); and,
- Values are ordered by importance relative to one another and form a hierarchical values system.

The relative importance of multiple values guides action (e.g., a behaviour may have implications for more than one value so the trade-off among relevant, competing values influences what behaviour is chosen). Research suggests that differences among individuals may emerge not so much from the presence or absence of particular values but from the prioritisation of values (Rokeach, 1973). Additionally, individuals may differ in their interpretation of values. For instance, two people who view the value of "achievement" as highly important may have different ideas about what behaviours they see as "acting out" or instantiating that value (Hanel et al., 2018b).

Values can bias and shape how people interpret the meaning of situations, events, or objects (including other people or organisations). In other words, values can create a tendency to "see things in a certain way," and people with different values would likely "see" identical situations in different ways (Kesberg & Keller, 2018).

Values can bias investors

Investors differ in their personal hierarchies of values and therefore will differ in their ideas about the meaning of financial wealth, how highly they prioritise financial wealth in their lives, and how they make trade-offs between competing uses of financial wealth.

Investors may differ in how thoughtfully they attempt to align their personal and financial goals with their values. For instance, an investor may set ambitious financial goals with the intention of buying high-priced consumption goods, such as luxury cars and travel, without having thoroughly considered what other uses of their time and wealth might have been more fulfilling and aligned with their personal values.

In terms of portfolio construction, although investors will generally value portfolio efficiency by default (in line with the assumptions of economic rationality), some investors will apply different personal values as criteria in selecting investments. A common example of this behaviour is in tailoring portfolio composition based on ESG (Environmental, Social, and Governance) or SRI (Socially Responsible Investing) criteria, which in many cases is more expensive.

In terms of trading behaviour, investors may trade more or less in their accounts based on what values they construe as relevant. For instance, active trading may be associated with values such as achievement or adventure; low trading activity may be associated with a value for simplicity.

3.1.2 Ethical biases

Moral principles of right and wrong that influence a person's beliefs and govern a person's behaviour

> "Markets do corrupt a set of morals present in non-commercial societies. But markets replace those morals with a different set of morals. So, it is not that markets crowd out virtues, leaving a vacuum, but that markets substitute a set of virtues with

another set of different virtues. In this sense, markets both corrupt our morals and help us become moral."

- Maria Pia Paganelli, 2020

"Because of the far-reaching implications of moral failures, people are highly motivated to protect their self-views of being a moral person…the strong desire to think of oneself as a moral person not only enhances people's efforts to display moral behaviour…it can also prompt individuals to engage in symbolic acts to distance themselves from moral transgressions or even makes them relax their behavioural standards once they have demonstrated their moral intentions."

- Naomi Ellemers et al., 2019

"…there is one and only one social responsibility of business - to use its resources and engage in activities designed to increase its profits so long as it stays within the rules of the game, which is to say, engages in open and free competition without deception or fraud."

- Milton Friedman, 1962

The terms "ethics" and "morals" are often used interchangeably[2]. In general, these terms refer to beliefs, standards, and principles about right and wrong conduct and what is considered to be good and bad behaviour (Erhard et al., 2009).

Ethical bias refers to how an individual's ethical judgments influence their decisions and behaviour (Guglielmo, 2015). An ethical bias might encourage behaviours that have no obvious, direct utilitarian value (i.e., not self-interested or utility maximising). A commonly cited example of this is when a person who, acting from a bias for fairness, shares equitably with others or punishes ethical violations such as selfishness (to the detriment of their direct personal utility). A more abstract example, common in modern society, is when a person displays "symbolic" ethical behaviour that taps into moral ideas such as serving "the greater good" (Ellemers et al., 2019). Some researchers suggest that this is part of the appeal of such behaviours as ESG/SRI investing and philanthropy.

The concept of "social preferences"[3] from conventional finance is closely related to ethical bias. Social preferences refers to one's concern for allocating benefits to others versus concern for one's own benefits. Research in this area focuses on the measurement of pro-social preferences, such as altruism, reciprocity, and inequality aversion, which are often viewed as "missing" from the conventional model of perfectly self-interested rational agents (Carpenter, 2010). Further research has shown that social preferences are also influenced by the phenomenon of "groupyness," in which individuals may show more concern and pro-social preferences for fellow "in group" members and less concern for "out group" members, as will be discussed in the next section on Culture (Kranton & Sanders, 2017).

[2] The concepts of values and ethics also overlap considerably.

[3] See Section 5 for more information about the concept of preferences, including social preferences.

Ethics can bias investors

Investors differ in their ethical beliefs and principles and how they judge the ethical significance of different behaviours. Such differences affect investors' conclusions about the "right" way to use and distribute wealth, the rules they apply in their investment portfolio, their judgment of and trust in different stakeholders in the investment industry, and their financial behaviour.

Ethical biases influence how an investor intends to use financial wealth, including decisions related to philanthropy and charitable giving, personal consumption, and bequests. The idea that a person who accumulates significant wealth in their lifetime is responsible for "giving back" to society represents an ethical notion that investors may or may not be influenced by.

In terms of portfolio construction, an investor's ethical biases may be considered (similar to personal values, as mentioned in the previous section) when tailoring portfolios, as can be seen in ESG and SRI investing.

Investors differ in terms of their awareness and standards when personally confronting ethical decision-making scenarios. For instance, some investors may exercise persistent caution regarding the conflicts of interest prevalent in the investment industry and financial media, while other investors may not be aware that such conflicts exist. Additionally, research shows that investors vary in their ethical judgements when presented with scenarios depicting ethically questionable conduct such as insider trading and tax evasion. (Shah, 2014)

3.1.3 Cultural biases

Social behaviour and norms… knowledge, beliefs, arts, laws, customs, habits of individuals in groups

> "We have never even begun to understand a people until we have found something that we do not understand. So long as we find the character easy to read, we are reading into it our own character."
>
> \- G K Chesterton, 1922

> "…consumers enjoy membership of a plethora of fragmented groups in which identity is constructed and discarded at will…these groups construct multiple trajectories of identity held together by temporary experiences…"
>
> \- Christina Goulding et al., 2013

Culture represents the "collective programming of the mind that distinguishes one human group from another." Viewed through a group-level lens, culture can be thought of as the patterned ways of thinking, feeling, and behaving among group members as influenced by "traditional (i.e., historically derived and selected) ideas and their attached values." (Kroeber & Kluckhohn, 1952; Hofstede, 2011)

Several decades of research has explored the dimensions in which overall group programming tends to differ among cultures and which gives rise to the sense of "cultural distance" between members of these groups. One dimension of cultural difference (and distance) is "individualism versus collectivism," which refers to the observation that certain cultures emphasise individuals and "loose" social ties, while others emphasise tightly integrated relationships and group well-being (Hofestede, 2011).

Culture-induced biases can include obvious external behaviours (e.g., acting out a custom, adhering to a behavioural norm) as well as more psychological differences in beliefs, values, and ethics. In addition, there is growing research to suggest that culture may shape development of more basic cognitive functions, such as visual perception, and give rise to significant variation in what psychologists tend to view as universal among humans (Winerman, 2006).

Strong cultural biases can also emerge based on membership in and identification with smaller social groups. An individual's decisions and behaviour may be influenced by what groups they most identify with (i.e., their "in group") and the norms of affirming and expressing "in group" membership. (Kranton & Sanders, 2017; Chen & Li, 2009).

Cultural bias is layered and subjective

Modern researchers of culture emphasise that individuals can belong to and be exposed to various groups and levels of culture simultaneously and across time. In this context, individuals subjectively interpret and act out their own sense of group and cultural identity in different situations (Triandis, 1972; Luna & Gupta, 2001).

To illustrate the complexity, consider that two individuals who live within the same country may experience their "national culture" differently based on what region they live in, what political opinions their parents have, and their divergent life experiences and choices. Add to this the possibility that each individual identifies more strongly with certain supranational or "borderless" cultural groups (e.g., a linguistic group, a religion, an academic discipline) and that they each belong to different social groups and subcultures (e.g., organisations, interest groups) and may also interact with cultures other than their own (e.g., via media, international friendships). Several layers of culture and group psychology will bias each individual's sense of social identity and their appraisal of the situations they face and the decisions they make (Claval, 2001; Karahanna & Evaristo, 2005).

Culture can bias investors

The influence of culture can shape an investor's perceptions of financial wealth and its appropriate uses. For instance, an investor may inherit attitudes and beliefs[4] about money (e.g., money is evil, money is a sign of respect, money is power) and its appropriate uses (e.g., self-indulgence, giving back, keeping within the family) from culture.

In terms of portfolio construction, culture affects investors in multiple ways. Cross-cultural studies show that investors from a similar culture may develop similar beliefs about the trustworthiness of financial markets and institutions and similar attitudes toward risk-taking. Culture is also considered a key contributor to the "equity home bias," which reflects investors' tendencies to prefer investments from their home country (although several exceptions to this effect exist); research suggests the equity home

[4] See Section 5 for more information about the concept of preferences, including social preferences.

bias likely overlaps with the more general cognitive bias of familiarity (i.e., the tendency to prefer what seems familiar) (Karolyi, 2016).

Research suggests that there may be a relationship between cultural differences in conformity and the propensity for engaging in certain group behaviours, including herding in financial markets. Herding is a situation in which people choose to trade in a security because they have observed others trading in it (Lobão & Maio, 2019).

Group identity may affect investment choices in instances where the investor is considering the emotional or expressive benefits (or consequences) that are associated with different investment options. For instance, investors may select asset classes (e.g., cryptocurrency) or securities (e.g., a former employer's stock, an iconic brand's stock) for which they have personal attachment and possibly "in group" associations while avoiding asset classes or securities which have "out group" associations.

3.1.4 Cognitive biases

Mental processes of perception, memory, judgment and reasoning

> "What we see changes what we know. What we know changes what we see."
>
> \- Jean Piaget, 1926

> "This is the essence of intuitive heuristics: when faced with a difficult question, we often answer an easier one instead, usually without noticing the substitution."
>
> \- Daniel Kahneman, 2011

Cognition can be described as consisting of content (e.g., memories, concepts) and processes, such as those related to attention, memory formation, language, pattern recognition, reasoning, and problem-solving.

A common framework for thinking about cognition divides it into two interrelated systems, which are often called System 1 and System 2.[5] System 1 is more automatic, intuitive, unconscious, and linked with emotion while System 2 is more deliberative, effortful, flexible, and analytical (Stanovich & West, 2000; Kahneman, 2011). Numerous tendencies, shortcuts, heuristics, and biases[6] in cognition have been researched and documented across the past several decades. In many cases, cognitive biases appear to be associated with a reliance on the faster and more intuition-based System 1 or a deficit in the influence of System 2.

System 1 confers many important advantages to normal people in many real-world decision situations. In this sense, such features of cognition are "ecologically rational". That said, in other situations (such as investing), normal human cognition can and does lead to judgement errors (i.e., judgements that are objectively incorrect, systematically and predictably skewed, or which otherwise result in counter-to-self-interest outcomes). To the extent cognitive errors are likely to affect investor behaviour, we refer to them as behavioural risks.

[5] See Section 5 for more detail about the distinction between System 1 and System 2.

[6] See Section 5 for more information about the cognitive biases considered most relevant for investor behaviour.

There are steps individuals can take to mitigate their risk of certain cognitive errors. Creating decision-support strategies (e.g., choice architecture, decision rules), developing higher-order cognitive skills (e.g., reflective awareness), and making decisions collaboratively have all been shown to help in detecting and minimising cognitive errors by taking advantage of cognitive strengths (Lebiere & Anderson, 2011).

It is important to note that research into cognitive biases continues to evolve, and not all researchers agree on how to interpret experimental research findings (Fox, 2014; Kahneman & Tversky, 1996). The validity of some biases appears to be in question, due to concerns that underlying research methods were flawed or that the interpretation of the observed bias was incomplete. In other cases, researchers question the universality of biases and suggest that significant individual variation exists, both due to cultural differences as well as individual differences based on personal experiences, education, and personality.

Cognitive biases can influence investors

There are several features of human cognition which shape and bias investor judgment.

Among the most well-documented cognitive biases[7] is mental accounting, which involves the underlying psychological processes of categorisation and the formation of mental schemas and scripts. Investors tend to form many mental accounts for their income, current assets, and future income, and treat money differently depending on which account it belongs to (Thaler, 1999).

Cognition plays a significant role in time preferences[8] which refers to an investor's preferences for smaller, near-term rewards versus larger, delayed rewards. For instance, more sophisticated investors would likely be able to envision their "future selves" more vividly and engage in more deliberate goal setting and goal-directed behaviour; less sophisticated investors tend to display higher "present bias" (akin to "immediate gratification") and have difficulty with setting and working toward goals (Frederick et al., 2002).

Several cognitive biases (e.g., availability, representativeness, anchoring and adjustment, confirmation) can influence investors as they research and evaluate investment opportunities, estimate scenarios and probabilities, and select or trade securities. Overall, investors who rely more on their intuitive System 1 are likely to make judgments and decisions based more on what seems or feels right. Investors who rely more on System 2 are likely to adopt a more deliberate and analytical approach but may still fall prey to such biases as confirmation or overconfidence in their beliefs.

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[7] See Section 5 for more information about the cognitive biases considered most relevant for investor behaviour.

[8] See Section 5 for more information about the content of preferences, including time preferences.

3.1.5 Emotional biases

Strong feelings deriving from circumstances, mood and/or relationships in response to events

> "Human beings have a demonstrated talent for self-deception when their emotions are stirred."
>
> - Carl Sagan, 1980

> "For better or worse, intelligence can come to nothing when the emotions hold sway."
>
> - Daniel Goleman, 1995

Emotion is often used interchangeably with the terms "mood" and "affect." Although there are not necessarily clear lines between these terms, some researchers distinguish them in the following way (Statman, 2019; Ekkekakis, 2012; Bolte et al. 2003):

- Core affect is a simple, primitive feeling state that is continuously present but which fluctuates in intensity and tone over time. Examples include pleasure and displeasure, tension and relaxation, energy and tiredness.
- Emotions can be thought of as "episodes" that are intense but short in duration. Examples include fear, anger, sadness, and happiness.
- Moods are generally less intense, less specific, and longer in duration than an emotion. Moods are often described in general positive terms (e.g., a good mood, a happy mood, an optimistic mood) or negative terms (e.g., a bad mood, a depressed mood, a pessimistic mood).

The impact of an individual's emotions can be brief and intense. Most people can think of a time when they have acted based on a surge of fear, greed, or anger. In such cases, the emotion functions as a kind of decision-making shortcut or otherwise skews judgment and decision making for a period of time.

The presence and influence of emotions can also be more complex and subtle. As noted above, core affect and mood are more prolonged, less intense emotional experiences that can give rise to more subtle biases. For instance, people who are in a positive or happy mood may have an increased propensity for certain ways of thinking (e.g., more likely to think holistically or optimistically, generate creative solutions to problems, and rely on intuition); in contrast, people who are in a negative mood may be more vigilant, suspicious, and analytical (Kahneman, 2011; Bolte et al. 2003).

People also vary in their temperament, particularly in the trait known as neuroticism (sometimes called emotional stability). Someone who scores high in neuroticism tends to be more easily aroused emotionally, experience more frequent negative emotions, and be less capable of coping with stress and regulating emotions. In contrast, someone with low neuroticism (or high emotional stability) tends to be less emotionally sensitive and more capable of regulating emotions (Ormel et al., 2012).

Cognition and beliefs can play an important role in generating emotions. The act of anticipating future experiences or contemplating memories from the past can give rise to emotions in the present. For instance, evaluating one's past actions may generate regret, while contemplating future actions may generate "anticipated regret," both of which are often cited as powerful "cognitive emotions" that can bias judgment and decision-making in the present (Loewenstein & Lerner, 2003).

Emotions can bias investors

Emotions have a broad and complex influence on investors. [9] As one researcher phrased it, money can be both a source of anxiety and the perceived solution (Klontz, 2011).

Emotions can play a significant role in how investors conceive of their goals and in their ability to achieve them. For instance, consider an investor who has been experiencing a prolonged negative or positive mood. This difference in mood may fundamentally alter the perception of the future, what goals are worth pursuing, and the likelihood of achieving them. In addition, an investor's ability (or inability) to self-regulate emotions is a key factor in determining if they can remain enthusiastic about and committed to long-term goals and make the trade-offs necessary to achieve them.

In terms of portfolio decisions, emotions are well known to influence risk perceptions and attitudes. Emotions can result in extreme risk aversion as well as risk-seeking, such as in an investor who abandons caution out of a "fear of missing out." Greed, fear, hope, regret, and unfounded confidence and optimism are commonly cited examples of emotions that shape investor portfolio decisions and trading behaviour.

Competence and flexibility in self-regulation, as mentioned repeatedly in this Backgrounder, is a big factor in an investor's success. Emotional biases can be at least partially reduced or controlled by investors who are aware that such biases exist and who have developed reliable strategies and systems to identify and regulate their influence (Kobylinska & Kusev, 2019).

Formation and evolution of biases across our lifespan

Notwithstanding our intrinsic Big 5 Bias Types, the term "adult development" refers to the evolution of the individual in both the biological (e.g., aging) and psychological domains of life (Baltes et al., 2006). This framework considers the lifelong gains (and losses) in knowledge and capabilities, changes in values and preferences, and development of personality and individual identity across the lifespan. Research in adult development yields many important insights relevant for finology. Although a thorough review is outside the scope of this Backgrounder, two key themes central to finology are described below:

- Theme 1: Personality and identity factors

  People develop and evolve their personalities and identities across their lifespan. Personality[10] represents an individual's characteristic patterns of thoughts, feelings, social adjustments, and behaviours exhibited over time. The Big Five Personality Types are commonly described, and are able to be measured, as:

  1. Agreeableness - desire to avoid interpersonal conflict, pro-social, sympathy, compassion and altruism;

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[9] See Section 5 for an exploration of emotional influences and biases considered important for investor behaviour.

[10] See Section 5 for a description of the most widely-researched personality framework, the Big Five model.

2. Neuroticism - emotional instability, tenseness, moodiness, sensitivity and anxiety;
3. Conscientiousness - self-motivation, goal-oriented, orderly, persistence and control;
4. Extraversion - prefers company of others, energetic, assertive, and excitement seeking; and,
5. Openness - tolerance for unfamiliar, appetite for new experiences, creativity, imagination and insightfulness.

A related construct is identity, which involves a person's actual perception of themselves as well as their ideal perception of who they'd like to be. People often define themselves in terms of both unique individualising attributes that they believe they have or wish to have, as well as collective attributes of the "in groups" they belong to or wish to belong to. (Chen & Li, 2009; Draguns, 2009)

Whereas a conventional view of decision-making focuses on the "utilitarian" benefits individuals desire, such as wealth, in reality, people often care deeply about who they are and who they want to be, and their decisions are often influenced by a desire for expressive benefits (i.e., choices that express desirable attributes of their identity, including their membership or status in a desirable "in group"). As such, decision-making strategies would need to account for the expressive benefits people seek (Statman, 2019).

- Theme 2: Change across our lifespan

A significant portion of an individual's biases, beliefs, and behaviours will change (sometimes quite dramatically) across the lifespan. These changes are both due to experience and learning as well as biological changes. Any effort to define goals and to make difficult trade-offs between the present and future time horizons has to reflect the fact that people change and that most people have difficulty envisioning and predicting what their future selves and future lives will be like.

While current age and proximity to expected retirement age are important markers for planning purposes, these provide only limited information about how an individual might change across time and what the individual may want and need when they have reached retirement. A person seeking to make "optimal decisions" today would need to anticipate how circumstances, wants, beliefs, and biases (as well as physical and mental health and capability) may differ in future time horizons (Frederick et al., 2002). As this is extremely difficult, decision-making strategies would need to account for the factor of change (Baltes et al., 2006).

3.2 Beliefs

Something we accept as true or real; a firmly held opinion. Portfolio construction beliefs are informed by our knowledge of conventional finance theory and are influenced by our biases.

> "The confidence that individuals have in their beliefs depends mostly on the quality of the story they can tell about what they see, even if they see little."
>
> \- Daniel Kahneman, 2011

"The purpose of belief is to guide action, not to indicate truth."

- Jonathan Leicester, 2008

The term "belief" refers to claims or expectations about reality and one's certainty or confidence in their truth or correctness. Psychology researchers tend to view beliefs as more personal and practical, aiding individuals in making decisions under conditions of uncertainty, information overload, and incomplete understanding. When beliefs become distorted or otherwise dysfunctional, however, they can impede rather than support decision-making (Wyer & Albarracin, 2005; Leicester, 2008; Nickerson, 1998).

The term "knowledge," in contrast with mere "belief," tends to be associated with a more rigorous standard for forming, adopting, and updating beliefs. Knowledge is not necessarily synonymous with "truth," since there are few things which can be universally agreed-upon as true. Instead, the essential criteria for knowledge are that it is derived from good evidence and sound arguments. Knowledge, therefore, is actually defined by a set of beliefs about what valid knowledge is (Hofer & Pintrich, 2009). Scientific knowledge, for instance, is considered by many to be the gold standard because it reflects a very specific set of rigorous, agreed-upon beliefs about valid knowledge and how to attain it (e.g., it is based on empirical observation, findings are reproducible, claims are not falsifiable).

Consequently, investment portfolio construction beliefs are most appropriately grounded, in the first instance, on a thorough understanding and knowledge of relevant and accepted evidence based academic principles.

Beliefs and knowledge about investing

Investors hold diverse beliefs about the technical aspects of investing (e.g., risk, asset values, strategies, methodologies) as well as the psychology and behaviour of investors, including themselves.

For instance, each of the following questions would correspond to different sets of beliefs for different investors:

- What is risk?
- Are markets efficient?
- What drives markets?
- How will markets perform in the coming decade?
- What level of diversification is sufficient?
- What makes a skilled and successful investor?
- What gives an investor a competitive advantage?

Investors may be deficient in knowledge about the technical aspects of investing, about human psychology and behavioural aspects, or both (Statman, 2019). Deficiencies in either type of knowledge may lead investors to misjudge investing information, to rely more heavily on simple intuitions and heuristics (e.g., naive diversification, familiarity) to make decisions, and to accept opinions received from within social networks or from financial media.

Self-knowledge

Investors frequently develop mis-calibrated beliefs about their actual knowledge and skill (i.e., overconfidence) and their susceptibility to belief errors (e.g., confirmation, conservatism, base rate neglect) or other distortions or biases. An investor's sophistication therefore extends to self-knowledge – especially one's own biases, beliefs, and behaviours and their impact on investment outcomes.

Self-knowledge is one of the antidotes for the "bias blind spot," which refers to the tendency for individuals to more easily recognise biases in others, while failing to see the influence of biases in themselves. Self-knowledge is developed primarily through reflection and feedback and is aimed at maintaining calibrated beliefs about one's investing beliefs, knowledge, and skill. Many investors lack sufficient knowledge of themselves and may even unwittingly bias the feedback they receive (e.g., giving preferential attention to positive investment outcomes and ignoring negative outcomes) (Pronin et al., 2002).

Another important dimension of self-knowledge is associated with the ideas of emotional intelligence and self-regulation – loosely defined as the ability to recognise, understand, and manage emotions. An investor's ability to identify or predict their emotional reactions to different conditions or events has access to valuable self-knowledge that can support more effective decision-making and self-regulation of behaviour.

3.3. Behaviours

The ways in which we respond to a particular situation or stimulus when investing, as influenced by our knowledge, biases and beliefs.

> "Humans are wired to act; markets tend to reward inaction."
>
> - Daniel Crosby, 2018

Understanding the many factors that drive investor behaviour is an essential foundation in finology, especially when one's behaviour is potentially counter to one's self-interest. In general, behaviour is influenced by a range of interrelated variables, both internal (e.g., beliefs, biases, values, intentions, constraints) and external (e.g., situation incentives, availability of options, information about others) to the decision-maker. As discussed in section 2, in contrast to the simplified world of economically rational agents, normal people often face complex decision situations which may include a range of considerations, influences, and constraints.

Planned versus unplanned behaviour

Researchers from several fields, especially consumer psychology and health psychology, have developed models aimed at disentangling individual behaviour. One common behavioural framework categorises behaviours based on degree of intention or planning (Montano & Kasprzyk, 2008; Stern, 1962):

- Planned behaviour - behaviours based on decisions and intentions made in advance

- Unplanned behaviour – behaviours one engages in without advanced planning, including impulsive behaviours, which are associated with quick decision-making and strong urges

Investors are often encouraged to engage in planned behaviour – a combination of developing plans and then following through on those plans when relevant decision situations arise – and to avoid the risks associated with unplanned or impulsive behaviour. However, research suggests that individuals often act differently than they had planned or intended to at the behavioural "moment of truth."

The Intention-Behaviour gap

Many researchers have investigated the "intention-behaviour gap," which centers on the question: why do people often set an intention to do (or not do) something and then choose differently at the "moment of truth?" (Sheeran & Webb, 2016; Carrington et al., 2014).

The System 1 and System 2[11] framework can be helpful in developing a basic (although incomplete) understanding of why this intention-behaviour gap may occur. In short, System 1 frequently "overpowers" System 2 (along with any intentions set by System 2) in many decision situations, giving rise to unplanned and potentially impulsive behaviour. Another important idea that can be associated with the System 1 and System 2 framework is that of self-regulation. Among the most important interventions for guiding behaviour change is in helping individuals become more sophisticated about themselves (i.e., self-knowledge) and about strategies for engaging System 2 and regulating the influence of System 1 more effectively. This is a core idea underlying many forms of therapy and personal development. (Stromback et al, 2017; Adesina, 2019; Fernandes et al., 2014).

Behaviour change (Stages of change model / Transtheoretical model)

The Stages of Change or Transtheoretical Model (TTM) was introduced in the late 1970s by researchers James Prochaska and Carlo DiClemente. In this model, change occurs gradually and relapses are an inevitable part of a six-step process of change. (Prochaska & DiClemente, 1984).

[11] For descriptions of System 1 and System 2, see Section 3.1.4 and Section 5.

4. APPLICATIONS OF FINOLOGY FOR INVESTMENT ADVISERS

Finology in practice means applying the knowledge of investing biases, beliefs, and behaviours to understanding the markets, yourself, and your clients and to driving better portfolio decisions and outcomes. In this section, we discuss several relevant applications for investment advisers and the benefits that can be expected for practitioners who develop more advanced finology knowledge and skills.

4.1 Know the Markets

> "For a gifted few in the industry, biases are a source of alpha. But for many others, biases impose a cost…"
>
> - Shreenivas Kunte, 2015

Finology study can help advisers develop a more sophisticated, psychologically realistic understanding of investment markets. This improved market understanding may not only inform an adviser's philosophy and the strategic beliefs underpinning their investment advice, but also support an adviser's role as educator and mentor for individual investor clients.

Application: Informing investment philosophy and strategic beliefs underpinning advice

Portfolio Construction Forum believes that finology is an essential ingredient in the development of modern investment philosophy and strategic beliefs. Although conventional finance frameworks will likely remain in widespread use in the near-term, several researchers have developed frameworks for identifying and explaining a broader set of psychology- and behaviour-based influences in markets that capture what conventional frameworks tend to miss. Finology-proficient advisers would likely be best-positioned to seek out investment strategies and managers that capitalise on opportunities identified by more modern and psychologically realistic investment frameworks.

Application: Offering higher-quality education and coaching to clients

A client's level of sophistication about investment markets, and other players in the investing ecosystem such as analysts, financial media, corporate executives, and advertisers, can be an important factor in understanding the behavioural risk they pose to their portfolio. Lower sophistication clients may struggle to reconcile conflicting market narratives and be more likely to react to specific narratives that coincide with their biases and beliefs. Finology-proficient advisers may be best-equipped to help clients make sense of the diversity of market narratives, the mixed incentives that shape those narratives, and human tendencies to distort and overreact to market narratives based on one's own biases and beliefs.

Finology-proficient advisers can guide clients in developing richer, more sophisticated mental models of how markets work, what factors are important in building their portfolios and allocating their wealth, as well as how biases, beliefs, and behaviours can help or hinder their success.

4.2 Know Yourself

> "Of all deceivers fear most yourself!"
>
> - Soren Kierkegard, 1998

Finology-proficient advisers likely understand themselves and their development needs more clearly and take greater measures to improve their client discovery practices and how they manage relationships with a diverse client base.

Application: Managing professional development

Although advisers will vary in their interests and specialisations, all advisers have an obligation to continuously develop their professional knowledge, skills, and identity as ethical, competent practitioners. The Forum views finology as an essential ingredient in professional development for all practitioners. Finology helps practitioners more deeply understand themselves, their biases, beliefs, and behaviours, and the influence they have on their clients as trusted practitioners.

More specifically, finology overlaps with key areas of continuing professional development, including:

- Evaluating your knowledge and competencies in client care and practice;
- Enhancing your technical competence, in the sense of understanding human and behavioural factors in investing and investment markets;
- Understanding your development opportunities and goals;
- Developing your reflective capacity and self-awareness; and,
- Understanding more deeply your ethical biases and intuitions.

Application: Managing and mitigating personal bias on client relationships and portfolios

Advisers' biases, beliefs, and behaviours have a substantial influence on their clients' portfolios, some of which is intentional (e.g., a result of educating the client) and some of which is less intentional (e.g., a result of assuming a client's values). One research study estimated that adviser variables were about twice as influential as client variables in explaining differences in equity holdings of client portfolios (Foerster et al., 2017).

Finology-proficient advisers likely have greater awareness of the nature and extent of their influence on client portfolios. Adviser influences may include subtle differences in culture or beliefs (e.g., an adviser may have deep-seated notions of how people "should use their wealth" that differ from the clients' views) as well as more specific security preferences (e.g., an adviser may preferentially select or recommend a particular set of familiar securities, which in turn limits possible client portfolios).

Application: Developing or acquiring more effective tools and techniques

Finology offers advisers deeper insight into the limitations of commonly used frameworks, tools, and techniques and can shed light on important blind spots and risks. While many advisers assume that their current approach to client discovery and portfolio construction is rigorous (or at least "good enough"), such claims are hardly well-founded unless they have been tested against the growing evidence base reflected in finology. While research tends to skew toward highlighting shortcomings in conventional adviser-client relationships and portfolio construction practices, new approaches that help correct for these problems and enable more successful relationships are being actively developed and validated.

Application: Increasing satisfaction with client relationships

Finology can be a source of growing satisfaction for advisers who undertake its deliberate study. By enriching their understanding (and curiosity) of human psychology and behaviour, and by improving facilitation and relational skills, finology-proficient advisers are likely to be more effective at developing high-quality client relationships that are satisfying and, in turn, more likely to be successful.

4.3 Know Your Clients

Finology can help advisers improve their understanding of their clients and form higher-quality, more successful relationships, as described below.

4.3.1 Client discovery & relationship development

Application: Connecting with clients and building trust and rapport

Finology-proficient advisers may feel more comfortable and confident in asking substantive questions around clients' values, goals, beliefs, and emotional life as it relates to their finances. The benefits are especially helpful when working with clients of different cultures and backgrounds, where the chances of misunderstandings are higher. Finology knowledge and skills can help advisers understand a clients' context more deeply and help build rapport, trust, and connection.

Application: Understanding clients' goals and priorities

Although advisers routinely ask clients for information about their goals (e.g., time horizons, target dollar amounts, priority level), to really understand a client's goals it is helpful to understand the psychology and the emotions underneath them and why investors are setting the goals that they are. (Das et al., 2018; Pompian, 2012).

In many cases, clients have only superficially thought about their longer-term goals and how they intend to use their wealth; in other cases, a client may have numerous specific wants they hope to fulfill that haven't been truly prioritised and reconciled. In both situations, advisers who can facilitate discovery interactions that connect conversations back to the client's own values and sense of meaning and guide clients in making trade-offs among competing wants, can deepen the client relationship and develop more successful and client-centric portfolios.

Application: Communicating more effectively about risk and loss

Finology knowledge may prompt advisers to rethink their discovery process and how they talk with clients about risk and loss. The common practice of defining risk in terms of variance and attempting to evaluate a client's risk tolerance (e.g., via a questionnaire) is widely viewed as insufficient (Yook & Everett, 2003; Nevins, 2004). Finology proficiency supports advisers in using clear, relatable language that focuses on clients' concerns, values, goals, and choices while framing conversations about risk, fear, and loss in this more client-centric context.

4.3.2 Tailoring client portfolios, advice and behavioural coaching

Application: Building and tailoring portfolios based on client values, ethics, and goals

By taking client values, ethics, and goals into account, finology proficiency supports advisers in creating portfolios that deliver more than the utilitarian benefits of wealth and lead to more successful client relationships. Two practical examples include 1) adopting a goals-based approach to planning and wealth management, and 2) designing portfolios that accommodate investment preferences based on client values, ethics, and culture (e.g., ESG, SRI).

A goals-based approach can be defined as "a process that focuses on helping investors realise their goals, both short-term and long-term, through a portfolio management method primarily focused on reaching well-defined financial goals" (Das et al., 2018). As mentioned, we believe this process is greatly enhanced by finology proficiency, including helping clients more clearly define and apply their values and priorities, understand trade-offs among their goals, and manage costs and benefits across different time horizons.

Many clients expect their advisers to tailor portfolio strategy based on their values, ethics, and culture (e.g., via filtering, tilting). Finology practitioners are better equipped to move beyond "one-size-fits-most" approaches and can mitigate the risks of possible "surprise holdings" (that clients react negatively to) and develop more customised and client-aligned portfolios.

Application: Identifying "behavioural risks" to a client's portfolio and likelihood of goal success

Finology-proficient advisers are better equipped to identify the biases, beliefs, and behaviours that are likely to represent "behavioural risks" in client portfolios and affect the likelihood of clients achieving their goals. Such risks can take the form of intention-behaviour gaps (e.g., a client expresses agreement with a particular policy or plan but acts in a way that counters the policy or plan) or be more general (e.g., a client has a propensity to make emotional or impulsive decisions). Knowledge of these behavioural risks, but more importantly the ability to recognise and mitigate them, represents a key competence in finology.

Many theorists, organisations, and practitioners have developed approaches to assessing client biases, tendencies, and behavioural risks. This is an area of rapid growth and development and advisers will likely benefit from exploring high-quality, evidence-based approaches. That said, Portfolio Construction Forum does not endorse any particular tool or methodology.

Application: Developing structures and interventions that help mitigate behavioural risks

Advisers can adopt several practices that help to accommodate certain client biases and mitigate behavioural risks. For instance, research suggests that a goals-oriented approach can help reduce certain investor biases such as overconfidence, hindsight bias, overreaction, belief perseverance, and regret avoidance (Nevins, 2004). Such an approach also "re-sets" the reference point in client conversations from gains and losses to progress toward goals and likelihood of success, which can be useful for dampening emotional reactivity and engaging in more deliberate analyses of market events.

Another practice advisers can adopt is developing more explicit decision rules and policies with clients which can be referred to in times when behavioural risks are elevated. Such rules and policies are general enough to apply to many situations, but specific enough to guide choices in ways that are most aligned with client success (Yeske & Buie, 2014).

5. REVIEW OF RELEVANT TERMS AND CONCEPTS

This section provides a focused review of select terms and concepts, many of which have been mentioned elsewhere in this Backgrounder, that would be useful for practitioners to include within their continued finology studies.

5.1 Conventional finance preferences and fundamental trade-offs

In conventional finance, the concept of preference refers to the ordering or "trade-off" made between alternatives to arrive at an optimal choice. Preference trade-offs commonly encountered in an investing context include:

- Risk preferences (risk versus reward)

  Risk preference refers to the tendency to choose an action that involves higher variance in potential benefits, relative to another option with a lower variance of potential benefits.

  Concepts that relate to risk preferences include: risk tolerance; risk aversion; risk appetite; subjective risk perceptions; and, subjective risk weighting

- Time preferences (now versus later)

  Time preference refers to the valuation placed on receiving a benefit at an earlier date compared with receiving it at a later date.

  Concepts that relate to time preferences include: time discounting, delay discounting, temporal discounting, long-term orientation, self-control bias, immediate gratification, impulsivity

- Social preferences (self versus others)

  Social preferences refers to one's concern for benefits allocated to others versus concern for one's own benefits. Note that social preferences related to one's close friends and family (or "in group") may differ from their more general social preferences related to society at large.

  Concepts that relate to social preferences include: self-interest, selfishness, generosity, fairness, inequality aversion, altruism, ethical bias

5.2 Behavioural finance / applied finance frameworks

5.2.1 Prospect Theory

Prospect theory, developed by Daniel Kahneman and Amos Tversky (1979), was one of the early successes in behavioural finance which showed that human beings are not well-described by the assumptions of the "rational agent" model. In particular, prospect theory represents a direct challenge to the assumptions of expected utility theory.

Prospect theory features three key concepts:

- framing: framing refers to the tendency for people to make decisions differently in situations with identical features based solely on how the situation is presented.

- loss aversion: loss aversion refers to the tendency for people to react differently to potential losses versus potential gains (typically overweighting losses compared to equally sized gains).
- reference dependence: people make decisions based on a potential gain or losses relative to a specific reference point, rather than in absolute terms; this is referred to as reference dependence.

5.2.2 Behavioural Life Cycle Theory (BLCT)

Introduced in 1988, Behavioural Life Cycle Theory (BLCT) extends Thaler's mental accounting model and incorporates cognitive biases such as framing. BLCT argues that people tend to divide their wealth into three mental accounts:

1. Current income
2. Current assets
3. Future income

Income and assets are not typically transferable between buckets. Also, people are more likely to spend current income, rather than future income. (Shefrin & Thaler, 1988)

5.2.3 Behavioural Asset Pricing Model (BAPM)

Based on BPT, the Behavioural Asset Pricing Model (BAPM) proposes that market participants comprise two groups – rational, CAPM-like investors, and less rational "noise" investors. By accounting for the influence noise investor psychology and behaviour, the model attempts to explain occurrences that would be considered inconsistencies in a CAPM world – for example, ethical investing or the excitement generated by an initial public offering. (Shefrin & Statman, 1994)

5.2.4 Behavioural Portfolio Theory (BPT)

In an extension of BLCT, Behavioural Portfolio Theory (BPT), which emerged in the early 21st century, proposes that investors should build portfolios as pyramids of assets. Each pyramid layer is a separate mental account representing a different aspiration level.

For example, the lowest level may be a pool or fund designed to avoid poverty, while the next level may seek to provide an acceptable standard of living, and so on. The highest level may be a travel fund.

Investors hold a different attitude toward risk for each layer, with risk profiles rising in line with aspiration levels. In other words, people are more willing to risk funds designed to provide non-essential benefits. (Shefrin & Statman, 2000).

5.2.5 Behaviourally Modified Asset Allocation (BMAA)

BMAA is a deviation-based approach that considers the effects of behavioural biases on investment decisions. Consider a worst-case scenario for a client, after setting the optimal portfolio they go on to abandon it during a stressful market period. The result can be detrimental, as investor's behavioural biases cause them to sell, typically at the bottom, right before a recovery period.

BMAA begins with that optimal portfolio construction but then allows deviation from that allocation to reduce the chance of behavioural biases impacting decisions (making them sell at the worst possible time). BMAA assesses investors and determines whether to adapt to or moderate their behavioural biases. It then considers how much to deviate from the optimal portfolio to reduce biased decisions, building a portfolio the client can stick with. It includes three criteria:

- Relative level of wealth: investors with high levels of wealth compared to their lifestyle can afford to deviate away from the optimal portfolio
- Standard of living risk: is the client's standard of living at risk if their portfolio was sub-optimally allocated. High standard of living risk reduces ability to deviate from the optimal portfolio
- Biases: the primary type of biases will also impact the decision. Cognitive biases are easier to moderate, proper education can reduce the need to deviate. Emotional biases are more difficult to deal with and will typically need to be adapted to allowing a larger deviation from the optimal portfolio would help the client stay the course.

BMAA comes down to a simple issue – can the investor afford to indulge their behavioural biases or does the advisor need to work more closely with the client to moderate the biases? The idea is that allowing an investor to deviate from the optimal portfolio will reduce the chance of complete abandonment during difficult market conditions.

5.3 Psychology & Social Science terms and concepts

5.3.1 Dual-System model of cognition (System 1 and System 2)

In psychology, a "dual system" or "dual process" theory provides an account of human cognition in terms of two separate modes of thinking and reasoning. These two modes have been referred to by numerous names; the names "System 1" and "System 2" have become more common since being adopted by Daniel Kahneman in his book *Thinking, Fast and Slow* (Stanovich & West, 2000; Kahneman, 2011).

System 1 thinking	System 2 thinking
Fast	Slower
Intuitive/Instinctive	Deliberative
Automatic	Considered
Unconscious	Conscious
Emotional	Logical
Effortless	Effortful
Implicit	Explicit
Contextualised	Abstract
More Subjective (value-based)	More Objective (fact- or rule-based)
More qualitative	More quantitative
Domain-specific	Domain-general
Understanding	Comprehension
Figurative	Exact

5.3.2 List of Values (Schwartz)

Several researchers have developed frameworks for understanding human values and how they vary across cultures. The values list developed by Schwartz, detailed below, is one of the most prominent (Schwartz, 2006).

- Self-Direction - Independent thought and action; choosing, creating, exploring.
- Stimulation - Excitement, novelty, and challenge in life.
- Hedonism - Pleasure and sensuous gratification for oneself.
- Achievement - Personal success through demonstrating competence according to social standards.
- Power - Social status and prestige, control or dominance over people and resources.
- Security - Safety, harmony, and stability of society, of relationships, and of self.
- Conformity - Restraint of actions, inclinations, and impulses likely to upset or harm others and violate social expectations or norms.
- Tradition - Respect, commitment, and acceptance of the customs and ideas that traditional culture or religion provide the self.
- Benevolence - Preserving and enhancing the welfare of those with whom one is in frequent personal contact (the 'in-group').
- Universalism - Understanding, appreciation, tolerance, and protection for the welfare of all people and for nature.

For more on human values, see "Research Review: Personal values and professionalism" (https://portfolioconstructionforum.edu.au/article/2612/research-review-personal-values-and-professionalism)

5.3.3 List of cognitive biases relevant for investing

A cognitive bias is generally considered a mental habit or shortcut in the way that people process and interpret information. Cognitive biases often function as a fast and efficient aid to making judgements and solving challenges, but in some cases lead to problematic errors. Outlined below is a list of cognitive biases that are often implicated in errors made by investors:

- Anchoring & Adjustment*[12]: The tendency to "anchor" (establish as a reference point) to the first information received and incorporate new information by adjusting this reference point.
- Availability*: The tendency to base decisions on information that is readily available or easily recallable.
- Bias Blind Spot: The tendency for individuals to more easily recognise biases in others, while failing to see the influence of biases in themselves.

[12] *For descriptions of System 1 and System 2, see Section 3.1.4 and Section 5.

- Confirmation*: The tendency to search for, interpret, focus on and remember information in a way that confirms one's preconceptions.
- Conservatism (in revising beliefs)*: The tendency to update one's beliefs slowly or insufficiently as new evidence becomes available.
- Disposition Effect: The tendency of investors to sell assets that have increased in value while retaining assets that have declined in value.
- Endowment Effect: The tendency to assign a higher value to items that one owns, with the result that an individual will often demand more to give up an item than they would be willing to pay to acquire it.
- Familiarity: The tendency to prefer things that are familiar or comfortable.
- Framing*: The tendency to answer questions or make decisions differently in situations sharing the same basic facts depending on how those facts are presented.
- Herding: The tendency to follow others or to imitate behaviours exhibited by a group rather than to act independently and in accordance with one's own individual information.
- Hindsight*: The tendency to perceive events that have already occurred as having been more predictable than they actually were, before the events took place.
- Home Bias: The tendency of investors to prefer domestic stocks to international ones.
- IKEA Effect: The tendency to place a higher value on products one had a hand in creating.
- Illusion of Control: The tendency to believe that one can control or influence outcomes over which they have no influence.
- Loss Aversion*: The tendency to prefer avoiding losses to acquiring equivalent gains.
- Mental Accounting: The tendency to place different values on money depending on its intended use or source, based in a set of cognitive processes related to categorisation.
- Naive Diversification: The tendency of investors to invest in several different assets in an effort to lower the variance on the expected return of a portfolio.
- Overconfidence: The tendency to feel a confidence in one's beliefs that exceeds one's knowledge.
- Recency Effect: The tendency to remember best the information that was presented most recently.
- Regret Aversion*: The tendency to prefer avoiding losses to acquiring equivalent gains.
- Representativeness: The tendency to believe that two similar things or events are more correlated than they actually are, and to make judgements or decisions based on that belief.

- Selective Memory: The tendency to remember certain information but not other information.
- Self-Control*: The tendency related to spending/seeking gratification now versus saving/awaiting less immediate (and potentially larger) rewards.
- Status Quo: The tendency to prefer to maintain the current state of things, often by doing nothing (inertia).

It is argued that over 180 cognitive biases have been identified. The Cognitive Bias Codex, a circle diagram, categorises them into four quadrants of cognitive bias resulting from:

1. Too much information
2. Not enough meaning
3. We need to act fast
4. What should we remember?

Download the Cognitive Bias Codex at:
https://upload.wikimedia.org/wikipedia/commons/6/65/Cognitive_bias_codex_en.svg

5.3.4 List of emotions relevant for investing

Emotions have a complex influence on investors; an investor's ability to recognise and self-regulate emotions is a key factor in investing success. Outlined below are several emotions considered relevant for investors:

- Anger: A strong negative emotion arising in response to a provocation or threat.
- Disgust: A negative emotion arising from proximity to distasteful objects or ideas.
- Fear: A negative emotion arising in response to danger.
- Greed: A reflection of ambition and status-seeking heightened by fear and hope.
- Guilt: An emotion that arises when a person believes or realises that they have compromised their own moral or ethical code or universal moral standards.
- Happiness: Associated with gains and enjoyments
- Hope: A positive emotion arising in anticipation of a reward.
- Pride: An emotion that arises from deep satisfaction with or pleasure in one's achievements or the achievements of those close to them.
- Regret: An emotion that arises as a result of experiencing disappointment or loss over something one has done or something one has failed to do.
- Sadness: An emotion that arises in response to emotional pain; sadness is often associated with losses and helplessness.
- Self-control: The restraint one exercises over their emotions, impulses, desires, or instincts.

- Shame: An emotion that arises in response to the awareness of having committed a wrong action or having engaged in foolish behaviour.
- Surprise: An emotion that arises in response to an unexpected event.
- Trust: A feeling of confidence and security in someone or something.

5.3.5 List of money attitudes and beliefs

Several researchers have developed and validated frameworks for measuring money-specific attitudes and beliefs. Outlined below are the most well-known frameworks:

- Money Attitude Scale (MAS): One of the most commonly used scales of people's attitudes and relationships to money, the MAS was developed in 1982. It proposed that money attitudes comprise four factors: power-prestige; retention-time; distrust; and, anxiety (Yamauchi & Templer, 1982).
- Money Beliefs and Behaviour Scale (MBSS): The MBBS cites six factors similar to those on the MAS: obsession; power; retention; security; inadequacy; and, effort/ability (Furnham, 1984). While the MBBS is still referenced in research, several studies dispute whether it is valid.
- Money Ethic Scale (MES): Another widely used, and comparatively well-regarded gauge, the MES was developed by Tang in 1992, and identifies six major beliefs about money:
    1. Money is good
    2. Money is evil
    3. Money represents achievement
    4. Money is a sign of respect
    5. Budgeting is important
    6. Money is power
- Klontz Money Script Inventory: A further scale, the Klontz Money Script Inventory was developed with the financial planning industry in mind. It has similarities with the scales above. Money scripts are core beliefs about money, which drive financial behaviours. Klontz et al., 2011, identified four main scripts:
    1. Money avoidance – money is bad and I do not deserve money
    2. Money worship – money will solve my problems
    3. Money status – this is associated with self-worth
    4. Money vigilance – to these people, money is a source of shame and secrecy.

5.3.6 Personality traits (Big 5 Model)

The most widely recognised theory of personality is the Five Factor Theory (or Big Five), which originated in the 1960s (Tupes & Christal, 1961), but which became increasingly accepted as the standard personality model in the early 1980s. It has gradually usurped the Myers Briggs indicators (which can be tracked to the five factors), as the dominant theory of personality. Some studies propose that each personality trait consists of two aspects.

1. Agreeableness
   - Compassion – empathy; and,
   - Politeness – compliance, morality, selflessness.
2. Neuroticism/Emotional stability
   - Volatility – irritability, anger, moodiness, tension; and,
   - Withdrawal – anxiety, depression.
3. Conscientiousness
   - Industriousness – self-discipline, competence, impulse control, work ethic; and,
   - Orderliness – neatness, perfectionism, organisation, thoroughness.
4. Extraversion
   - Enthusiasm – excitability, sociability, enthusiasm, talkativeness, energy, emotional expressiveness; and,
   - Assertiveness – leadership, dominance.
5. Openness to experience/Intellect
   - Openness – artistry, reflection, seeking education; and,
   - Intellect – intelligence, ingenuity.

Research suggests that emotional stability, agreeableness and conscientiousness (the Stability factor) may be connected, and extraversion and openness (the Plasticity factor) may be linked.

5.3.7 Behaviour change

The Stages of Change or Transtheoretical Model (TTM) was introduced in the late 1970s by researchers James Prochaska and Carlo DiClemente. In this model, change occurs gradually and relapses are an inevitable part of a six-step process:

1. Pre-contemplation – denial, ignorance of the problem
2. Contemplation – ambivalence, conflicted emotions
3. Preparation – experimenting with small changes, collecting information about change
4. Action – direct action toward a goal
5. Maintenance – maintenance of the new behaviour, avoiding temptation
6. Relapse – disappointment, frustration, feelings of failure

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