ATHABASCA UNIVERSITY

# THE EFFECT OF COGNITIVE STYLE ON REINVESTING GAINS IN PERSONAL FINANCE DECISION-MAKING

BY

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A DISSERTATION

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

DOCTOR OF BUSINESS ADMINSTRATION

FACULTY OF BUSINESS

ATHABASCA, ALBERTA

APRIL 2023

**Approval of Dissertation**

The undersigned certify that they have read the dissertation entitled

**THE EFFECT OF COGNITIVE STYLE ON REINVESTING GAINS IN PERSONAL FINANCE DECISION-MAKING**

Submitted by:

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In partial fulfillment of the requirements for the degree of

**Doctor of Business Administration**

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April 14, 2023

**Abstract**

Consumer behaviour research has demonstrated that an individual's cognitive style can affect their mental accounting in consumer purchases. The goal of this dissertation is to investigate whether this effect can explain investor behaviour in portfolio formulation, specifically in relation to diversification strategies. To investigate this problem, I use a quasi-experiment to test the effect of cognitive style on the reinvestment of gains in personal finance decision making and, examines whether the effect will differ between analytic and holistic thinkers. Additionally, consumer behaviour research suggests that the effect may be moderated in utilitarian consumption when compared to hedonic instances. Since the nature of investment has rarely been studied as utilitarian or hedonic and empirical testing has not been conducted, the Hedonic and Utilitarian Dimensions of Consumer Attitude (HED/UT) scale is used to assess the hedonic and utilitarian nature of investments against six real world investments. The results of this experiment provide empirical evidence that analytic thinkers are more likely to reinvest gains from one investment into similar investments, especially in instances where the nature of the investment is utilitarian. The effect is more prominent in Caucasians and risk-averse investors. This work provides far ranging implications for theoretical insight and practical matters in decision making, customer service, and protecting consumers. These theoretical advances include empirical evidence of investor behaviour under uncertainty and a proposed platform for comparing investments to purchases in the consumer behaviour context. In practice, this information can be used in the financial services sector by individual investors and money managers to help develop training tools that support portfolio diversification. Highlighting this unconscious bias will help strengthen the average investor's portfolio by optimizing returns and reducing volatility from market risk.

*Keywords:* cognitive style, mental accounting, holistic thinking, analytic thinking, reinvestment, diversification, hedonic investment, utilitarian investment

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# Chapter 1: Introduction

## 1.1 A Diversification Problem

A diversified portfolio approach is seen as a prudent investment strategy as it can optimize returns and reduce volatility. This advice was made famous by American economist Harry Markowitz (1959) to gain expected returns while protecting against market risk (this is now referred to as Modern Portfolio Theory (MPT)). This investment principle is still useful today, exemplified in the common advice to hold stocks in unrelated sectors. This approach can reduce the correlation in the financial returns of the individual companies in the market, making it a fundamental component of a truly diversified portfolio (Mohamad et al., 2006). This also applies to holding investments across asset classes and foreign markets because it raises the return for a given risk (Siegel, 2021). Although diversification of one's sources of wealth is seen as standard economic theory (Zhang & Sussman, 2018), in reality individual investors tend do it quite poorly (Frydman & Camerer, 2016a; Read & Loewenstein, 1995). Investigating the differences between what people ought to do, as described in classic economic theory, and what they actually do in finance related decision making, is a concern of the field of behavioural finance (Baron, 2000). The literature in behavioural finance provides a variety of examples of instances where diversification is not employed as intended by the investor. Common errors include buying stock in local companies (Huberman, 2001) and fixing past mistakes (Frydman & Camerer, 2016b), among others.

Proponents of behavioural finance believe that one of the key reasons for the discrepancies between finance theory and practice is due to an individual's cognitive limitations in problem solving (or as Herbert Simon (1957) coined it "bounded rationality"). Behavioural scientists propose that individuals, to better organize financial decisions, engage in mental accounting (Thaler, 1985, 1999). However, little is known about the specific cognitive mechanisms that occur in mental accounting. It is

therefore difficult to determine why investors do not always deploy satisfactory diversification strategies (Frydman & Camerer, 2016a; Zhang & Sussman, 2018).

Recent consumer behavior literature asserts that individuals have varying evaluation tendencies when it comes to their mental accounting systems (Hossain, 2018). In this study, Hossain finds that some individuals are prone to rule-based systems making them perform a mental labeling effect, while others disinhibit rule-based thinking and perform categorization flexibility. This study highlights that an individual's cognitive style (i.e., the patterns in which people think) is a key factor in evaluation tendencies, such that analytic thinkers are less flexible in their thinking style than their holistic thinking counterparts. This suggests that in the context of choosing an investment portfolio, analytic thinkers may be more susceptible to the mental labeling effect. Specifically, when deciding what to do with gains from investments, analytic thinkers may be more likely to reinvest gains into similar investments.

The purpose of this dissertation is to explore why individuals tend to reinvest gains into similar investments, rather than diversify. If this is the case, those investors will be acting contrary to MPT, because they are not optimizing their asset allocation according to their individual risk preference, adversely affecting the benefits of diversification.[1] Borrowing from the Consumer Behaviour literature, and in particular Hossain's recent work, may help us to explain why investors make different purchase decisions than economic theory would suggest. Understanding this phenomenon will help close a gap in the literature in mental accounting, because the effect of cognitive style in reinvesting financial gains has yet to be investigated.

Now that I have highlighted the purpose of this research, I will outline the context in which it is being investigated. For my dissertation to be fully understood and assessed I need to explain the realm of behavioural finance and the theory of mental accounting to explain how individuals make day-to-day

[1] I am not directly focusing on Asset Risk in this paper, I am only considering risk as a general attitude.

decisions in personal finance. This context will help frame issues that arise in terms of how people manage their portfolios.

**1.2 Context**

Mental accounting, or the way that humans understand and organize personal financial matters in order to make decisions, is an integral part of daily life (Thaler, 1999). The literature on mental accounting demonstrates that when consumers are more deliberate with planning before spending, they benefit from better self-control in personal finance decision making through improved household budgeting techniques (Heath & Soll, 1996), cash flow management (Lusardi et al., 2011), and saving for the future (Soman & Cheema, 2011). However, these benefits have their bounds because individuals reach cognitive limitations in problem solving as calculations get more complex (Simon, 1957). The mental accounting of organizing an individual's personal finances for decision making is a complex calculation.

Understanding one's personal finances is a very complex task because it spans across many facets of daily life. According to Garman and Forgue (2011), the discipline of personal finance decision making is concerned with increasing the financial success of individuals and families, covering a vast array of topics including: financial planning, day-to-day expenses and transactions, and investments strategies. The authors contend that amongst these themes, and maybe one of the key long-term objectives of personal finance, is building wealth. For this reason, I argue that having a clearer picture of how wealth is understood, in the context of mental accounting, is of the utmost importance in personal finance.

Wealth is an individual's net-worth, or more explicitly, the value of all personal assets less liabilities (Garman & Forgue, 2011). However, due to the complex calculation required to compute it regularly, individuals heuristically simplify wealth as income or cash flow as a means of making daily or

weekly financial decisions easier; yet this approach neglects important sources of wealth such as owned assets and potential future income (Shefrin & Thaler, 1988). One explanation for why individuals over-simplify the definition or notion of wealth, is because non-cash items have less liquidity, that is, they are not able to be spent as easily as cash. Shefrin and Thaler (1988) argue that the most common mental accounts used to organize wealth are: income, which includes spendable cash types like bi-weekly pay from labour and bank deposits; current assets, which includes assets with high liquidity, that need some willpower not to spend, such as stocks/bonds, mutual funds, and educational savings accounts; future cash flows (FCF), which includes illiquid investments with severe barriers to access (i.e., financial penalties) such as registered retirement plans, pensions, life insurance policies, and inheritances.

The research in mental accounting is useful in describing initial investment decisions, however it does not adequately explain subsequent decisions, such as the reinvestment of gains in the portfolio. Clues to understanding those decisions may be found in behavioural finance, and psychology research, giving us a depiction of how an individual's cognition can affect reinvestment of gains. For example, behavioral finance theory shows that individuals use subjective groupings to simplify investment decisions and appear to re-invest funds without consideration of diversification (Zhang & Sussman, 2018). At the same time, psychology research suggests that cognitive style may affect some of the cognitive effects associated with mental accounting, such that different thinking styles will either support or suppress the mental labeling effect. This leads to the research question I set out to address.

### 1.3 Research Question

*How does cognitive style affect the reinvesting of gains from investment in one period to the next in personal finance?*

**1.4 Rationale for Work in Doctorate in Business Administration Context**

This document serves as a dissertation for research conducted in fulfillment of Athabasca University's Doctorate in Business Administration (DBA). The five chapters contained within include: Introduction, Literature Review and Hypothesis Development, Research Methodology, Results, and Discussion and Implications. A preliminary study was conducted in 2021 to gain insight into the research methodology and lessons learned from this study are referenced in footnotes four and twelve.

This dissertation is designed to extend the research of Hossain (2018) by applying the concepts developed in the consumer behaviour literature to individuals' reinvestment decisions. In that study, the author found that cognitive style affects mental accounting in consumer product decisions. Hossain suggests a similar effect may be present in the reinvestment of gains. His indication that there may be a connection between his results in consumer behaviour and personal finance highlights a gap in the literature, worthy of further study.

Hossain (2018) employs five experiments to make two relevant conclusions: first, he finds that holistic thinkers are more flexible in their mental accounts and analytic thinkers have a stronger "mental labeling effect" for similar related category purchases. Secondly, he notes that "product type" can moderate the effect, such that divergence between the cognitive styles occurs more with utilitarian purchases, possibly due to holistic thinkers' "categorization flexibility." I conducted a similar study to corroborate these conclusions in the context of personal finance decision making.

In order to test Hossain's assertion that investment behaviour will mimic his results in consumer behaviour, a connection must be made between product type in consumer behaviour and investment type in personal finance decision making. I intend to better understand the relationship between these two concepts as literature connecting these two concepts is limited. As a first attempt to bridge the gap, I adopt the Hedonic and Utilitarian Dimensions of Consumer Attitude (HED/UT) scale from (Voss et al.,

2003) to provide evidence that investments may be perceived as utilitarian or hedonic. As part of my study, the HED/UT scale will be tested on a series of investment activities (i.e., real world investment opportunities) to determine which activities are utilitarian and which are hedonic. Knowing this information will allow me to test the moderation effect of these investment activities to find divergence in behaviour between cognitive style.

Since my study takes place in a new context, it requires the use of another well-researched mental accounting parameter for categorization. I assert wealth type would be a good fit for this new independent variable because it intuitively follows the logic of the three categories of "source of funds" (income, available resources, and windfalls) (Shefrin & Thaler, 1988; Zhang & Sussman, 2018). I suspect individuals categorize their initial investment into one of the three wealth categories and this categorization influences their subsequent reinvestment of gains.[2]

**1.5 Significance of Research**

This study contributes to both practice and academic literature. Also, on a personal level, I hope this study contributes to the Behavioral Economics field of research that has improved my understanding of individuals' critical thinking in everyday judgments and decisions.

Regarding practice, this research is beneficial to consumer investors, investment advisors, and policymakers. First, this research should help consumer investors to understand and think about reinvestment decisions in a new way. There is a trend of consumers moving away from the traditional financial advisor that works at a brick-and-mortar bank/firm to fintech based platforms like robo-advisors and online brokerages that offer cheaper rates (MoneySense, 2020; Statista, 2020). As individuals get more comfortable with self-directed investing, it becomes increasingly more important

[2] The source of funds is not the gain itself (e.g., a windfall is not a gain, but rather interest earned from the investment of it is).

for consumer investors to understand their biases to achieve their investment goals and diversify their portfolios to help protect from market volatility. Second, for traditional advisors, knowledge that some of their clients (analytic thinkers) exhibit an unconscious desire to reinvest gains in similar investments, can be used to help them achieve a more diversified portfolio, and more importantly, a more trusting relationship. Finally, this study provides insight and possibly guidance to policymakers. The results of this research could help them [policymakers] use the framing of mental accounts to inform the creation of programs for citizens that incentivize saving for big life events such as their retirement or children's education.

Regarding the academic study of individual financial behavior, this study provides several valuable insights. First, with respect to behavioral finance, this study contributes to our understanding of mental accounting and provides a new context (i.e., personal finance decision making) to explore the specific cognitive mechanisms that make up our mental labeling systems. This is done specifically through adding to the literature in the mental accounting of personal investment portfolios. Second, this research leverages the literature on consumption decisions to draw conclusions about the nature of investment decisions. Since traditional consumer behavior research asserts that these two concepts are mutually exclusive, and behavioural finance research has argued that both have similar utilitarian and hedonic elements (Allen & McGoun, 2001), I've tested the HED/UT scale against six investment activities, to provide the first empirical research on the matter. This research is the first to examine the aspects of utilitarian/hedonic investments.

On a personal level, as an undergraduate I struggled with Economics because I thought economic theory better explained what people should do but did not fully appreciate what people actually do. From this perspective, I always felt like I was missing something. After being introduced to studies in Behavioural Economics (the intersection of economic theory and psychology) that highlight the predictably "irrational" behaviour of humans, I was inspired to look at areas in life where the

standard economic model doesn't hold up (e.g., when investors ought to diversify their portfolio, but in fact do not). I hope this study contributes to the field of Behavioural Economics that has given me so much insight into human behaviour.

### 1.6 Conclusion

This chapter provided a brief overview of the dissertation, hitting the highlights and introducing the research question and contributions that came from addressing this important practical and theoretical gap in our understanding of personal finance decision making. In the following chapter, I provide a description of the theoretical foundation for this work emerging from behavioural finance, and in particular, mental accounting. I review the literature regarding cognitive style, categorization, and the nature of investment in the mental accounting context. I conclude chapter two with a discussion of the gaps in the intersection between these literatures and the hypotheses to be tested in this study. In chapter three of this dissertation, I discuss the details of the methodology which experimentally tests the hypotheses stated in Section 2.5. This includes an exploration of the data collection and analysis techniques of the experiment. Next, in chapter four I show the results of the experiment including the outcomes of the statistical analysis. In the final chapter, I discuss the findings reported in chapter four and provides a review of the theoretical and practical implications of this research. I conclude the dissertation with a review of the limitations and provides ideas for future research.

### 1.7 Glossary

Below is a list of the most common terms used in the dissertation provided for quick reference.

**Analytic thinkers –** A thinking style that has a predisposition for using rules and formal logic to make judgements under uncertainty (Nisbett et al., 2001).

**Categorization flexibility –** The ability for an individual to allow cross-classification of items (e.g., the ability to eat pizza for breakfast) (Khare & Chowdhury, 2015).

**Hedonic consumption –** A consumer's experience with the "multisensory, fantasy, and emotive aspects" of products (Hirschman & Holbrook, 1982).

**Holistic thinkers –** A thinking style that has a predisposition for using context, relationships, and experience to make judgements under uncertainty (Nisbett et al., 2001).

**Mental accounting –** The cognitive processes individuals use to "record, summarize, and analyze their expenses and consumption with the objective of making a decision" (Soman, 2004).

**Mental labeling effect –** The specific cognitive process of assigning money to congruent categories for the purpose of making purchases (Hossain, 2018).

**Nature of investment –** A proposed construct that helps identify financial investments as utilitarian or hedonic. Used to moderate the independent variables by activating the mental labeling effect.

**Utilitarian Consumption –** A consumer's experience with the functionality of products (Khan et al., 2005).

**Wealth type –** A means of categorizing a source of funds for making a financial investment. Proposed as an independent variable in this study.

**Windfall gains –** Financial gains that are not expected or predicted (Arkes et al., 1994).

# Chapter 2: Literature Review and Hypothesis Development

## 2.1 Introduction

This literature review discusses the key studies that drove this research and explains my thinking and the ideas that provide the foundation for this study. This review aims to simultaneously span broad historic timeframes and home in on recent literature. This approach was used to ensure that seminal papers are parsimoniously explained to describe the underlying psychological and decision-making context of the field, while highlighting key advancements to the theories along the way. Furthermore, this approach identifies the most recent developments in the field of behavioural finance, which have been the most influential in the direction of this research. The intent here is not to discuss all the literature reviewed in developing this dissertation but rather to focus on the specific literature needed to support gap identification and hypothesis design for this study.

The review is structured as follows: First, I introduce Behavioural Finance and a more detailed synopsis of the founding theories of mental accounting as it related to cognitive functioning and diversification in consumer choice (Section 2.2). Next, I outline the critical literature as it relates to the variables of the study (Section 2.3), first the independent variables of cognitive style and categorization of mental accounting and then the moderator variable of the nature of investment. This section closes with a discussion on the gap in the literature (Section 2.4) and then the concludes with definition of hypothesis to be tested to close that gap (Section 2.5).

## 2.2 Theoretical Foundation – Behavioural Finance

This study is set within the field of Behavioural Finance. Behavioural Finance examines how financial decisions are made (Ackert & Deaves, 2009). It accomplishes this by combining the methods and methodologies commonly found in cognitive psychology such as ethnographic and experimental research with extant microeconomic theories (i.e., expected utility) (Forbes, 2009). Major concepts in

Behavioural Finance include mental accounting (Thaler 1980, 1985), biases and heuristics (Tversky & Kahneman, 1974), and the presentation of choice (Read & Loewenstein, 1995; Simonson, 1990). The knowledge discovered by this field of research is useful to a variety of practitioners in the field of finance such as investors, portfolio managers, auditors, and regulators, but also, individuals making every day personal finance decisions like budgeting, investing, and building wealth (Garman & Forgue, 2011). This field of research is extremely interesting as it bridges the gap between academia and practice by creating trading strategies, enriching the use of financial instruments, and developing regulatory frameworks (DeBondt et al., 2010). More importantly, it constantly strives to capitalize on the benefits of the predictive value of behavioural insights (DeBondt et al., 2010; Frydman & Camerer, 2016a). In doing so, it sometimes contradicts traditional finance theory or explains why longstanding financial theories do not always hold true in practice. Behavioral finance began by trying to explain why individuals sometimes deviate from rational economic behavior by exploring how they think about such decisions.

### *2.2.1 Mental Accounting*

In a seminal paper on mental accounting, Thaler (1980) discussed a series of behaviours that deviate from the rational economic behaviour predicted in normative-based economic theories (such as those proposed by Friedman (1957) (consumers spend at a consistent pace based on their long-term average income) and Becker (1965) (personal time should be as efficient as employed time). Thaler (1980) highlights unique behaviors deemed as “irrational,” such as putting more value on the items you own (endowment effect) when compared to the value in the open market and giving too much value to financial expenditures that occurred in the past (sunk costs). The concept of mental accounting has since evolved into a description of the overall cognitive structures that individuals use in personal financial decision making to provide an explanation where standard economic utility theories fail (Thaler, 1999). Mental accounting is defined as the cognitive processes individuals use to “record, summarize, and

analyze their expenses and consumption with the objective of making a decision" (Soman, 2004). This literature provides practical advice on how we can use mental accounting in personal decision-making scenarios such as: self-control (Shefrin & Thaler, 1988), budgeting (Heath & Soll, 1996), cash flow management (Lusardi et al., 2011), and increasing savings (Prelec & Loewenstein, 1998; Soman & Cheema, 2011).

To give this new field of research a grounding in psychological theory, Henderson and Peterson (1992) emphasized that the cognitive processes used in mental accounting are akin to those in cognitive psychology where they are referred to "categorization, schema, and script." They are conceptually equivalent to theories that describe how information is processed and stored in an individual's memory (Rosch & Mervis, 1975). Furthermore, the issues tackled in the mental accounting literature are essentially tricky framing of problems that challenge individuals to spontaneously group the decision-making elements at the time of solving a decision-making task. This is quite difficult for most individuals, but training and repetition reduces the level of thought and effort needed for creating future mental accounts (Henderson & Peterson, 1992). Beyond adopting the concept of categorization, not much has been done in the field to bridge the gap between cognitive psychology and mental accounting (Zhang & Sussman, 2018). In fact, much of the mental accounting literature focuses on how to side-step self-control mechanisms rather than understanding them directly (Frydman & Camerer, 2016a; Hossain, 2018). However, recently Hossain (2018) proposed that individuals that are prone to rule-based systems are more likely to perform a mental labeling effect. Alternatively, Hossain asserts that some individuals are able to disinhibit rule-based thinking, performing categorization flexibility by creating a connection between categorization and deliberation in decision making. Categorization flexibility is the ability for an individual to allow cross-classification of items (e.g., the ability to eat pizza for breakfast) (Khare & Chowdhury, 2015). Hossain's study gives us the insight that different cognition approaches affect the

way we use mental accounting systems. In addition, Hossain highlights the relevance of categorization flexibility in the cognitive process.

### *2.2.2 Diversification Bias*

One commonly studied topic in behavioral finance is a phenomenon coined the "diversification bias." The diversification bias occurs when an individual's overall choices lead to more diversification when made in combination, if compared to making the same choices separated over a longer timeframe (Read & Loewenstein, 1995; Simonson, 1990). For example, Simonson (1990) demonstrated that individuals were variety seeking, choosing three unique snacks when given the opportunity to obtain the snacks in advance of any consumption (simultaneous choice), but chose the same snack three times in a row when making the choice prior to each of three unique consumption episodes (sequential choice). The diversification bias is the result of subjective groupings influencing individuals' decision making, rather than choices matching sustained preferences (Benartzi & Thaler, 2007). This finding is supported by Shin and Ariely (2004) who explain that individuals choose to diversify to avoid losing a potential gain later, and so, they will make decisions to keep their options open, even at a cost (opportunity or financial). Benartzi and Thaler (2007) also coined the "1/n heuristic," a version of this phenomenon that recognizes that some individuals will distribute their choices among all available options evenly.

These studies point to a variety of scenarios where diversification strategies are not consciously deployed or understood, or worse, advertised but not attained. Fox et al. (2005) showed that portfolio managers who present simultaneous choice through investment menus are more likely to give clients a more diverse portfolio. However, this approach may only appear to be diversified because it is being compared to the subjectively presented options available at that moment (referred to as security selection). For example, a menu of Nasdaq Composite stocks may be evenly distributed, but Nasdaq Composite is technology sector heavy, so the 1/n heuristic diminishes the potential power of a diversification strategy across sectors. This design and presentation of options to consumers is referred

to as choice architecture, which has been shown to be influential over diversification (Thaler & Sunstein, 2008).

Supporters of Modern Portfolio Theory (MPT) suggest that diversification is the best way to gain expected returns while protecting against market risk in a single period (Markowitz, 1959) and over several periods (Mossin, 1968). However, true diversification occurs by attaining the best return at a given risk tolerance through diversification by industry, sector, international market, or any other ways that de-correlate asset growth (Mohamad et al., 2006; Siegel, 2021). Yet, as seen in this section, diversification is rarely achieved during judgments using sequential choice, which makes them less effective as a diversification strategy. For this reason, the experimental design in this dissertation will use sequential choice in the choice architecture.

## 2.3 Current Research – Independent and Moderating Variables

### *2.3.1 Cognitive Styles*

The field of cognitive psychology explains the many differences in the characteristics between individuals, specifically those responsible for how individuals process information (Ausburn & Ausburn, 1978). Throughout the history of the field, various theories have been introduced to explain these individual differences and are often discussed in three main categories: personality-, cognition-, and activity-centered (Sternberg & Grigorenko, 1997). The authors explain these categories in their simplest forms: personality-centered are based on personality traits (for example, as explored in the Myers-Briggs test), cognition-centered are based on cognitive processing (i.e., a person's natural thinking ability), and activity-centered are based on activities that arise from the combination of cognition and personality (i.e., a person's learning style). In this research, I focus on cognition-centered approaches because their theoretical foundation in the cognitive functions of perception and intelligence relate to those found in decision making research (Sternberg & Grigorenko, 1997).

#### 2.3.1.1 Cognition-Centred Cognitive Styles.

One prominent cognitive-centred theory is Psychological Differentiation, which describes people as either field dependent or field independent (Sternberg & Grigorenko, 1997). The original concept was that field dependent people are influenced by their physical surroundings, whereas field independent people rely on them less (Witkin & Goodenough, 1977). Witkin and Goodenough (1977) explain that the theory extends the study of cognition past traditional intelligence tests to see how study participants relate to their physical surroundings with cognition. An alternative view to field dependence/independence is intuitive/reflective cognitive style (Sternberg & Grigorenko, 1997), which includes the popular Dual Process Theory (Phillips et al., 2016). Modern versions of this competing theory attempt to explain cognitive style through an individual's use of intuitive, fast autonomous working memory (Type 1) and reflective, slow calculated responses to more complex issues (Type 2) (Kahneman & Frederick, 2002). This theory is especially prevalent in the behavioural economics research (Benhabib & Bisin, 2005; Kahneman & Frederick, 2002; Loewenstein, 2000).[3] Cognition-centred cognitive styles can be considered relatively stable over time (Phillips et al., 2016).

Importantly for my research, many other characteristics of psychological differentiation have been noted, especially in a cross-cultural context (Ji et al., 2000). Specifically, field dependence-independence was used to investigate the stark cognitive differences between Eastern and Western cultures. Nisbett et al. (2001) started using tests designed by Witkin such as the Rod and Frame Test and the Embedded Figures Test to examine these inter-cultural differences. These differences were explained using individuals' perceptual abilities and their attention to context. Ji et al. (2000) notes that intra-cultural field dependence-independence exists for the same reason that inter-cultural dependence

[3] I discuss this view, even though I'm not appealing to it because it has been commonly used in the field of behavioural economics, despite its many critiques in mainstream psychology (Keren & Schul, 2009).

exists. Ji et al. argue that work by Witkin and Goodenough (1977) and Berry and Annis (1974) was conducted in the United States where there is a variety of cultures within the large country. The juxtaposition of Asian vs. American culture seems to be a more commonly used case because of the stark difference in culture, but perceptual differences in the social environment could have garnered similar effects. For example, if the social environment had a variety of people with different individual and collective goals such as farmers, hunters, or industrialized people in the 1960s and 1970s. They also argue that the hunters and urban groups would be more likely to focus on individual goals as opposed to the socially complex rural farming of that day and its previous generations. Due to these measurable differences between cultures, the cognition-centered literature made a notable shift to focus on comparing and contrasting American and Asian populations (Choi et al., 2003; Ji et al., 2000; Masuda & Nisbett, 2001; Nisbett et al., 2001).

#### 2.3.1.2 Cognitive Style in American/Asian Studies.

A seminal article by Nisbett et. al, (2001) studied the logic systems in East Asians and Americans and found that the two cultures produced markedly different ways in which they solved problems. The authors surmised that the difference was due to cognitive processes, stemming mostly from culturally different epistemologies of what constitutes knowledge. The authors detail the different histories of the two cultures and lay out a framework for a variety of differences between them, identifying East Asians as prone to make use of a holistic style and Americans to an analytic style. The authors make hypotheses for cognitive differences in the areas of attention, control, explanation, prediction, relationships, logic, and dialectics. This study is seminal because it challenges the assumption of Universality in cognitive processes and challenges the field of psychology to test cultural differences against cognitive variables. Interestingly, the authors note that East Asians are starting to adopt an “American thinking style,” suggesting that social orientations contain within-culture differences. This is later supported by the work of Choi et al. (2007), who created a 24-item Analysis-Holism Scale to measure holistic and analytic

thinking tendencies. Choi et al. (2007) found differences in thinking tendencies between traditional and western influenced Koreans but noted that analytic thinking Koreans were still more holistic than Americans.

Further research into the theoretical model presented by Nisbett et al. (2001), is provided by Masuda and Nisbett (2001). They conducted two studies where East Asians and Americans observed complex visual displays in order to test participants' recognition of animals in two contexts, coined the "original" and the "novel" context. Interestingly, the Japanese participants remembered the same amount about the main objects, but more about the background context than the Americans. This supported other claims that East Asians are not able to "separate objects from their context," which is a key factor in assigning East Asians to a holistic cognitive style.

Similarly, another key argument connecting cognitive style to culture is laid out by Peng and Nesbitt, (1999) where the authors note that East Asians embrace contradiction through tolerance, whereas Americans tend to use formal Aristotelian logic which discounts contradicting information, polarizing their opinions. Peng and Nesbitt hypothesize that East Asians have a cognitive style that leads to dialectic thinking, that explains differences in reasoning between the two cultures. They then connect dialectic reasoning to Psychological Differentiation, linking field dependence to cognitive integration (holistic style) and field independence to cognitively differentiate objects (analytical style). The authors tested their hypotheses through a series of experimental studies that asked members from both cultures to rate their comfort with contradictory sources of information, using dialectic (logic-based) and non-dialectic (contradictory) axioms. Table 1 summarizes how this work solidifies terminology use from field dependence/independence to holistic/analytic in cross-cultural psychology.

Table 1

*Summary of Epistemology Effects on Psychological Differentiations and Cognitive Style*

| Epistemology | Effects | Psychological Differentiation | Cognitive Style |
|---|---|---|---|
| Reasoning Type | Dialectic (compromising logic) | Dependence | Holistic |
| | Rule-Based (inflexible) | Independence | Analytic |
| Cognitive Approach | Integral (holistic view) | Dependence | Holistic |
| | Piece-meal (differentiation of objects purpose) | Independence | Analytic |
| Locus of Attention | The field as a whole | Dependence | Holistic |
| | Focal object in the field | Independence | Analytic |
| Causal Attribution | Attribute to context | Dependence | Holistic |
| | Attribute to the disposition of object (e.g., human, animal, rock) | Independence | Analytic |

Though my research will not focus on a cross-cultural context, it's important to note that cognitive style as described by Nesbitt et al. (2001) is extensively used in consumer behaviour research. Also, as we will see below, within-culture experimental methods are now commonly deployed in the field of consumer behaviour (Hossain, 2018; Kim & Tanford, 2019; Lalwani & Shavitt, 2013) likely due to the multi-cultural nature of American post-secondary institutions (Monga & John, 2007).

#### 2.3.1.3 Cognitive Style in Consumer Behaviour.

Collectively, the consumer behaviour research on cognitive style captures holistic/analytic thinking through experiments in a variety of ways without separating the participants by Eastern and Western Culture as described by Nisbett et al. (2001). Key studies have used a variety of experimental methods including: manipulating cognitive style as a temporary state using priming effects such as the Pronoun Circling Test (Lalwani & Shavitt, 2013; Monga & John, 2007); measuring it as a steady state using the Embedded Figures Test (Hossain, 2018; McElroy & Seta, 2003); and splitting groups based on

median average score using the Analysis-Holism Scale (AHS), a 10-item scale created by Choi et al. (2003) (Kim & Tanford, 2021; Monga & John, 2010).[4]

A variety of experiments have been completed by researchers testing the effects of cognitive style in consumer behaviour contexts (Kim & Tanford 2019; Lalwani & Shavitt, 2013; Monga & John 2007). Specifically, Lalwani and Shavitt (2013) looked at the relationship between price and quality judgements, McElroy and Seta (2003) on the lasting effects of framing manipulations, Monga and John (2007) on consumer preference for corporate brand extensions, and Kim and Tanford (2019) on the role of discounts on unplanned purchase decisions. In all these articles, the results were compatible with previous research on cognitive style as described by Nesbitt et al. (2001) finding that holistic thinkers would see the world as composed of interconnected elements. For example, holistic thinkers saw a greater connection between price and quality, more consistency between brand and brand extensions to new product categories, and more frequently made unplanned purchases.

The most notable study in the literature, Hossain (2018) investigates cognitive style's effect on an individual's mental accounting system. This study found that one style (analytic thinkers) performed a mental labeling effect in decision making (when compared to holistic thinkers) on account of analytic thinkers' using rule-based cognition. Furthermore, the effect is even more prominent in the consumption of utilitarian (practicality driven) consumer goods, when compared to hedonic (affect/emotionally driven) consumption. As discussed previously, the explanation may lie in the holistic thinker's categorization flexibility (i.e., the ability to disinhibit the effects of rule-based thinking), since it helps remove barriers to hedonic consumption. Banerjee et al. (2019) showed that holistic thinkers in Eastern cultures did not show effects of mental accounting when compared to their Western counterparts (analytic thinkers). The Banerjee et al. study similarly explained the difference across

[4] After exploring the manipulation of cognitive style as a temporary state using priming effects in the preliminary study to little effect, this study used the Choi et al. (2003) scales as depicted in Table A1 (Appendix A).

cognitive styles: that holistic thinkers use an integral accounting process, while analytic thinkers use a piecemeal accounting process.

#### 2.3.1.4 Individual Effects of Cognitive Style and Mental Accounting.

Beyond the broad investigation of how cognitive style is studied in groups, some research has been conducted on how cognitive style effects individuals (Jones & Wright, 2011; Khan, 2017). For example, Jones and Wright (2011) found that cognitive style affects the final decision for students to major in accounting. Additionally, Kahn (2017) found that cognitive style affects risk tolerance, such that holistic thinkers take above average risks, when compared to analytic thinkers.

Similarly, limited research has been conducted on how mental accounting affects individuals (Barberis & Huang, 2001; Muehlbacher & Kirchler, 2019). Importantly, Barberis and Huang (2001) found that mental accounting can affect the perception of risk. The authors note that the bundling of stocks through mutual funds can reduce the perceived volatility of investments, therefore reducing the perception of risk when compared to that of individual stocks. Furthermore, individual differences were studied by Muehlbacher and Kirchler (2019) who note that gender, education, and finance experience are positively connected to performing mental accounting. These noted cases of the individual effects of cognitive style and mental accounting make it imperative to understand the individual differences on investment decisions.

### *2.3.2 Categorization Methods*

The practice of mental accounting is well-researched and it is commonly accepted that individuals group purchases together by subjective categories in order to make decisions under uncertainty (Baron, 2000). In order to do this, individuals must overcome their own “bounded rationality,” or, their own cognitive limitations (Thaler, 1980, 1985). In this manner, individuals make

"funds" or "mental accounts" in which they simulate the fund accounting schemes of universities, whereby university administrators set aside pools of money for specified purposes, across many funds for endowments or investments to prevent over-spending in those categories (Shefrin & Thaler, 1988). Although these categorizations are subjective to cognition of the individual, they affect behaviour in a multitude of predictable ways (Thaler, 1999). The literature can be divided into three main approaches to categorizing the funds used in mental accounting: source of funds, use of funds, and choice bracketing (Zhang & Sussman, 2018).

#### 2.3.2.1 Source of Funds.

Some individuals tend to categorize their mental accounts by labeling the source of funds to make an attribution of where the funds should be spent (Heath & Soll, 1996; Shefrin & Thaler, 1988). The source of funds usually originates from one of three places: regular income, available resources, and unexpected windfalls (Thaler, 1985). However, in the context of budgeting and spending wealth, Shefrin and Thaler (1988) incisively state more appropriate terms as current income, current assets, and future income. The authors assert that households typically spend primarily first out of their income and last out of their future income, this is because decision-makers have a reduced marginal propensity to consume their wealth as a matter of self-control. However, once a source of funds has been tapped, it becomes easier to spend out of it. When funds are sourced with unexpected windfalls, experiments have shown further behavioural insights; for example, large windfalls increased durable good purchases (Zhang, 2017), small windfalls are likely to be spent on hedonic purchases (Milkman & Beshears, 2009), emotionally laden (sad) windfalls tend to be spent on utilitarian (virtuous) goods rather than hedonic ones (Levav & McGraw, 2009), and spending declines proportionately to the size of the windfall (Shefrin & Thaler, 1988). Importantly, unexpected windfalls are thought to increase emotional arousal, making them hedonic in nature. (Shefrin & Thaler, 1988).

#### 2.3.2.2 Use of Funds.

Another way that individuals categorize their mental accounts is by the use of funds. Instead of categorizing funds by where the money originated, they can be categorized by where the money is going to be spent (Heath & Soll, 1996; Thaler, 1985; Zhang & Sussman, 2018). Researchers suggest that individuals set an arbitrary budget for expenses like "entertainment" and refuse to exceed that budget in a given timeframe (Heath & Soll, 1996). For example, individuals or households may mentally budget $100 for entertainment for each one-week period (Thaler, 1985, 1999). When categorizing by use of funds, mental accounting creates issues for individuals if the uses are too vague (e.g., food), because they may overlap too many categories. In this manner, food could be categorized as dining out, groceries, or a morning coffee. Similarly, too many uses do not leave ample flexibility to spend appropriately, and thus, too many and overlapping uses will leave too much or too little budget within a given category of use, inevitably leading to over- or under-consumption (Heath & Soll, 1996). Until now, research has not investigated use of funds in terms of analytic versus holistic thinking.

#### 2.3.2.3 Choice Bracketing.

Lastly, individuals can categorize by the options they have available to them. By assessing options as separate choices or by grouping a series of choices to make at the same time, the individual's decisions can yield largely different outcomes (Read et al., 1999). Read and his colleagues explain choice bracketing using the example of purchasing lottery tickets, suggesting that the decision of purchasing one lottery ticket (narrow bracketing) might be an appropriate use of funds in a given week. However, when conceiving purchasing one lottery ticket every week for a year (broad bracketing), it would have a huge effect on a source of funds over a year. Choice bracketing is therefore a mix of the two previous categorization methods perceived over longer timeframes and so categorization is not as rigid (Thaler, 1999). Read et al. (1999) conclude that in most cases, grouping choices provides better decision-making outcomes. However, since choice bracketing requires a running evaluation of all transactions in one's

mind, it is at the odds of bounded rationality and cash flow restraints (e.g., weekly or biweekly pay schedules).

### *2.3.3 Nature of Investment*

#### 2.3.3.1 Investment as Consumption.

Intuitively, consumers create a dichotomy in saving vs. spending, whereby the two terms are considered mutually exclusive such that investing is the saving of money and consumption of goods is the spending of it (Allen & McGoun, 2001); self-control is the only thing that divides the two states (Shefrin & Thaler, 1988). Yet, consumer behaviour research has shifted focus to the idea that consumption itself has many elements, such that the facets of affect and emotion are those of hedonic consumption and those of practicality are instances of utilitarian consumption (Hirschman & Holbrook, 1982). Sometimes, both motivations can even occur simultaneously when features overlap (e.g., cars or running shoes) (Dhar & Wertenbroch, 2000; Voss et al., 2003). However, in general, products that are seen as both ulititarian and hedonic are categorized by a main feature, thereby characterized by the consumer as either one or the other (Batra & Ahtola, 1991; Dhar & Wertenbroch, 2000).

More recently, consumer behaviour literature has specified differences in the cognitive processes that occur between the two instances of consumption, noting that utilitarian consumption is driven by intentionally evaluating rules, while hedonic consumption is implicitly intuited as evaluating preference (i.e., liking or not liking something) (Khan et al., 2005). Furthermore, a scale of the hedonic and utilitarian aspects of consumption were shown to be highly reliable by Voss et al. (2003) for measuring the dimensions of utilitarian and hedonic attitudes. The four most appropriate scale items of the HED/UT scale outlined in Table B1 (Appendix B).

Conversely, investments are typically thought to be evaluated as rational-based decision-making episodes to maximize return on investment. However, some research has argued investments can also

be hedonic (Allen & McGoun, 2001). Allen and McGoun argue that consumer behaviour research, like that of Hirschman and Holbrook (1982), is not unique to that field, but also pertains to investing. As such, investing is full of affect and pleasure and therefore the nature of investment can be multi-faceted; sometimes it lies in the consumption of the investment itself (hedonic) and sometimes in rate of return (utilitarian). The authors argue that hedonic episodes of investment exist in consumption through instances of status, gambling, societal integration and engagement, and play.

#### 2.3.3.2 Investment as Optimization in a Given Timeframe.

Another possibility is that the nature of investment may reside in the timeframe in which the investment takes place. Take for example buy-and-hold strategies, investors that passively hold a portfolio of capital stock across market sectors, tend to outperform active traders, such that, long-term (passive) investments can produce higher yields when compared to short-term (active) ones (Cremers & Pareek, 2016). This could suggest that long-term investments are more utilitarian when compared to short-term investments. However, a priori, it would stand to reason that strategies which hold short-term guaranteed investments while the investor waits for more lucrative opportunities, could be utilitarian in nature.

The field of behavioural finance also points to evidence that short-term investing is hedonic, as the literature provides a wealth of studies showing individual investors deviating from normative theories of investing (Daniel & Hirshleifer, 2015; Frydman & Camerer, 2016b; Huberman, 2001; Odean 1998, 1999). Frydman and Camerer (2016a) note that psychological experiments and advances in neuroscience demonstrate that pleasure driven motives can affect investor decision making, resulting in sub-optimal return on investment. For example, some investors trade too often incurring large fees that eat into gains (Odean, 1999) or buy the stocks of firms that operate close to their physical address (Home Bias) (Huberman, 2001). Other research asserts that investors tend to fix past mistakes by buying previously sold assets (Frydman & Camerer, 2016b), are too quick to sell winners and keep losers too

long (Disposition Effect) (Odean, 1998), and are overconfident in their own abilities (Daniel & Hirshleifer, 2015). Table 2 summarizes this non-normative individual investment behaviour.

Table 2

*Summary of Non-Normative Individual Investment Behaviour*

| Investment Type | Strategic flaw | Investment Nature |
|---|---|---|
| Short-term / Immediate gains | Trading too often (Odean, 1999) | Hedonic |
| Narcissistic | Home Bias (Huberman, 2001)<br>Fixing past mistakes (Frydman & Camerer, 2016b)<br>Disposition Effect (selling winners) (Odean, 1998)<br>Overconfidence (Daniel & Hirshleifer, 2015) | Hedonic |
| Long-term | Disposition Effect (holding losers) (Odean, 1998) | Utilitarian |
| Meeting a desired threshold | Doesn't maximize utility (Cremers & Pareek, 2016) | Utilitarian |

This pattern of behaviour suggests that some short-term investing strategies are hedonic, affect-driven for immediate gains, not long-term growth. These affect driven responses may be an indication of investment as "play" (Allen & McGoun, 2001) or as an instrument for individuals with narcissistic tendencies (Foster et al., 2011). The concept of the nature of investment described through certain activities has heavily influenced the creation of Table B1.

### *2.3.4 Summary of Findings*

Prior research shows that holistic thinkers view the world to have interconnected elements and engage in context dependent thinking (Masuda & Nisbett, 2001; Nisbett at al., 2001). Furthermore, holistic decision-makers are more likely to consider more, and more complex, information and hold a non-linear view of change (Peng & Nisbett, 1999). On the contrary, analytic thinkers can separate issues, removing the context and isolate the elements contained within (Masuda & Nisbett, 2001) resulting in rule-based, inflexible decision making (Hossain, 2018). Analytic thinkers also hold a relatively more linear view of change (Peng & Nisbett, 1999).

As previously discussed, both cognitive styles use mental accounting systems to categorize and track financial information in decision making (Thaler, 1999). This is because all individuals spontaneously create mental accounts to help organize information as framed in a problem that contains uncertainty (Henderson & Peterson, 1992). When provided with the idea of categorizing a source of funds, such as wealth types, individuals form the mental accounts necessary to solve the problem (Shefrin & Thaler, 1988). However, the unique features of each cognitive style, (i.e., analytic thinkers' rule-based cognition and holistic thinkers' relations-based thinking) will become apparent in the mental accounting activity of each group. This will be evident in the way each group handles the mental accounting of diversifying investments (Banerjee et al., 2019; Hossain, 2018; Read et al., 1999).

Hossain (2018) asserts that analytic thinkers are prone to rule-based systems and therefore perform a mental labeling effect. This in turn creates a connection between categorization and cognition in decision making. Alternatively, categorization flexibility gives holistic thinkers the ability to disinhibit the effects of rule-based thinking, enabling them to forgo mental labeling. Categorization flexibility is the ability for an individual to allow cross-classification of items (Khare & Chowdhury, 2015). Therefore, holistic thinkers are less likely to perform the mental labeling effect than analytic thinkers.

### 2.4 Gaps in the Literature

In this review, I have highlighted many important insights about the effect of cognitive style on the mental accounting of reinvesting gains in personal finance decision making. For example, past work identified that individuals spontaneously create mental accounts to help organize information in personal investing and the source of funds (such as wealth types) provide a promising prospect of how those accounts are formed (Henderson & Peterson, 1992; Shefrin & Thaler, 1988). The precise nature and quick categorization of source of funds makes it a more appealing option to investigate when compared to use of funds or choice bracketing. Furthermore, there is evidence that analytic thinkers do not use categorization flexibility when compared to holistic thinkers and are more prone to using the

mental labeling effect (Hossain, 2018). Interestingly, research shows the effects of mental labeling are amplified when the product type is utilitarian in the consumer behaviour context of decision making. The literature also provides insight that investments are not necessarily at odds with consuming, but rather are consumed in similar ways to products.

However, it is not clear whether these cognitive effects are present in all contexts, for example personal finance decision making. Furthermore, empirical testing is needed to understand the ways in which consuming investments is like consuming goods in terms of utilitarian and hedonic elements, which is imperative to understand the role of utilitarian elements in the mental labeling effect and how it relates to personal finance decision making (and similarly, understanding the hedonic elements in categorization flexibility). Thus, this review gives rise to the research question first identified in the introduction, namely, *how does cognitive style affect the reinvesting of gains from investment in one period to the next in personal finance?* The next section (2.5) provides insight into the hypothesises used to investigate this question.

**2.5 Hypothesis Development**

As discussed above, when mental accounting occurs, individuals will spontaneously create categories to help solve the problem. When presented with wealth types as a categorization of sources of funds, individuals will most likely use wealth types as their mental account for problem solving. Therefore, relative to holistic thinkers, analytic thinkers will use mental labeling to a greater extent and subsequently reinvest their gains in a similar wealth type to their initial investment.

*Hypothesis 1 (H1): Analytic thinkers will exhibit a propensity to reinvest gains in similar investment ventures more than holistic thinkers.*

Consumer behaviour research shows that the mental labeling effect is even more prominent in the consumption of utilitarian (practicality driven) consumer goods, when compared to hedonic

(affect/emotionally driven) consumption (Hossain, 2018). It is likely that this effect exists in the context of investing, too. For example, Allen & McGoun (2001) assert that investment and consumption are not mutually exclusive. The authors state that not all investment behaviour can be explained by practically driven behaviour and deduce that hedonic episodes of investment exist in consumption through behaviours categorized as status, gambling, societal integration and engagement, and play. Given these assertions, the cannon of research on consumers may be underutilized in the understanding of investors. However, to bridge the gap between investment and consumption decisions, we need to understand what type of financial decisions could be considered hedonistic/utilitarian.

As identified in the literature, more needs to be known about the nature of investment in terms of hedonic and utilitarian investing. In particular, understanding the role of utilitarian elements in the mental labeling effect and how it relates to personal finance decision making. As a means of comparing the consumption of investments to consumer products, I've adopted the HED/UT scale from Voss et al. (2003)[5] to test whether it can be deemed consistent when employed with real-world investment opportunities (referred hereafter as "investment activities").[6] This may provide insight into the key elements that define the concept of the nature of investment per the hypothesis below:

*Hypothesis 2 (H2): The categorization of investment (i.e., type and investment activities) resembles that of consumer product type as both consist of utilitarian and hedonic characteristics, such that:*

*a.) hedonic / utilitarian scale items can significantly differentiate between investment activities.*

[5] This is a validated and widely used scale in consumer behaviour (Bruner et al, 2005).
[6] The full list of investment activities can be found in Table B2 (Appendix B).

*b.) hedonic / utilitarian scale items can be significantly differentiated among hedonic and utilitarian activities (e.g., "fun" is significantly different in hedonic activities when compared to utilitarian activities).*

This empirical evidence can be presented with other literature to support the definition of the construct investment type (as utilitarian or hedonic investment). I hypothesize that analytic thinkers will reinvest gains to a much more pronounced degree through "utilitarian investment" (i.e., they are prominently practical, necessary, effective, and helpful) as opposed to "hedonic investment" (i.e., prominently pleasurable, fun, thrilling, and exciting). Therefore, relative to undefined investment activities, during utilitarian investment activities analytic thinkers will use mental labeling to a greater extent and subsequently reinvest their gains in a similar wealth type to their initial investment.

*Hypothesis 3 (H3): The propensity effect in H1 will be more pronouncedly observed when investments are utilitarian compared to when they are hedonic (i.e., when moderated by the utilitarian investment activities measured in H2).*

Rejecting these hypotheses will expand the definition of consumption to include utilitarian investment, distinct from Hossain's (2018) utilitarian consumption instances. This is an important distinction because we tend to think of consumption as the buying of durable and non-durable goods (Zhang, 2017). However, this research goes beyond to show that consumption is more generalizable than just durable (e.g., cars, appliances) and non-durable goods (e.g., food and fuel). This result will allow me to assert that mental accounting broadens our definition of consumption to purchasing many types of goods and services, including investment products.

Furthermore, H3 may offer insight into how cognitive style affects diversification bias. Analytic thinkers may be less prone to the diversification bias in the context of reinvesting their gains. Since the diversification bias is the result of subjective groupings influencing individuals' decision making, rather

than choices matching sustained preferences (Benartzi & Thaler, 2007), analytic thinkers will not make a choice in combination. Over a long-term investment strategy, analytic thinkers will make a series of sequential choices every time they make an investment (Read & Loewenstein, 1995; Read et al., 1999). Each of these sequential investments will be made through the individual's preferred investment vehicle and will not be allocated out amongst all available alternatives in the financial marketplace. This potentially results in a lack of diversification in a portfolio over time as gains go back into similar investments at a different rate over time rather than re-evaluating the diversification for each reinvestment decision.

Now that the research question has been defined and the hypotheses developed, I turn to the method used for investigation.

# Chapter 3: Research Methodology

## 3.1 Introduction

Identifying the gap in the literature and identifying the null hypotheses to bridge the gap is only the first important step in conducting research. The next and equally important step is to decide how to conduct the tests through a research study. This entails deciding what data to collect and how. In making these decisions, I have consulted existing research studies for input on the kinds of questions to be answered and conducted a preliminary study to test some of these decisions. Ultimately, I employed a quasi-experimental approach using an online survey and a factorial design to manipulate two independent variables.

In this chapter, I explain these what data was collected and how it will be used to investigate the research question. Section 3.2 outlines the research design, which includes justification for the research method and an explanation of independent and dependant variables. Section 3.3 discusses information pertaining to the participants of the study including their profile, recruitment, and the sample sizes used. Section 3.4 describes how the variables were manipulated and details the step-by-step experimental procedures followed. Finally, Section 3.5 discusses how the data was measured by detailing the procedures that were carried out for statistical testing and finishes with a table summarizing how each tested construct aligns with the hypothesis, data technique used, and how the data will be analyzed in chapter four.

## 3.2 Research Design

Given that this research is an attempt to if not replicate, then approximate the Hossain (2018) study, the starting point for the research design was to consider experimental design approaches. Although an in-person experimental approach would have been preferred for results of higher validity (Shadish et al., 2002), I adopted a quasi-experimental research design using an online survey experiment

due to limitations on in-person activities imposed by the Covid-19 pandemic. Under the circumstances, a quasi-experimental research design was identified as the best approach to collect, analyze, and interpret data. The non-randomized assignment (i.e., self-selection) of participants was controlled using comparison groups for which treatment is compared using the demographic information provided by participants (Shadish et al., 2002).

I chose this design to assess the causal impact of manipulating the independent variables for outcomes of interest on the dependent variable (Shadish et al., 2002). The quasi-experimental design allowed me to identify a potential causal relationship between both cognitive style and wealth type on reinvesting gains from one period to the next in personal finance. This design helped to limit the alterative explanations for the effects of cognitive style on reinvestment in personal finance decision making.

A 2 (cognitive style: analytic thinking vs. holistic thinking) x 3 (wealth type: income vs. current assets vs. future cash flows) factorial between-subjects design was used to test H1 and H3. The independent variable, cognitive style, is a measured variable and was sorted by the median split method.[7] The independent variable, wealth type, is a manipulated variable and was randomly assigned. Table 3 summarizes the independent variables in the factorial design, showing the number of participants per condition:

Table 3

*Experimental Design – Interaction Effect*

| Wealth Type | Cognitive Style | |
|---|---|---|
| | Analytic | Holistic |
| Income (Certificate of Deposit) | 69 | 69 |
| Current Asset (Mutual Fund) | 69 | 69 |
| Future Cash Flow (Fixed Annuity) | 69 | 69 |

[7] The median split method is the separation of participants into two groups (above and below the median), a common approach for analyzing continuous variables in the consumer behaviour research (Iacobucci et al., 2015).

Further to this main interaction, I used investment type as a moderating variable to see how it influences the effects of treatment (Shadish et al., 2002). Each wealth type treatment was given a corresponding utilitarian investment activity only. Therefore, the number of treatment groups were not affected. Table 4 summarizes the variables in the factorial design.

Table 4

*Variables to be Tested*

| Variable Name | Variable ID | Factors |
|---|---|---|
| Cognitive Style | ID1 | Holistic, Analytic |
| Wealth Type | ID2 | Income, Current Assets, Future Cash Flows (FCF) |
| Investment Type | MV1 | Utilitarian |
| Reinvestment | DV1 | Yes / No |

**3.3 Participants**

The following section discusses all of the necessary information that pertains to the participants in this study including their profile, recruitment, and the sample sizes used.

***3.3.1 Participant Profile***

Participants were self-selected survey takers. Participants did not require any specific knowledge in finance or personal investing strategy. This group of participants was selected to get a cross-section of a variety of levels of financial literacy. There were no criteria for inclusion/exclusion, however demographic information was collected to identify potential effects specific to individual groups. Participants of this study were selected from the United States to replicate studies that used the median average score of the AHS in inter-cultural populations (i.e., Kim & Tanford, 2021; Monga & John, 2010).

***3.3.2 Recruitment***

Participants were recruited through Amazon Mechanical Turk (MTurk) as the main mode of data collection. Each participant performed the tasks generated in the experiment described in Section 3.5.

This mode of surveying participants has been shown to have great benefits when compared to traditional web-based surveys, such as: lower risk of contaminating the participant pool, lower risk of multiple responses by the same participants, and lower non-response errors (Paolacci et al., 2010). MTurk has been used to conduct behavioural economic research in complex studies (Roma et al., 2016) and to replicate findings in classic experiments (Horton et al., 2011).[8] All participants from this crowdsourcing marketplace were selected as Master Workers, those that have demonstrated consistent performance across tasks as determined by the MTurk platform. Master Workers were selected because they have an increased likelihood to spend more time per assignment, fare better at measurable tasks, and have more formal education. All of these decisions have been shown to result in higher quality data (Lovett et al., 2018).

#### 3.3.2.1 Incentives.

Cash payments were given to the participants at the hourly local minimum wage rate for Ontario and were paid out at a proportion of hourly rate times the approximate length of the survey. The study took approximately ten minutes to complete. Based on a proportionate payment equal to $15/hour, cash payments were made of $2.50 to each participant. Incentivizing participants at the jurisdictional minimum wage is consistent with best practices in addressing validity threats using MTurk (Aguinis et al., 2021).

#### 3.3.2.2 Budget.

All costs for this study were borne by the principal investigator.[9]

[8] Best practices in collecting data were completed by following the guidance in "MTurk Research: Review and Recommendations" (Aguinis et al., 2021).

[9] Research funding was approved by Athabasca University's Graduate Student Research Fund (GSRF) up to a maximum of $1,500 for the preliminary study.

### *3.3.3 Sample Size*

A total of 414 participants were recruited through MTurk and were randomly assigned to one of the six conditions. Each condition was assigned 69 participants to achieve a large effect size with a power of .80 at a significance level of .05, a level appropriate for chi-squared tests (Cohen, 1992). [10]

### *3.3.4 Preliminary Study*

A preliminary study was conducted to test the feasibility, cost of the experimental design, and assumptions made (Hulley et al., 2013). Small changes were made at the proposal stage of this dissertation after that work and notable changes to the experiment are referenced in the footnotes. Participants that partook in the preliminary study were ineligible for the study outlined in this dissertation.[11] This study received ethics approval in April 2021 and was renewed in April 2022 to reflect changes that occurred from the preliminary study to the proposal (see Appendix D).

## 3.4 Variable Manipulation and Experimental Procedure

Table 5 below provides a summary of the experimental design, which variables were operationalized, and how causality was approached in the hypotheses:

Table 5

*Summary of Variable Manipulation*

| Experiment Input | Design | Variables Operationalized | Hypothesis Tested |
|---|---|---|---|
| Investment Type Construct Reliability and Validity | Likert Scale | None | H2a, H2b |
| Reinvestment #1 | 2x3 factorial design | ID1, ID2 | H1 |
| Reinvestment #2 | 2x3 factorial design | ID1, ID2, MV1 | H3 |

[10] For the complete sample size calculation please see Appendix C.

[11] To ensure this, participants' MTurk ID number will be uploaded to my profile and blocked from participating in the experiment.

### *3.4.1 Operationalization of Variables*

I used a quasi-experiment to test the hypotheses with two independent variables: cognitive style and wealth type. Wealth type was operationalized by dividing participants into randomly generated groups: income, current asset, or future cash flow.

Cognitive style was operationalized by asking all respondents to rate the 10-item Analysis-Holism Scale (AHS) (Choi et al., 2003) using a seven-point Likert scale. A high rating indicates a holistic thinking style, and a low rating indicates an analytic thinking style. After participants completed the AHS, all 10 items were averaged, and two groups were formed for each of the 3 wealth type treatments. The groups were then split in two by the median score (the group above the median are analytic thinkers and the group below are holistic thinkers). The AHS questions are listed in Appendix A.[12]

To operationalize the moderator variable (investment type) each wealth type was coupled with a utilitarian investment activity. Wealth types were then compared by cognitive style to see the effect of the moderating variable.

### *3.4.2 Experimental Procedure*

Below is the experimental procedure followed (see Appendix E for the complementary Experimental Procedure Flowchart):

1. To assess risk preferences, participants were given a gambling game asking how much they would be willing to pay to play a game for a 50% chance at winning $100.

2. Participants were given the 10-item Analysis-Holism scale developed by Choi et al. (2003).

[12] In the preliminary study, I manipulated cognitive style by having the participants complete the pronoun-circling task (Gardner et al., 1999) to induce analytic or holistic thinking, but statistical analysis of the manipulation check showed the priming instrument to be unsuccessful.

3. Participants were asked to provide a ranked order of the most important features in the eight-item HED/UT scale across six investment activities using a drag and drop graphic.

4. Participants were told that a typical portfolio consists of cash earning 3% bank interest, corporate stocks earning 6%, and retirement savings account earning 5% (items from each of the three mental accounting wealth types: income, current assets, or future cash flow).

5. Then, the participants were randomly assigned into one of three investment conditions: A) income, B) current assets, or C) future cash flow (FCF).

6. Participants were given a proposed investment with a typical ROI (7%). The investment type was generated at random in Step 1 as investment conditions A, B, or C. The corresponding wealth type was described in the proposed investment as a certificate of deposits (income), mutual fund (current assets), or fixed annuity (FCF).

7. An attention check was given, asking participants to click a radio button to validate which investment vehicle they were given (i.e., which wealth type treatment they were assigned to). Incorrect responses rerouted participants to their randomized investment (item 6) to reorient themselves.

8. Participants were given their payout after one year. In all conditions their payout is 7% as expected. They were then provided a with a list of three investment opportunities, one of which was the same as their randomly generated wealth type and the other two are generic descriptions from the other two wealth type conditions (the payouts for all were 7%). Participants were then asked how they would like to reinvest their gains from the previous investment out of the three choices.

9. Participants were then provided with a new scenario that provided more information on their wealth type. The new information provided is the corresponding utilitarian investment activity for their assigned wealth type. After being informed that their investment paid out 7% as expected, they were again provided a with the (same) list of three investment opportunities (the payouts for all were 7%).

10. Participants were asked again how they would like to reinvest their gains from the previous investment out of the three choices.

11. Participants were asked a series of demographic questions (e.g., age, gender, ethnicity, etc.).

12. Participants were categorized as analytic or holistic thinkers based on the outcome of the median split method (this occurs after the experiment's conclusion and is therefore not revealed to the participant).

#### *3.4.3 Experiment Task*

The task required participants to log into their MTurk account and select the HTML link to my experiment. Web hosting for the experiment and data collection was hosted by Alchemer. Participants completed the questions provided in the experimental design instrument (Appendix F).

### 3.5 Measurement Procedure

I followed the procedure below to complete the statistical tests used to analyze the data. The information is organized according to the order presented in the hypothesis development in section 2.5.

#### *3.5.1 Hypothesis 1*

a. Three, 2 x 3 one-tailed frequency distribution tests of non-parametric data (chi-squared) were conducted on the dependent variable to determine whether analytic thinkers

were more likely to reinvest than their holistic counterparts. The order of the analysis was:

i. Responses were sorted by wealth type (income, current asset, FCF).
ii. Ten Analysis-Holism Scale items were averaged into one overall score.
iii. Two groups were created (analytic vs. holistic) for each wealth type using a median split method (*Median* = 5.5, 5.3, 5.3 respectively for income, current asset, FCF); and,
iv. Reinvestment behaviour was dichotomously coded (as "did reinvest" or "did not reinvest").

b. Three, independent samples t-tests were performed to determine whether there are significant differences in the means for analytic vs. holistic thinkers for each wealth type.
c. Another 2 x 3 one-tailed frequency distribution test of non-parametric data (chi-squared) was conducted on the dependent variable to determine whether analytic thinkers were more likely to reinvest than their holistic counterparts. The procedure was similar to test (a) above; however, responses were not sorted by wealth type (Median = 5.3).
d. Using the cognitive style sorting method used in test (c), a binary logistic regression was conducted to understand the relationship between wealth type and cognitive style and its effect on reinvesting gains.

### *3.5.2 Hypothesis 2*

1. Hedonic and utilitarian items were checked for fit by comparing means and Cronbach's Alpha was used to show the reliability of the scale. The order of the analysis was:

i. Responses for the eight-item Investment Type HED/UT scale across six Investment Activities were computed.
ii. Mean responses for each investment activity were checked for reliability using Cronbach's Alpha (hedonic items were shown to not be reliable, but utilitarian items were reliable).
iii. An independent samples t-test was conducted comparing HED/UT scale items across hedonic and utilitarian investment activities (hedonic investment activities were shown not to be significantly different, but utilitarian activities were shown to be significantly different (i.e., the hedonic real world investment opportunities were not sufficiently defined).
iv. An independent samples t-test was conducted comparing the investment activities across the HED/UT scale items as hedonic or utilitarian (none of the HED/UT scale items were shown to be significantly different as hedonic or utilitarian (i.e., HED/UT scale elements cannot be distinctly labeled as hedonic or utilitarian based on the selected investment activities).

#### *3.5.3 Hypothesis 3*

Hypothesis 3 looked at the outcome produced in Hypothesis 1 to see if the effect is amplified by introducing a utilitarian investment activity to moderate the dependent variable. Using the same procedure outlined in Section 3.5.1, the input data was moderated by utilitarian investment to determine whether analytic thinkers were more likely to reinvest than their holistic counterparts. With that modification, the same four tests were produced: (a) three, one-tailed frequency distribution tests of non-parametric data (chi-squared), (b) Three, independent samples t-tests, (c) a final 2 x 3 one-tailed frequency distribution test of non-parametric data (chi-squared) using one mean for the entire sample, (d) a binary logistic regression.

### *3.5.4 Measurement Procedure Summary*

The following table summarizes the key constructs and how they are measured and analyzed in chapter four:

Table 6

*Measurement and Data Analysis Summary*

| Construct | Measurement | Data Techniques Used | Data Analysis |
|---|---|---|---|
| Risk | Wager < $50 (Risk-averse)<br>Wager = $50 (Risk neutral)<br>Wager > $50 (Risk seeking) | 1. Chi-squared test for independence | This measure may help explain anomalies in the hypothesis, specifically any relationship between Risk and Wealth Type/Reinvestment at a 5% level of significance |
| Demographics | Chosen from dropdown menus | 1. Chi-squared test for independence | This measure may help explain anomalies in my hypothesis at a 5% level of significance |
| Cognitive Style | Likert-Scale 1-7 | 1. Median split | No Analysis - This measure was used for sorting only |
| H1: Reinvestment (no moderator) | Binary - Yes/No | 1. Chi-squared test for independence (sorted by Wealth Type)<br>2. Independent samples t-test<br>3. Chi-squared test for independence (not sorted by Wealth Type)<br>4. Binary logistical regression | Reject the null hypothesis using 5% level of significance (p-value ≤.05) |
| H2A: HED/UT Scale | Ranked order (1-8) | 1. Cronbach's Alpha<br>2. Independent samples t-test | Find reliability if Cronbach's Alpha > .8<br>Reject the null hypothesis using 5% level of significance (p-value ≤.05) |
| H2B: Investment Activities | Ranked order (1-8) | 1. Independent samples t-test | Reject the null hypothesis using 5% level of significance (p-value ≤.05) |
| H3: Reinvestment (with moderator) | Binary - Yes/No | 1. Chi-squared test for independence (sorted by Wealth Type)<br>2. Independent samples t-test<br>3. Chi-squared test for independence (not sorted by Wealth Type)<br>4. Binary logistical regression | Reject the null hypothesis using 5% level of significance (p-value ≤.05) |

### 3.5.5 Software

I used SPSS version 27 to analyze the data.

# Chapter 4: Results

## 4.1 Demographic Profile

A total of 414 samples were collected through Amazon Turk, a crowdsourcing marketplace. The experiment was available From August 19 to August 25, 2022. Table 7 displays the key demographic statistics of the respondents in this study. Sixty-nine subjects were randomly assigned to each of six manipulated conditions. 50.2% of the sample identified as female and 49.6% male. Regarding age, approximately 61.4% of the respondents were under 40 years old. In terms of annual income, 54.3% of the respondents indicated an annual household income of less than $60,000 (USD). For education level, 81.4% of the sample had a bachelor's degree or graduate degree. More than three quarters of the sample was Caucasian (80.2%), with the second most reported ethnic group being African American (8.0%). All respondents were based in the United States.

## 4.2 Results

### *4.2.1 Data Analysis - H1: Reinvestment (no Moderator)*

This study examines the effect of cognitive style on the reinvestment of gains into similar investments, specifically investigating the difference between analytic and holistic thinkers through four statistical tests:

For the first test, three one-tailed chi-squared tests were conducted on the opportunity for reinvestment prior to knowing the nature of the investment. In contrast to the predicted interaction between cognitive style and wealth type (income, current asset, FCF), chi-squared tests of independence shows that there was no significant association for any of the conditions ($\chi^2$ (1, N = 138) = 1.79, p = .091), $\chi^2$ (1, N = 138) = 0.83, p = .181, $\chi^2$ (1, N = 138) = 1.08, p = .15, respectively - see Table 8).

Next, three, one-tailed independent samples t-tests were conducted to test proportionality. The results of these tests slightly differed to the aforementioned chi-squared tests, as a significant result was

found in the income condition t(71) = 1.90, p = .031, but not in the current asset t(53) = 1.05, p = .149 or FCF conditions t(81) = 1.04, p = .15 (Table 9).

Third, after completing a median split on cognitive style for the entire sample (*Median* = 5.3), a final chi-squared test was conducted. This chi-squared tests for independence showed a significant relationship between the two independent variables, $\chi^2$ (1, N = 414) = 3.13, p = .039 (Table 10). Thus, analytic thinkers are in fact more likely to reinvest than their holistic counterparts and the null hypothesis can be rejected (H1).

Furthermore, while looking into the demographic segments that comprise this data, two other significant differences were noted (Table 11). Filtering responses by ethnicity, analytic reinvestment made by Caucasian respondents exhibit a significant result, $\chi^2$ (1, N = 332) = 3.18, p = .037). Similarly, analyzing risk-averse respondents provided a significant result, $\chi^2$ (1, N = 193) = 3.18, p = .040). This effect was even more prominent in Caucasian, risk-averse analytic thinkers, $\chi^2$ (1, N = 154) = 3.18, p = .037.

Lastly, a binary logistical regression was performed to ascertain the effects of cognitive style and wealth type on the likelihood that participants would reinvest gains from one investment to the next. The logistic regression model was statistically significant, $\chi^2$ (3, N = 414) = 16.259, $p < .001$. The model correctly classified 59.2% of cases. When using holistic cognitive style as the reference category, analytic thinkers were 1.522 times more likely to reinvest their gains in the same wealth type than holistic thinkers. Also, when using the income wealth type as the reference category, current assets were more likely to be the category of reinvestment by 1.863 times. Details are provided in Table 12.

#### 4.2.1.1 Conclusion.

Based on the results, a significant interaction exists between cognitive style and wealth type on reinvestment of gains. In particular, strong evidence was provided using the median split across all samples on a 2 x 3 one-tailed chi-squared test. Therefore, the results support Hypothesis 1.

I also analyzed how the effect of Hypothesis 1 can depend on demographic profiles such as ethnic group and risk profile of the investors. The result show that the effect of H1 is stronger when investors are risk-averse Caucasians.

To help narrow the source of the main effect described above, a binary logistical regression was conducted. The results of this test showed that analytic thinkers are 1.5 times more likely to reinvest gains than holistic thinkers. Additionally, analytic thinkers are 2 times more likely to reinvest gains in current assets than any other wealth type.

### *4.2.2 Data Analysis – H2: HED/UT Scale*

Hedonic and utilitarian items were checked for fit by comparing means, and Cronbach's Alpha was used to show the reliability of the scale. Mean responses for the eight-item Investment Type HED/UT scale across the six investment activities were computed (Table 13).

Mean responses for each investment activity were checked for reliability using Cronbach's Alpha. Per Table 14, the results for hedonic investment activities were not reliable at .497 but utilitarian investment activities were reliable at .994.

A one-way independent samples t-test was conducted comparing HED/UT scale items across hedonic and utilitarian investment activities. Per Table 15, hedonic investment activities were shown not to be significantly different, $t(6) = 4.63$, $p = .004$, $t(6) = 1.18$, $p = .281$, $t(6) = -1.73$, $p = .135$, but utilitarian activities were shown to be significantly different, $t(6) = 5.71$, $p = .001$, $t(6) = 5.07$, $p = .002$, $t(6) = 5.30$, $p$

= .002. Since the analysis revealed that utilitarian scale items can significantly differentiate between investment types, Hypothesis 2A is only partially supported.

Next, a one-way independent samples t-test was conducted comparing the investment activities across the HED/UT scale items as hedonic or utilitarian. Per Table 16, none of the HED/UT scale items were shown to be significantly different as hedonic or utilitarian. This data does not support the assertion that hedonic / utilitarian scale items can significantly differentiate between investment activities. Therefore, Hypothesis 2B is not supported.

#### 4.2.2.1 Conclusion.

Based on these results, it is not conclusive that the categorization of investment (type and investment activities) resembles that of consumer product type. Since the above statistical analysis revealed that utilitarian scale items can significantly differentiate between investment types, Hypothesis 2A is partially supported and Hypothesis 2B is not supported.

Although these specific hypotheses are not supported, it is still possible that the categorization of investment resembles that of consumer product type using utilitarian and hedonic characteristics. It may be that better examples of hedonic investment are needed to be identified to support the hypotheses. This will be discussed further in chapter five.

### *4.2.3 Data Analysis – H3: Reinvestment (With Moderator)*

Furthermore, this study examines the differences between analytic and holistic thinkers in the instance where investments are considered utilitarian (vs. hedonistic) through four statistical tests:

First, three one-tailed chi-squared tests were conducted on the opportunity for reinvestment using the nature of the investment as a moderator variable. In contrast to the predicted interaction between cognitive style and wealth type (income, current asset, FCF), chi-squared tests of independence

shows that there was no significant association for any of the conditions ($\chi 2$ (1, N = 138) = 1.86, p = .086, $\chi 2$ (1, N = 138) = 1.16, p = .140, $\chi 2$ (1, N = 138) = 0.77, p = .191 respectively - see Table 17).

Next, three one-tailed independent samples t-tests were conducted to test proportionality. The results of these tests slightly differed from the chi-squared tests above, as a significant result was found in the income condition t(68) = 1.90, p = .032, but not in the current asset t(54) = 1.22, p = .113 or FCF conditions t(84) = 0.88, p = .192 (Table 18).

Third, after completing a median split on cognitive style for the entire sample (*Median* = 5.3), a final chi-squared test was conducted. This chi-squared test for independence showed a significant relationship between the two independent variables, $\chi^2$ (1, N = 414) = 3.86, p = .025 (Table 19). Thus, the effect is more pronouncedly observed that analytic thinkers are in fact more likely to reinvest than their holistic counterparts when reinvesting gains into utilitarian investments; therefore, the null hypothesis can be rejected (H3).

Furthermore, while looking into the demographic segments that comprise this data, two other significant differences were noted (Table 20). Filtering responses by ethnicity, analytic reinvestment made by Caucasian respondents exhibit a significant result, $\chi^2$ (1, N = 332) = 6.33, p = .006. Similarly, analyzing risk-averse respondents provided a significant result, $\chi^2$ (1, N = 193) = 4.51, p = .017. This effect was even more prominent in Caucasian, risk-averse analytic thinkers, $\chi^2$ (1, N = 154) = 7.19, p = .004.

Lastly, a binary logistical regression was performed to ascertain the effects of cognitive style and wealth type on the likelihood that participants would reinvest gains from one investment to the next. The logistic regression model was statistically significant $\chi^2$ (3, N = 414) = 18.094, $p < .001$. The model correctly classified 59.2% of cases. When using holistic cognitive style as the reference category, analytic thinkers were 1.566 times more likely to reinvest their gains in the same wealth type than holistic

thinkers. Also, when using the income wealth type as the reference category, current assets were more likely to be the category of reinvestment by 2.528 times. Details are provided in Table 21.

#### 4.2.3.1 Conclusion.

Based on these tests, the analysis revealed a significant interaction exists between cognitive style and wealth type on reinvestment of gains while moderated by utilitarian investment. In particular, strong evidence was provided using the median split across all samples on a 2 x 3 one-tailed chi-squared test. When comparing the results of the moderated chi-squared test ($\chi^2$ (1, N = 414) = 3.86, p = .025) to the unmoderated one ($\chi^2$ (1, N = *414*) = 3.13, p = .039), the former p-value is lower. Therefore, the propensity effect in H1 is indeed more markedly observed when investments are utilitarian compared to when they are hedonic, supporting Hypothesis 3.

I also analyzed how the effect of Hypothesis 3 is affected by demographic profiles such as ethnic group and risk profile of the participants. The result showed that H3 is more strongly supported when investors are risk-averse Caucasians.

To help narrow the source of the main effect described above, a binary logistical regression was conducted. The results of this test showed that while decisions are moderated by utilitarian investment, analytic thinkers are 1.6 times more likely to reinvest gains than holistic thinkers. Additionally, analytic thinkers are 2.5 times more likely to reinvest gains in current assets than any other wealth type.

### 4.3 Hypothesis Support Summary

The table presents the stated the prediction of each hypothesis and whether the prediction was supported.

Table 22

*Hypothesis Support*

| Hypothesis | Prediction | Supported |
|---|---|---|
| H1 | IV1 * IV2 Interact with DV1 | Yes |
| H2A | HED/UT investment activities are reliable | Partially (utilitarian items) |
| | Investment activities are utilitarian or hedonic | Partially (utilitarian items) |
| H2B | HED/UT scale items are utilitarian or hedonic | No |
| H3 | Interaction of MV1 * DV1 > DV1 | Yes |

**4.4 Summary**

The results obtained from the study shed light on interesting observations that are relevant to the research question. Specifically, the chi-squared tests for independence revealed a significant correlation between cognitive style and wealth type. Analytic thinkers are more likely to reinvest their investment gains compared to their holistic counterparts, particularly when the investment type is utilitarian. The findings also suggest that these effects are further influenced by demographic profiles such as ethnic group and risk profile of the investors. The results show that risk-averse Caucasians exhibit a stronger relationship between cognitive style and wealth type. While the study did not provide conclusive evidence that investment type and activities resemble consumer product type, it partially supports H2A by showing that utilitarian scale items significantly differ from hedonic scale items for utilitarian investments.

The subsequent chapter will discuss the interpretation of these results, as well as the limitations of the study, practical and academic implications, and future research ideas.

# Chapter 5: Discussion and Implications

## 5.1 Introduction

In this chapter, I interpret the results provided in chapter four. I will accomplish this by discussing the findings in the context of the literature review (Section 5.2) and their implications for theory and practice (Section 5.3). Section 5.4 discusses the limitations of the results and offers insight into possible areas of future research. Concluding remarks are provided in Section 5.5.

## 5.2 Discussion

This study demonstrates how individual cognitive style in the mental accounting context affects personal investment decision behaviour. It provides insight into an interaction between cognitive style and wealth type on the reinvestment of gains from one investment to the next. In addition, a quantitative approach to understanding the nature of investment is explored. Finally, utilitarian investment activities are applied to the reinvestment of gains.

### *5.2.1 Cognitive Style and Wealth Type*

The results of this study show an interaction effect between cognitive style and wealth type in the reinvestment of gains. As predicted, analytic thinkers were more likely to reinvest gains from one investment to the next in the personal finance context. As asserted by Hossain (2018), analytic thinkers exhibited a mental labelling effect when prompted. Furthermore, these results are consistent with Shefrin and Thaler's (1988) claim that wealth types help form mental accounts in decision making.

This study also provides empirical support that both risk-averse and Caucasian segments of the population have a greater propensity to reinvest gains into similar investment ventures, when compared to other risk profiles and ethnicities. This is consistent with Peng and Nesbitt (1999) and Nesbitt et. al, (2001) who state that cross-cultural elements exist among East Asian and Western backgrounds which are consistent with holistic and analytic thinking styles (respectively).

This study also gives credence to the idea that analytic thinkers are more likely to suffer from diversification bias, (Read & Loewenstein, 1995; Simonson, 1990). However, further research is required to determine whether analytic thinkers are likely to have less diversified portfolios in the long-term and to what degree.

### *5.2.2 Nature of Investment*

In this study I attempted to further understand the nature of investments as either hedonic or utilitarian. To achieve this, I employed a highly reliable scale from the consumer behaviour literature (Voss et al., 2003) to explore whether consumer attitudes are consistent with investment activities and/or, that they are consistent with HED/UT scale items. The results did not produce conclusive evidence that supported either approach. However, the investment activities that were identified as utilitarian, were consistent with HED/UT scale items which suggests that investment activities can be categorized by type (i.e., utilitarian and hedonic). This is consistent with consumer behavior research which upholds that consumer products are both hedonic and utilitarian and can be characterized by consumers as one or the other (Batra & Ahtola, 1991; Dhar & Wertenbroch, 2000). It is also consistent with behavioural finance literature, such as Allen & McGoun (2001), that suggests investments are multi-faceted, but ultimately can be categorized as hedonic and utilitarian. To further investigate this problem, a longer list of investment activities would be useful to identify a larger pool of hedonic activities (discussed further in Section 5.4).

### *5.2.3 Utilitarian Investment on Reinvestment*

The third objective of this study was to take the interaction effect between cognitive style and wealth type (discussed in Section 5.2.1) and moderate it with utilitarian investment activities (described in Section 5.2.2). I predicted that the results of the interaction would be more prominent when analytic thinkers considered utilitarian investment activities when reinvesting their gains. The results of this test were statistically significant and indeed more pronounced than that of the original effect. This result is

consistent with Hossain (2018) which suggests analytic thinkers will be more likely to reinvest than holistic thinkers because the latter exhibit categorization flexibility, changing their behaviour during utilitarian consumption instances.

One obvious issue with this result (as pointed out in Section 5.2.2), is that Hypotheses 2A is only partially supported and 2B is not supported. However, when comparing the means of the proposed utilitarian and hedonic investment activities, one of the hedonic investment activities scored very closely to the utilitarian investment activities ("Investing in a city that is building green infrastructure"). Since only the utilitarian activities were used in H3, the partially supported hypothesis is still useful in moderating the effect. It therefore suggests that the result provides empirical evidence that the effect is more pronouncedly observed when investments are utilitarian. Replication of this test is suggested for future research, after more thorough testing on the nature of investment has been conducted.

## 5.3 Implications of This Research

In this research I have replicated previous results in consumer behaviour research showing that cognitive style influences mental accounting in making personal investment decisions. The statistically significant results of this research lends weight to the idea that analytic thinkers are more likely to reinvest gains into similar investment types in a personal finance context. These results in turn produce theoretical and practical implications.

### *5.3.1 Theoretical Implications*

In terms of theoretical implications, this research contributes to the literature in behavioral finance. Specifically, these findings will be useful for scholars and research communicators that study and disseminate cognitive biases in real world situations. These researchers can use the results of this study to further investigate undiscovered connections between consumer behaviour and personal

finance theory. Also, further study can be done into the individual perception of the characteristics of the hedonic/utilitarian nature of investments.

First, this research demonstrates replication of the effects of mental accounting on cognitive style in a new context: personal finance decision making. Previous consumer behaviour research showed that analytic thinkers will exhibit the mental labelling effect and be inflexible with mental accounting, and the effect will be most evident in utilitarian product purchases (Hossain, 2018). The results of this study replicate this effect using personal finance mental accounts (wealth types) and moderate the effect with utilitarian investment. The findings suggest that both thinking styles and investment type have a key impact on personal finance decision making, but they also impact each other. This gives rise to broader implications for behavioral finance since it strengthens our understanding of mental accounting in personal finance decision making and the specific cognitive mechanisms that make up our mental labeling systems. It also warrants further investigation into more connections between consumer behaviour and personal finance theory.

Secondly, there is very little research in the field of behavioural finance that pertains to how the characteristics of an investment are perceived by individuals. Allen & McGoun (2001) argue that a priori we can intuit that investment has both utilitarian and hedonic elements, consistent to those described in consumer products (Voss et al., 2003); however, there is a significant lack of research attempting to demonstrate that empirically. This study demonstrates that the nature of investment can be characterized as hedonic or utilitarian, by using the HED/UT scale. To better understand the relationship of scale items to hedonic investments, more investment activities need to be tested against the HED/UT scale. More broadly, having further evidence that investments can be defined as hedonic, would allow other consumer behaviour results to be tested for similar marketing behaviour (e.g., pricing strategies (Rosen, 1974)).

### *5.3.2 Practical Implications*

In terms of practical implications, this research contributes to practice in personal finance. In particular, the findings are useful for self-serve investors, investments advisors, and policymakers. These players can ascertain guidance on portfolio diversification and unconscious bias to improve decision making, customer service, and consumer protection (respectively).

First, practical advice can be given to self-serve investors about their individual biases through popular media. The findings of this dissertation indicate that analytic thinkers (particularly those that are risk-averse and/or Caucasian) are more likely to reinvest the gains from one investment into similar investments, especially ones that are deemed to be utilitarian investments. Individual investors can be made aware that there may be a tendency for them to stick with the same investments chosen in the past, regardless of changes in the investment environment; and they may also be more likely to double-down on investments that are considered “effective”, “necessary”, “helpful”, and “practical”. Furthermore, it is likely that these investors will have less diversified portfolios as a result. Therefore, self-serve investors should be encouraged to employ principles of MPT by periodically rebalancing their portfolio to optimize returns and reduce volatility. Finally, self-serve investors could be made aware of the benefits using fee-based consultants for third-party portfolio reviews. This could help ensure diversification to help with long-term wealth building and protect their portfolios during market down-turns.

Second, this research can inform the practical guidance given by financial advisors to their retail clients. The findings of this dissertation suggest that advisors may require customized solutions for analytic thinkers (and those that are risk-averse and/or Caucasian) for re-distributing the reinvestment of gains, especially ones that are deemed to be utilitarian investments. To accomplish this, advisors could learn more about new clients by providing them cognitive style surveys to determine if they are a holistic or analytic thinker. Combining this context with static data on ethnicity could provide more

information on reinvestment preferences and portfolio make-up. Advisors could then pre-emptively strategize with their clients about how to best reinvest gains in accordance with MPT.

Lastly, this study provides insight and guidance to policymakers. The findings suggest that unconscious bias exists in reinvesting gains for some investors. As a result, this could lead to less diversified portfolios and affect liquidity for investors during market downturns, thereby having ramifications for timing the exit of long-term investment accounts that fund retirement and education plans. The knowledge of this phenomenon could be used to create programs for citizens that safeguard these planned life-events from down-markets. For example, policymakers could work with financial institutions to set-up investment accounts to perform portfolio rebalances by default, of which investors need to opt-out to take on the greater risk associated with an unbalanced portfolio. This would help protect risk-averse investors by reducing risk (e.g., Beta), while making risk-seeking investors mindful in their decision to increase risk to outperform the market (e.g., Alpha).

**5.4 Limitations and Future Research**

First and foremost, this study is limited by the quasi-experimental design. There are a few areas in which the hypothetical nature may not be providing real-world results including the gambling game (measuring risk) and the investment opportunity scenario (measuring reinvestment of gains). In order to achieve more generalizable results, a field experiment could be conducted in conjunction with a financial institution or investment broker to use real-world observation in actual decision-making scenarios.

Secondly, this research design forced the participants to make a new selection of investment. In real-world applications investors typically don't make conscious reinvestments. In many scenarios, assets such as real estate and equities/corporate stock tend to be ongoing (resulting in an overweight position and requiring intervention to actualize gains). Future research should focus on instances where

overweight positions are not highlighted to observe whether holistic thinkers are more likely to intervene.

Lastly, as discussed in Section 5.2.2., the concept of the nature of investment is consistent with consumer behaviour and finance literature in so far that investments, like products, are multi-faceted but can be categorized as hedonic or utilitarian. However, in my study, four of the six investment activities were rated as utilitarian, which may have been why the results were unsupported. To further investigate this problem, I believe that a longer list of investment activities should be rated using the HED/UT scale to identify superior examples of hedonic activities. In this study, the most hedonic investment activities were “investing in a vacation resort's property expansion” and “investing in high growth firms.” To identify superior hedonic investment activities, future research should focus on the elements that makes these activities fail to be utilitarian. Similarly, another option is to focus on hedonic investment activities that are consumed at the moment of purchase, rather than for the outcome at a later date (Allen & McGoun, 2001).

**5.5 Summary**

The above chapter discussed the results of the experiment, described the theoretical and practical implications, and identified limitations and ideas for future research. The results of this experiment provided empirical evidence that analytic thinkers are more like to reinvest gains from investment in one period to the next, especially in instances where the nature of the investment is utilitarian. The effect is more prominent in Caucasians and risk-averse investors, and even more prominent with Caucasians that are also risk-averse.

This information benefits theoretical and practical matters in decision making, customer service, and protecting consumers. Daily, self-serve investors and advisors make direct and indirect decisions on how to reinvest gains within their portfolio. If academia and research communicators can help promote

awareness of some individuals' unconscious biases to reinvest gains from one investment into a similar venture, this can help strengthen the average investor's portfolio by optimizing returns and reducing volatility from market risk.

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# Appendices

## Appendix A – The Analysis-Holism Scale

Table A1

*10-Item Analysis-Holism Scale Items*[13]

| *Scale Items* |
|---|
| 1. Everything in the universe is somehow related to each other. |
| 2. Even a small change in any element in the universe can lead to substantial alterations in others. |
| 3. Any phenomenon has a numerous number of causes although some of the causes are not known. |
| 4. Any phenomenon has a numerous number of results although some of the results are not known. |
| 5. Nothing is unrelated. |
| 6. It's not possible to understand the pieces without considering the whole picture. |
| 7. Sometimes, the empty space in a painting is just as important as the objects. |
| 8. The whole is greater than the sum of its parts. |
| 9. Paying attention to the field is more important than paying attention to its elements. |
| 10. A marker of good architecture is how harmoniously it blends with other buildings around it. |

[13] (Choi, Dalal, Kim-Prieto, & Park, 2003).

**Appendix B – Investment Type**

Table B1

*List of HED/UT Scale Items*

| Scale Items |
|---|
| 1. Fun (h) |
| 2. Exciting (h) |
| 3. Thrilling (h) |
| 4. Enjoyable (h) |
| 5. Effective (u) |
| 6. Necessary (u) |
| 7. Helpful (u) |
| 8. Practical (u) |
| *(h) denotes hedonic, (u) denotes utilitarian |

Table B2

*List of Investment Activities*

| *Investment Activities* |
|---|
| 1. Investing in a city that is building green infrastructure. {Hedonic, Income} |
| 2. Investing in a group of high-tech companies. {Hedonic, Current Assets} |
| 3. Investing in a vacation resort's property expansion. {Hedonic, Future Cash Flow} |
| 4. Investing in a federal government highway expansion initiative. {Utilitarian, Income} |
| 5. Investing in a group of local utility companies. {Utilitarian, Current Assets} |
| 6. Investing in a toilet paper company's manufacturing capabilities. {Utilitarian, Future Cash Flow} |

**Appendix C – Complete Sample Size Calculation**

Sample size of a large population[14] :

$n' = n/(1 + (z^2 * \frac{\hat{p}(1-\hat{p}]}{E^2 N}))$

Where:

z = 1.645 (z score)

E = 10% (margin of error)

N = 350,000 (estimated population size)

$\hat{p}$ = 0.5 (population proportion)

$n'$= 350000 / [1 + (1.645^2*.5(1-0.5)/.1^2*350000)]

$n'$= 69

[14] (Smith, 2013).

## Appendix D – Certification of Ethics

Athabasca University
RESEARCH CENTRE

**CERTIFICATION OF ETHICAL APPROVAL - RENEWAL**

The Athabasca University Research Ethics Board (REB) has reviewed and approved the research project noted below. The REB is constituted and operates in accordance with the current version of the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS2) and Athabasca University Policy and Procedures.

**Ethics File No**.: **24289**

**Principal Investigator**:
Mr. Matthew Donovan, Graduate Student
Faculty of Business\Doctor of Business Administration (DBA)

**Supervisor**:
Dr. Weiming Liu (Supervisor)

**Project Title**:
The Effect of Cognitive Style on Mental Accounting in Personal Finance Decision Making

**Effective Date:** April 08, 2022 **Expiry Date**: April 07, 2023

**Restrictions:**

Any modification or amendment to the approved research must be submitted to the AUREB for approval.

Ethical approval is valid *for a period of one year*. An annual request for renewal must be submitted and approved by the above expiry date if a project is ongoing beyond one year.

A Project Completion (Final) Report must be submitted when the research is complete *(i.e., all participants contact and data collection is concluded, no follow-up with participants is anticipated and findings have been made available/provided to participants (if applicable))* or the research is terminated.

**Approved by:** **Date: March 28, 2022**

Carolyn Greene, Chair
Athabasca University Research Ethics Board

Athabasca University Research Ethics Board
University Research Services, Research Centre
1 University Drive, Athabasca AB Canada T9S 3A3
E-mail rebsec@athabascau.ca
Telephone: 780.213.2033

Athabasca University
RESEARCH CENTRE

# CERTIFICATION OF ETHICAL APPROVAL

The Athabasca University Research Ethics Board (REB) has reviewed and approved the research project noted below. The REB is constituted and operates in accordance with the current version of the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS2) and Athabasca University Policy and Procedures.

**Ethics File No.: 24289**

**Principal Investigator:**
Mr. Donovan Matthew, Graduate Student
Faculty of Business\Doctor of Business Administration (DBA)

**Supervisor:**
Dr. Weiming Liu (Supervisor)

**Project Title:**
Exploratory Proposal - The Effect of Cognitive Style on Mental Accounting in Personal Finance Decision-Making

**Effective Date:** April 08, 2021 **Expiry Date:** April 07, 2022

**Restrictions:**

Any modification or amendment to the approved research must be submitted to the AUREB for approval.

Ethical approval is valid *for a period of one year*. An annual request for renewal must be submitted and approved by the above expiry date if a project is ongoing beyond one year.

A Project Completion (Final) Report must be submitted when the research is complete *(i.e. all participant contact and data collection is concluded, no follow-up with participants is anticipated and findings have been made available/provided to participants (if applicable))* or the research is terminated.

**Approved by:** **Date: April 08, 2021**

Houda Trabelsi, Chair
Faculty of Business, Departmental Ethics Review Committee

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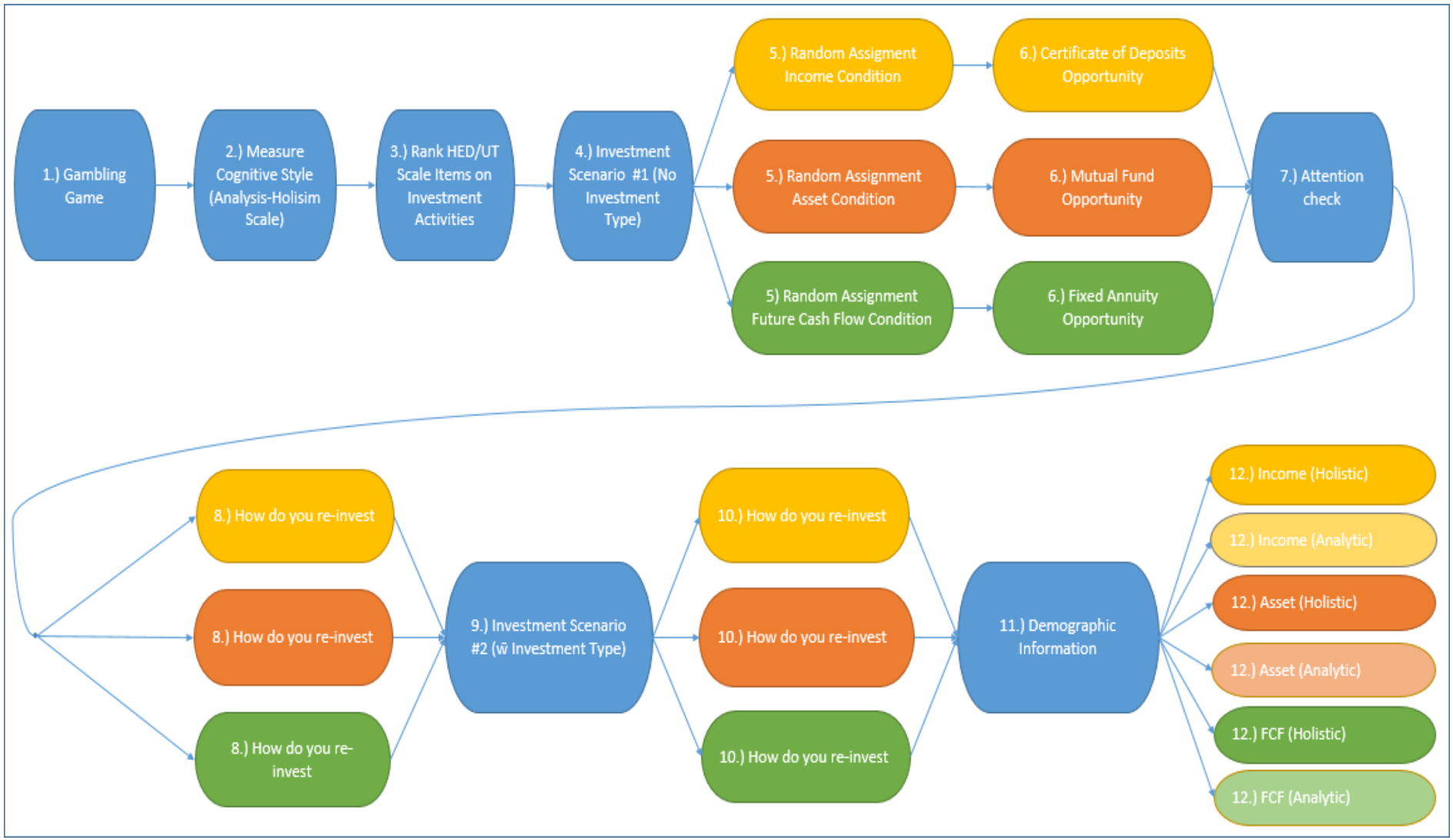
Athabasca University Research Ethics Board
University Research Services, Research Centre
1 University Drive, Athabasca AB Canada T9S 3A3
E-mail rebsec@athabascau.ca
Telephone: 780.213.2033

**Appendix E - Experimental Procedure Flowchart**



**Appendix F – Experimental Design Instrument**

Slide 1 - Welcome!

**ONLINE PARTICIPANT CONSENT FORM**

**Principal Researcher:**
Matthew Donovan
613-539-6906

**Supervisor:** (if applicable)
Weiming Liu

You are invited to participate in a research study. I am conducting this study as a requirement to complete my Doctorate in Business Administration.

As a participant, you are asked to participate in this study by completing a short online questionnaire about Personal Finance and Investing. Participation will take approximately 5-8 minutes of your time.

Involvement in this study is entirely voluntary and you may refuse to answer any questions or to share information that you are not comfortable with. You will not be asked to provide any personal or identifiable information or data.

You may withdraw from the study at any time by simply closing out of your browser. Once you submit your completed survey, however, data cannot be withdrawn as the survey is completely anonymous. Please print a copy of this consent form for your records.

*Please note that the survey data may be initially collected and stored on a server in the U.S. and is subject to access under the U.S. Patriot Act until it is transferred from that server to the researcher's computer*.

All hard copy data will be kept in locked cabinets in my office. All electronic data will be kept in a password protected computer in my office. All information and records will be destroyed by confidential shredding. Electronic records will be deleted when all project requirements have been met approximately by August 2023.

Results of this study may be used to conduct research to complete a thesis and/or publish articles in periodicals that disseminate information in personal finance and investment. The existence of the research will be listed in an abstract posted online at the Athabasca University Library's Digital Thesis and Project Room and the final research paper will be publicly available.

If you have any questions about this study or require further information, please contact Matthew Donovan using the contact information above.

This study has been reviewed by the Athabasca University Research Ethics Board. Should you have any comments or concerns regarding your treatment as a participant in this study, please contact the Research Ethics Officer at 780-213-2033 or by e-mail to rebsec@athabascau.ca.

Thank you for your assistance in this project.

**CONSENT:**
**The completion of the questionnaire and its submission is viewed as your consent to participate.**

BEGIN THE SURVEY

Slide 2 - Gambling Game

Imagine a scenario where you have a 50% chance of winning $100.

{Validation: Min = 0 Max = 100}

How much would you be willing to pay for this opportunity?
*

0 _____[ 50_]_____ 100

**Hidden Value: Confirmation Code**[15]

**Value:** populates with a randomly generated number between 1 and 99999

**Hidden Action: Percent Branch Action**[16]

Certificate of Deposits 33%

Stock 33%

Fixed Annuity 34%

[15] On this slide a hidden confirmation code is created. Upon completion of the survey, it will be provided to the participant. They will need to enter it in Mturk to get compensated.

[16] On this slide, traffic is equally divided into one of the three wealth type treatments.

Slide 3 - How Do You See it?

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| It's not possible to understand the pieces without considering the whole picture. | | | | | | | |
| Sometimes, the empty space in a painting is just as important as the objects. | | | | | | | |
| The whole is greater than the sum of its parts. | | | | | | | |
| Paying attention to the field is more important than paying attention to its elements. | | | | | | | |
| A marker of good architecture is how harmoniously it blends with other buildings around it. | | | | | | | |

*[Items 1-7 are listed as Strongly Disagree, Mostly Disagree, Mildly Disagree, Neither Agree Disagree, Mildly Agree, Mostly Agree, Strongly Agree, I've just put the numbers in for readability.]

Slide 4 - How Do You See it? (2/2)

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| Everything in the universe is somehow related to each other. | | | | | | | |
| Even a small change in any element in the universe can lead to substantial alterations in others. | | | | | | | |
| Any phenomenon has a numerous number of causes although some of the causes are not known. | | | | | | | |
| Any phenomenon has a numerous number of results although some of the results are not known. | | | | | | | |
| Nothing is unrelated. | | | | | | | |

*[Items 1-7 are listed as Strongly Disagree, Mostly Disagree, Mildly Disagree, Neither Agree Disagree, Mildly Agree, Mostly Disagree, Strongly Agree, I've just put the numbers in for readability.]

Slide 5 - Think About the Following Activity as a Financial Investment

Investing in a city that is building green infrastructure?

Please rank the following items in terms of how relevant they are to the above investment using the drag and drop feature below, the top answer (1) is the most relevant word and the bottom answer (8) is the least relevant.*

| | |
|---|---|
| Fun | 1. |
| Practical | 2. |
| Exciting | 3. |
| Helpful | 4. |
| Thrilling | 5. |
| Necessary | 6. |
| Enjoyable | 7. |
| Effective | 8. |

Slide 6 - Think About the Following Activity as a Financial Investment

Investing in a federal government highway expansion initiative?

Please rank the following items in terms of how relevant they are to the above investment using the drag and drop feature below, the top answer (1) is the most relevant word and the bottom answer (8) is the least relevant.*

| | |
|---|---|
| Fun | 1. |
| Practical | 2. |
| Exciting | 3. |
| Helpful | 4. |
| Thrilling | 5. |
| Necessary | 6. |
| Enjoyable | 7. |
| Effective | 8. |

Slide 7 - Think About the Following Activity as a Financial Investment

investing in a group of local utility companies?

Please rank the following items in terms of how relevant they are to the above investment using the drag and drop feature below, the top answer (1) is the most relevant word and the bottom answer (8) is the least relevant.*

| | |
|---|---|
| Fun | 1. |
| Practical | 2. |
| Exciting | 3. |
| Helpful | 4. |
| Thrilling | 5. |
| Necessary | 6. |
| Enjoyable | 7. |
| Effective | 8. |

Slide 8 - Think About the Following Activity as a Financial Investment

Investing in a group of high-tech companies?

Please rank the following items in terms of how relevant they are to the above investment using the drag and drop feature below, the top answer (1) is the most relevant word and the bottom answer (8) is the least relevant.*

| | |
|---|---|
| Fun | 1. |
| Practical | 2. |
| Exciting | 3. |
| Helpful | 4. |
| Thrilling | 5. |
| Necessary | 6. |
| Enjoyable | 7. |
| Effective | 8. |

Slide 9 - Think About the Following Activity as a Financial Investment

Investing in a vacation resort's property expansion?

Please rank the following items in terms of how relevant they are to the above investment using the drag and drop feature below, the top answer (1) is the most relevant word and the bottom answer (8) is the least relevant.*

| | |
|---|---|
| Fun | 1. |
| Practical | 2. |
| Exciting | 3. |
| Helpful | 4. |
| Thrilling | 5. |
| Necessary | 6. |
| Enjoyable | 7. |
| Effective | 8. |

Slide 10 - Think About the Following Activity as a Financial Investment

Investing in a toilet paper company's manufacturing capabilities?

Please rank the following items in terms of how relevant they are to the above investment using the drag and drop feature below, the top answer (1) is the most relevant word and the bottom answer (8) is the least relevant.*

| | |
|---|---|
| Fun | 1. |
| Practical | 2. |
| Exciting | 3. |
| Helpful | 4. |
| Thrilling | 5. |
| Necessary | 6. |
| Enjoyable | 7. |
| Effective | 8. |

Slide 11 - Scenario - Investment Opportunity

Imagine a scenario where you could break down your net worth into this simplified portfolio of investments. In this scenario, a typical financial portfolio consists of the following:

- Cash - earning 3% bank interest (annually).
- Corporate stocks - earning 6% (annually).
- Retirement savings account (e.g., IRA, 401k) - earning 5% (annually).

Slide 12A - You are Given the Opportunity to Buy a Certificate of Deposits (CD) on a Two-ear Term

[Condition A]

A Certificate of Deposits (CD) is an investment with a guaranteed interest rate on a lump-sum payment for a pre-determined amount of time. A typical Return on Investment (ROI) for this type of Certificate of Deposits (CD) is 7% per year.

Now imagine that you made an investment in this Certificate of Deposits (CD). Recall that a typical financial portfolio consists of:

- Cash earning 3%
- Corporate stock earning 6%
- Retirement savings account earning 5%

Slide 12B - You are Given the Opportunity to Buy Shares in a Mutual Fund

[Condition B]

A Mutual Fund is an investment in a variety of stocks and bonds, instead of having a share of ownership in one company. A typical Return on Investment (ROI) for this type of Mutual Fund is 7% per year.

Now imagine that you made an investment in this Mutual Fund. Recall that a typical financial portfolio consists of:

- Cash earning 3%
- Corporate stock earning 6%
- Retirement savings account earning 5%

Slide 12C - You are Given the Opportunity to Buy a Fixed Annuity in a Retirement Savings Account

[Condition C]

A Fixed Annuity is an insurance contract that guarantees an interest rate payable to you when you retire. A typical Return on Investment (ROI) for this type of Fixed Annuity is 7% per year.

Now imagine that you made an investment in this Fixed Annuity. Recall that a typical financial portfolio consists of:

- Cash earning 3%
- Corporate stock earning 6%
- Retirement savings account 5%

Slide 13 - Checking In

Which investment opportunity did you receive in this survey[17]?*

- ☐ Certificate of Deposits (CD)
- ☐ Mutual Fund
- ☐ Fixed Annuity

[17] These items are randomized.

Slide 14A - I'm Sorry That Answer is Incorrect. Please Re-Read the Information Provided Below[18].

[Condition A]

A Certificate of Deposits (CD) is an investment with a guaranteed interest rate on a lump-sum payment for a pre-determined amount of time. A typical Return on Investment (ROI) for this type of Certificate of Deposits (CD) is 7% per year.

Now imagine that you made an investment in this Certificate of Deposits (CD). Recall that a typical financial portfolio consists of:

- Cash earning 3%
- Corporate stock earning 6%
- Retirement savings account earning 5%

Slide 14B - I'm Sorry That Answer is Incorrect. Please Re-Read the Information Provided Below.

[Condition B]

A Mutual Fund is an investment in a variety of stocks and bonds, instead of having a share of ownership in one company. A typical Return on Investment (ROI) for this type of Mutual Fund is 7% per year.

Now imagine that you made an investment in this Mutual Fund. Recall that a typical financial portfolio consists of:

- Cash earning 3%
- Corporate stock earning 6%
- Retirement savings account earning 5%

Slide 14C - I'm Sorry That Answer is Incorrect. Please Re-Read the Information Provided Below.

[Condition C]

A Fixed Annuity is an insurance contract that guarantees an interest rate payable to you when you retire. A typical Return on Investment (ROI) for this type of Fixed Annuity is 7% per year.

Now imagine that you made an investment in this Fixed Annuity. Recall that a typical financial portfolio consists of:

- Cash earning 3%
- Corporate stock earning 6%
- Retirement savings account 5%

[18] Slide 14 is shown only to participants that selected the incorrect response.

Slide 15A - Congratulations! Your investment has Yielded 7% Interest as Expected.[19]

[Condition A]

You have received interest back from your investment. How would you like to reinvest the gains from your Certificate of Deposits (CD)?[20]

- ☐ The stock market (estimated return of 7%)
- ☐ A similar two-year Certificate of Deposit (CD) (estimated return of 7%)
- ☐ A retirement savings account (estimated return of 7%)

Slide 15B - Congratulations! Your investment has Yielded 7% Interest as Expected.

[Condition B]

You have received interest back from your investment. How would you like to reinvest the gains from your Mutual Fund?*

- ☐ A similar mutual fund (estimated return of 7%)
- ☐ A two-year deposit in a high interest savings account (estimated return of 7%)
- ☐ A retirement savings account (estimated return of 7%)

Slide 15C - Congratulations! Your investment has yielded 7% interest as expected.

[Condition C]

You have received interest back from your investment. How would you like to reinvest the gains from your Fixed Annuity?*

- ☐ The stock market (estimated return of 7%)
- ☐ A two-year deposit in a high interest savings account (estimated return of 7%)
- ☐ A similar Fixed Annuity (estimated return of 7%)

[19] Responses are randomized to reduce selection order bias.

[20] All responses are mandatory.

Slide 16A - After Doing Some Digging…

[Condition A]

After investigating your Certificate of Deposits (CD), you find out that you finance a federal government highway expansion initiative.

Knowing this information, how would you reinvest your 7% interest gains:*

- The stock market (estimated return of 7%)
- A similar two-year Certificate of Deposit (CD) (estimated return of 7%)
- A retirement savings account (estimated return of 7%)

Slide 16B - After Doing Some Digging…

[Condition B]

After investigating your Mutual Fund, you find out that you own a small fraction of the local utility companies.

Knowing this information, how would you reinvest your 7% interest gains:*

- A similar mutual fund (estimated return of 7%)
- A two-year deposit in a high interest savings account (estimated return of 7%)
- A retirement savings account (estimated return of 7%)

Slide 16C - After Doing Some Digging…

[Condition C]

After investigating your Fixed Annuity, you find out that you loan cash to expand a toilet paper company's manufacturing capability.

Knowing this information, how would you reinvest your 7% interest gains:*

- The stock market (estimated return of 7%)
- A two-year deposit in a high interest savings account (estimated return of 7%)
- A similar Fixed Annuity (estimated return of 7%)

Slide 17 - Tell Me About Yourself (1 of 2)

Please respond to the following questions

What age group applies to you?*

- 18-29
- 30-39
- 40-49
- 50-59
- 60+

What is your gender?*

- Male
- Female
- Non-binary
- Prefer not to say

What best describes your ethnicity?*

- Caucasian
- East Asian
- African-American
- Hispanic / Latino
- South Asian
- Other

What best describes your level of education?*

- High school graduate or less
- Two-year degree or some college
- Bachelor's degree
- Graduate degree

What is your marital status?*

- Single
- Married
- Separated/Divorced/Widowed
- Other

Slide 18 - Tell Me About Yourself (2 of 2)

What is your employment status?*

- Full-time (40+ hours per week)
- Part-time (less than 40 hours per week)
- Retired
- Student
- Not currently employed

What industry do you work in?*[21]

- Business / Accounting
- Community / Social Services
- Education
- Food Services / Retail
- Information Technology
- Life / Physical Sciences
- Legal Services
- Manufacturing
- Tourism
- Other

What is your annual household income?*

- Less than $40,000
- $40,000 - $59,999
- $60,000 - $79,999
- $80,000 - $99,999
- $100,000 - $149,999
- $150,000 - $199,999
- $200,000 +

How much accumulated net-worth do you have (i.e., total amount of your savings, investments, retirement funds, house equity, etc. less what you owe)?*

- Less Than $121,700
- More than $121,700

How would you rate your expertise in personal finance when comparing yourself to friends?*

- More Experienced
- Equally Experienced
- Less Experienced

[21]Asked only to those currently working.

Slide 19 - Thank You!

Thank you for taking our survey. Your response is very important to us.

Here is your Mturk Code _____

[The Mturk Code is provided to each participant and is used for them to receive compensation. It is randomly generated on slide 2 and displayed at the end]

**Appendix G – Statistical Tables**

Table 7

*Demographic Frequencies*

This table provides descriptive statistics on demographic data. Data is sorted by the demographic characteristic, the options presented to the respondents, and the frequency of the responses listed as a percentage.

| Characteristic | Options | Frequency % |
|---|---|---|
| | | N = 414 |
| Gender | Female | 50.2% |
| | Male | 49.6% |
| | Non-Binary | 0.2% |
| Age Group | 18-29 | 23.2% |
| | 30-39 | 38.1% |
| | 40-49 | 18.4% |
| | 50-59 | 14.0% |
| | 60+ | 6.3% |
| Ethnic Group | African-American | 8.0% |
| | Caucasian | 80.2% |
| | East Asian | 3.5% |
| | Hispanic / Latino | 3.9% |
| | Other | 3.9% |
| | South Asian | 0.5% |
| Education | 2-year degree or some college | 11.1% |
| | Bachelor's degree | 67.6% |
| | Graduate degree | 13.8% |
| | High school graduate or less | 7.5% |
| Marital Status | Separated/Divorced/Widowed | 4.8% |
| | Single | 21.3% |
| | Married | 73.2% |
| | Other | 0.7% |
| Employment Status | Full-time (40+ hours per week) | 87.0% |
| | Part-time (less than 40 hours per week) | 7.6% |
| | Retired | 1.0% |
| | Student | 1.5% |
| | Not currently employed | 2.9% |
| Sector | Business/Accounting | 18.6% |
| | Community/Social Services | 3.6% |
| | Education | 10.4% |
| | Food Services/Retail | 8.9% |
| | Information Technology | 27.8% |

| | | |
|---|---|---|
| | Legal Services | 1.0% |
| | Life/Physical Sciences | 3.4% |
| | Manufacturing | 13.0% |
| | Other | 8.0% |
| | Not Employed | 5.3% |
| Annual Income | Less than $40,000 | 20.0% |
| | $40,000 - $59,999 | 34.4% |
| | $60,000 - $79,999 | 19.8% |
| | $80,000 - $99,999 | 17.4% |
| | $100,000 - $149,999 | 6.3% |
| | $150,000 - $199,999 | 1.4% |
| | $200,000 + | 0.7% |
| Accumulated Wealth | Less than $31,000 | 57.1% |
| | More than $31,000 | 42.9% |
| Personal Finance Experience | Less Experienced | 12.6% |
| | Equally Experienced | 51.8% |
| | More Experienced | 35.6% |
| Risk Profile | Risk-averse | 46.6% |
| | Neutral | 16.4% |
| | Risk-seeking | 37.0% |

Table 8

*Main Effect of Cognitive Style on Reinvestment (No Moderator - $\chi^2$ of Independence)*

The table presents the main effect of cognitive style on reinvestment, using a chi-square test of independence. The table shows the number of participants who reinvested and did not reinvest in each wealth type condition, broken down by analytic and holistic cognitive styles. The data is analyzed using a chi-square statistic and p-value for each condition. The results suggest there is no significant effect of cognitive style on reinvestment in any wealth type condition.

| Condition | Cognitive Style | Did Reinvest | Did Not Reinvest | Total | $\chi^2$ | p-value (one-tailed) |
|---|---|---|---|---|---|---|
| Income | Analytic | 42 | 30 | 72 | 1.79 | .091 |
| | Holistic | 31 | 35 | 66 | | |
| Current Asset | Analytic | 30 | 40 | 70 | .083 | .181 |
| | Holistic | 24 | 44 | 68 | | |
| FCF | Analytic | 44 | 25 | 69 | 1.08 | .150 |
| | Holistic | 38 | 31 | 69 | | |

Table 9

*Main Effect of Cognitive Style on Reinvestment (No Moderator – Two Proportions)*

The table presents the main effect of cognitive style on reinvestment, using two proportions. For each of the three conditions (Income, Current Asset, FCF), the number of participants who reinvested and did not reinvest in each wealth type condition, broken down by analytic and holistic cognitive style. The data is analyzed using a t-test, and the results suggest that in the income condition, participants with an analytic cognitive style are more likely to reinvest than those with a holistic cognitive style. However, in the Current Asset and FCF conditions, there is no significant difference in reinvestment behavior between the two cognitive styles.

| Condition | Cognitive Style | Did Reinvest | Did Not Reinvest | Total | t-stat | p-value (one tailed) |
|---|---|---|---|---|---|---|
| Income | Analytic | 42 | 30 | 72 | 1.90 | .031 |
| | Holistic | 31 | 35 | 66 | | |
| Current Asset | Analytic | 30 | 40 | 70 | 1.04 | .149 |
| | Holistic | 24 | 44 | 68 | | |
| FCF | Analytic | 44 | 25 | 69 | 1.05 | .150 |
| | Holistic | 38 | 31 | 69 | | |

Table 10

*Main Effect of Cognitive Style on Reinvestment (No Condition - No Moderator)*

The table presents the results of a chi-square test examining the main effect of cognitive style on reinvestment, without performing a median split on each wealth type condition. The data indicates that there is a significant difference between the reinvestment behavior of participants with an analytic cognitive style versus those with a holistic cognitive style, with those with an analytic style more likely to reinvest.

| Condition | Cognitive Style | Did Reinvest | Did Not Reinvest | Total | $\chi^2$ | p-value (one tailed) |
|---|---|---|---|---|---|---|
| None | Analytic | 114 | 94 | 208 | 3.13 | .039 |
| | Holistic | 95 | 111 | 206 | | |

Table 11

*Demographic of Cognitive Style on Reinvestment (No Condition - No Moderator)*

The table presents data on the number of participants who have a certain cognitive style and have either reinvested or not reinvested when median split is applied to the responses. The data is analyzed using a chi-square test, and the results suggest that there is a significant difference in reinvestment behavior between participants with analytic and holistic cognitive styles in both the Caucasian and Risk Averse conditions.

| Condition | Cognitive Style | Did Reinvest | Did Not Reinvest | Total | $\chi^2$ | p-value (one tailed) |
|---|---|---|---|---|---|---|
| Caucasian | Analytic | 95 | 82 | 177 | 3.18 | .037 |
| | Holistic | 68 | 87 | 155 | | |
| Risk Averse | Analytic | 74 | 49 | 123 | 3.06 | .040 |
| | Holistic | 33 | 37 | 70 | | |
| Caucasian and Risk Averse | Analytic | 63 | 42 | 105 | 3.96 | .023 |
| | Holistic | 21 | 28 | 49 | | |

Table 12

*Binary Logistical Regressions of Main Effect (No Condition - No Moderator)*

The table presents the results of a logistic regression analysis examining the effect of the independent variables (Wealth Type and Cognitive Style) on the dependent variable (outcome). The results indicate that for the Wealth Type independent variable, the Current Assets group is significantly different from the FCF group, while for the Cognitive Style independent variable, the Analytic group is significantly different from the Holistic group. Independent Variable Group

| Independent Variable Group | Variable | Wald | Df | Sig | Exp(B) |
|---|---|---|---|---|---|
| Wealth Type | Income | - | - | - | - |
| | Current Assets | 6.313 | 1 | .012 | 1.863 |
| | FCF | .967 | 1 | .325 | .786 |
| Cognitive Style | Holistic | - | - | - | - |
| | Analytic | 4.297 | 1 | .038 | 1.522 |

Table 13

*Mean Responses for HET/UT Scale across Investment Activities*

The table presents data on the relevance assigned by participants to the six difference investment activities (Hed1, Hed2, Hed3, Util1, Util2, Util3) by the HED/UT scale items. Each investment activity is rated using the HED/UT scale on a scale from 1 to 8, with lower values indicating more relevance.

| | Hed1 | Hed2 | Hed3 | Util1 | Util2 | Util3 |
|---|---|---|---|---|---|---|
| H1 | 5.24 | 4.88 | 3.97 | 5.48 | 5.41 | 5.42 |
| H2 | 4.81 | 3.95 | 3.84 | 4.80 | 4.68 | 4.98 |
| H3 | 6.04 | 4.93 | 4.84 | 5.79 | 5.63 | 5.56 |
| H4 | 5.07 | 5.14 | 4.23 | 5.37 | 5.43 | 5.45 |
| U1 | 3.27 | 3.77 | 4.30 | 3.21 | 3.28 | 3.00 |
| U2 | 3.48 | 3.85 | 4.45 | 3.58 | 3.41 | 3.41 |
| U3 | 3.86 | 4.75 | 5.22 | 3.52 | 3.91 | 3.79 |
| U4 | 4.24 | 4.74 | 5.14 | 4.25 | 4.27 | 4.39 |

Table 14

*Reliability Statistics Analysis of Investment Activities*

The table presents the results of the Cronbach's alpha coefficient and the number of items for the hedonic and utilitarian investment activities. The Cronbach's alpha coefficient for the hedonic items is low (0.497), which suggests that the hedonic investment activities not highly correlated and the scale may not be very reliable. In contrast, the Cronbach's alpha coefficient for the utilitarian items is (0.994), indicating that the utilitarian investment activities are highly correlated, and the scale is highly reliable.

| Cronbach's Alpha | Cronbach's Alpha | N of Items |
|---|---|---|
| Investment Activities HED | .497 | 4 |
| Investment Activities UTIL | .994 | 4 |

Table 15

*Independent Samples Test of Investment Activities*

The table presents the results of independent samples t-tests which examine differences between HED/UT scale items across hedonic and utilitarian investment activities. Results indicate hedonic investment activities are not significantly different, but utilitarian investment activities are.

| Investment Activity | df | t-stat | Sig. (1-tailed) |
|---|---|---|---|
| Hedonic (Income) | 6 | 4.629 | 0.002 |
| Hedonic (Assets) | 6 | 1.183 | 0.14 |
| Hedonic (FCF) | 6 | -1.725 | 0.077 |
| Utilitarian (Income) | 6 | 5.712 | 0.001 |
| Utilitarian (Assets) | 6 | 5.072 | 0.001 |
| Utilitarian (FCF) | 6 | 5.297 | 0.001 |

Table 16

*Independent Samples Test of HED/UT Scale Items*

The table presents the results of independent samples t-tests which examine differences between hedonic and utilitarian investment activities on the HED/UT scale items. None of the HED/UT scale items were shown to be significantly different as hedonic or utilitarian.

| HED/UT Item | df | t-stat | Sig. (1-tailed) |
|---|---|---|---|
| Fun | 4 | -1.955 | 0.095 |
| Exciting | 4 | -1.945 | 0.062 |
| Thrilling | 4 | -.995 | 0.21 |
| Enjoyable | 4 | -2.097 | 0.087 |
| Practical | 4 | 1.995 | 0.059 |
| Helpful | 4 | 1.596 | 0.093 |
| Necessary | 4 | 2.096 | 0.052 |
| Effective | 4 | 1.559 | 0.097 |

Table 17

*Main Effect of Cognitive Style on Reinvestment (With Moderator - $\chi^2$ of Independence)*

The table presents the main effect of cognitive style on reinvestment, using a chi-square test of independence. The table shows the number of participants who reinvested and did not reinvest in each wealth type condition, broken down by analytic and holistic cognitive styles. The data is analyzed using a chi-square statistic and p-value for each condition. The results suggest there is no significant effect of cognitive style on reinvestment in any wealth type condition.

| Condition | Cognitive Style | Did Reinvest | Did Not Reinvest | Total | $\chi^2$ | p-value (one tailed) |
|---|---|---|---|---|---|---|
| Income | Analytic | 40 | 32 | 72 | 1.86 | .086 |
| | Holistic | 29 | 37 | 66 | | |
| Current Asset | Analytic | 31 | 39 | 70 | 1.16 | .140 |
| | Holistic | 24 | 44 | 68 | | |
| FCF | Analytic | 45 | 24 | 69 | 0.77 | .191 |
| | Holistic | 40 | 29 | 69 | | |

Table 18

*Main Effect of Cognitive Style on Reinvestment (No Moderator – Two Proportions)*

The table presents the main effect of cognitive style on reinvestment, using two proportions. For each of the three conditions (Income, Current Asset, FCF), the number of participants who reinvested and did not reinvest in each wealth type condition, broken down by analytic and holistic cognitive style. The data is analyzed using a t-test, and the results suggest that in the income condition, participants with an analytic cognitive style are more likely to reinvest than those with a holistic cognitive style. However, in the Current Asset and FCF conditions, there is no significant difference in reinvestment behavior between the two cognitive styles.

| Condition | Cognitive Style | Did Reinvest | Did Not Reinvest | Total | t-stat | p-value (one tailed) |
|---|---|---|---|---|---|---|
| Income | Analytic | 40 | 32 | 72 | 1.90 | .032 |
| | Holistic | 29 | 37 | 66 | | |
| Current Asset | Analytic | 31 | 39 | 70 | 1.22 | .113 |
| | Holistic | 24 | 44 | 68 | | |
| FCF | Analytic | 45 | 24 | 69 | .878 | .192 |
| | Holistic | 40 | 29 | 69 | | |

Table 19

*Main Effect of Cognitive Style on Reinvestment (No Condition - With Moderator)*

The table presents the results of a chi-square test examining the main effect of cognitive style on reinvestment, without performing a median split on each wealth type condition. The data indicates that there is a significant difference between the reinvestment behavior of participants with an analytic cognitive style versus those with a holistic cognitive style, with those with an analytic style more likely to reinvest.

| Condition | Cognitive Style | Did Reinvest | Did Not Reinvest | Total | $\chi^2$ | p-value (one tailed) |
|---|---|---|---|---|---|---|
| None | Analytic | 115 | 93 | 208 | 3.86 | .025 |
| | Holistic | 94 | 112 | 206 | | |

Table 20

*Demographic of Cognitive Style on Reinvestment (No Condition - With Moderator)*

The table presents data on the number of participants who have a certain cognitive style and have either reinvested or not reinvested when median split is applied to all responses. The data is analyzed using a chi-square test, and the results suggest that there is a significant difference in reinvestment behavior between participants with analytic and holistic cognitive styles in both the Caucasian and Risk Averse conditions.

| Condition | Cognitive Style | Did Reinvest | Did Not Reinvest | Total | $\chi^2$ | p-value (one tailed) |
|---|---|---|---|---|---|---|
| Caucasian | Analytic | 101 | 76 | 177 | 6.33 | .006 |
| | Holistic | 67 | 88 | 155 | | |
| Risk Averse | Analytic | 79 | 44 | 123 | 4.51 | .017 |
| | Holistic | 34 | 36 | 70 | | |
| Caucasian and Risk Averse | Analytic | 69 | 36 | 105 | 7.19 | .004 |
| | Holistic | 21 | 28 | 49 | | |

Table 21

*Binary Logistical Regressions of Main Effect (No Condition - With Moderator)*

The table presents the results of a logistic regression analysis examining the effect of the independent variables (Wealth Type and Cognitive Style) on the dependent variable (outcome). The results indicate that for the Wealth Type independent variable, the Current Assets group is significantly different from the FCF group, while for the Cognitive Style independent variable, the Analytic group is significantly different from the Holistic group.

| Independent Variable Group | Variable | Wald | Df | Sig | Exp(B) |
|---|---|---|---|---|---|
| Wealth Type | Income | - | - | - | - |
| | Current Assets | 13.829 | 1 | .001 | 2.528 |
| | FCF | 3.333 | 1 | .068 | 1.566 |
| Cognitive Style | Holistic | - | - | - | - |
| | Analytic | 4.881 | 1 | .027 | 1.566 |