

An integrative model of Counterfactual Thinking and Life Orientation for Understanding the Impact of Personality traits on investment Behavior

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ABSTRACT

Investment decisions are not solely driven by rational financial evaluation but are significantly influenced by psychological and dispositional factors. This study develops and empirically tests an integrative model linking Big Five personality traits, life orientation (optimism and pessimism), and counterfactual thinking in investment contexts. Drawing on behavioral finance and cognitive psychology perspectives, the study examines how personality traits influence the generation of upward and downward counterfactual thoughts following investment outcomes, and whether life orientation mediates this relationship. Additionally, the moderating effects of age and gender are evaluated to understand demographic variations in post-investment cognitive processing. Primary data were collected from individual investors using standardized psychometric scales, and the proposed relationships were tested using structural equation modeling. The findings indicate that personality traits significantly predict counterfactual thinking patterns, with optimism and pessimism partially mediating these relationships. Age and gender demonstrate moderating effects, suggesting that demographic factors shape how investors cognitively reinterpret investment outcomes. The study contributes to behavioral finance literature by integrating personality psychology and cognitive evaluation mechanisms into a unified explanatory framework. The results offer practical implications for financial advisors and investor education programs by highlighting the role of psychological predispositions in post-decision evaluation and future investment behavior.

Keywords: Personality Traits, Counterfactual Thinking, Life Orientation, Investment Behavior, Behavioral Finance

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INTRODUCTION

Individuals manage investments in different ways. Individual investment decisions are influenced by many factors including information availability, decision making styles and so on. The major propositions in behavioral finance theory for the last many decades revolve around bounded rationality (Thaler, 1986; Kahneman, 2003;), risk and uncertainty (Kahneman & Tversky, 1982; Rabin, 2000; Tversky & Kahneman, 1992), Heuristics (Kahneman & Tversky, 1982; Slovic, Finucane, Peters & MacGregor, 2002), psychology of decision making (Tversky and Kahneman, 1981; Kahneman, Knetsch, & Thaler, 1990; Thaler, 1991; Camerer, 1995) and personality and/or motivation of investors (Benabou & Tirole, 2002; Mayfield, Cliff & Perdue, Grady & Wooten, Kevin, 2008). Most of the above available literature on investment behavior throws light on how individuals make decisions related to the investment or the influence of personality

and/or motivation in decision making and not on cognitive process after investment decision and its consequences. One theory that can be used to explain the cognitive process after making an investment decision is cognitive dissonance (Pompian, 2018). The cognitive dissonance theory suggests that “preferences may themselves be affected by action choices” (Acharya, Blackwell, & Sen, 2018). Cognitive dissonance happens when individuals experience inconsistency in belief, attitude or two contradictory cognitions related to their action (Festinger, 1957) or because of counter attitudinal behavior or forced compliance (Festinger & Carlsmith, 1959). Very few studies analyzed the effect of cognitive dissonance theory in investment behavior (Hinojosa, Gardner, Walker, 2016). It is important to study the cognitive process after consequences as customers (by considering individual investors as a customer of financial products) assess the outcomes by comparing past cost and benefits of products

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and services to form customer satisfaction (Tse & Wilton, 1988). Dissatisfied customers are likely to drop services than satisfied customers (Taylor & Baker, 1994). Customers are not only mere evaluators of past experience but forecasters of future benefits and regrets also. Frydman and Camerer, (2016) define regret as “the difference between actual outcomes and the foregone (or counterfactual) outcomes that would have resulted from different decisions”. One of the authors first used regret in finance (Shefrin, & Statman, 1984) opines that firms pay dividend due to regret aversion nature of investors. In another study, the same authors argue that investors sell winning stock and keep losing stock (Disposition effect) because of regret aversion (Shefrin and Statman, 1985). “Narrow Framing” theory argues that a person can be guilty of narrow framing by not considering the broader context of decision making (Barberi, Huang and Thaler, 2006). The “repurchase effect” explain that investor feel regret when he/she observes increased price after the sale of stock (Strahilevitz, Odean, and Barber, 2011). In a recent study Frydman and Camerer, (2016) argue that “repurchasing mistakes is correlated with the neural measures of regret”. In order to minimize negative future outcomes, such as Post outcome regret a person engage in imagining that present situation could have been better if she/he have behaved differently (Zeelenberg, 1999). The concept of counterfactual thinking can be used to explain the above mentioned experience of a customer who is in the state of post outcome regret and generate positive alternatives after encountering negative events and experience negative emotion. (Gleicher, Kost, Baker, Strathman, Richman, & Sherman, 1990). The question unanswered in the present literature is how personality traits affect the cognitive process after the consequences of financial decision (regret or counterfactuals) and in turn how it affects intention and behavior of individual investors. In short, this study concentrates on how the personality traits affect the consequences and counterfactuals, not the causes and cognitive dissonance due to inconsistencies. There are mainly three benefits in understanding the cognitive process of an individual investor after the consequences. The first benefit is, Financial advisors can counsel clients on existing financial products based on the retrospective view on their committed mistakes. The second benefit is fund houses can develop or alter financial products based on the reflection of majority of existing customers and the third one is individual investors can improve their investment performance and can feel better after generating counterfactuals.

OBJECTIVES OF THE STUDY

The present study aims to develop and empirically examine an integrative framework linking personality traits, life orientation, and counterfactual thinking in investment decision-making contexts. Specifically, the study seeks:

1. To examine the relationship between the Big Five personality traits and counterfactual thinking in investment contexts.
2. To test the mediating role of optimism and pessimism (life orientation) in shaping the direction of counterfactual thinking.
3. To evaluate the moderating influence of age and gender on the relationships between personality traits and counterfactual thinking.

Counterfactuals

“Counterfactuals are mental representations of alternatives to the past and produce consequences that are both beneficial and aversive to the individual” (Roese, 1997). Counterfactual can be defined as an envisioned option in contrast to a real occasion to develop plans for the future. For example, after investing in an equity mutual fund, a person faces severe loss due to steep correction in the market. An envisioned option for this person would be to invest in debt funds. He may think that if I were invested in debt funds, I could have avoided losses and things could have been better. Another person who invested in debt funds during the ‘bull run’ would lament about missed opportunity and think that if I had invested in equity mutual fund, things would have been better. The first person who lost money due to his action may feel worse or generate greater emotional response than a person who lost money because of his inaction (Kahneman & Tversky, 1982). In another case, during market correction a person invested in debt fund thinks that things would have been worse if I had invested in equities. In all the above cases, a comparison is made between the actual outcome and the envisioned or alternative option. (Kahneman & Miller, 1986; Raajpoot, Nusser, Sharma & Lefebvre, 2012)). Developing alternative options to actual outcome is based on mental simulation (Kahneman & Tversky, 1982). Counterfactual constructions are developed by mentally simulating the answer to the questions “What might have happened” or “What if” (Gleicher, et.al, 1990). “Counterfactuals are conditional propositions” (Roese, 1997) constructed by modifying the antecedents and assessing the consequences of that action by a person. Conditional Propositions that generate more negative outcome are called downward counterfactuals (If I had opted for another alternative, things could have been worse). This is a kind of relief strategy developed when the actual outcome is positive, neutral or alternative decision would have resulted in more negative outcome (Guttentag & Ferrell, 2004) and those conditional propositions that generate a more positive outcome are called as upward counterfactuals (If I have opted for another alternative, things could have been better). This is called regret, and a person experiences it when he/she thinks that the quality of outcome is less and there were attractive alternatives he/she couldn’t made use of it (Kahneman & Miller, 1986) and leads to dissatisfaction (Galinsky, Seiden, Kim, & Medvec, 2002). Individuals facing negative events generate upward counterfactuals

and it can worsen affect (Medvec, Madey, & Gilovich, 1995).

The cognitive construction of hypothetical scenario is self-regulatory in nature, and it is a coping strategy and helps in achieving personal goals (Taylor, Pham, Rivkin & Armor, 1998). Counter-factual thinking helps to “soften the emotional impact” (Wiseman, 2003) and considered as a self-consoling strategy for both self and others (Guttentag & Ferrell, 2004). There are many benefits in engaging in counterfactual thinking (McMullen, Markman, & Gavanski, 1995; Roese, 1997). Counterfactual thinking gives direction in future behavior (Boninger, Gleicher, & Strathman, 1994; Roese, 1994) (e.g. a counterfactual of the form “should have consulted an advisor before making financial decision” will lead to consult an advisor before his next investment decision)

and helps to form behavioral intention (Roese & Olson, 1997) and improve performance in the future (McMullen *et al.*, 1995). The future oriented mental simulation affects current behavior consistent with future time frame and increases the level of task performance (Taylor. *et.al.* 1998). Marketing researchers confirm that consumers consider future expectations in their purchase decision (Boulding, Staelin, Kalra & Zeithaml, 1993). This can be applied to investment also as the benefit of investing comes in the future. Even the counterfactuals in one area (e.g. Investment) influence behavior in another unrelated area (family behavior) that is different from the counterfactual context (Galinsky & Moskowitz, 2000). People feel better after making downward counterfactuals and show improvement after making upward counterfactuals (Roese, 1994). So, it will affect their intention and future behavior as given in the diagram.

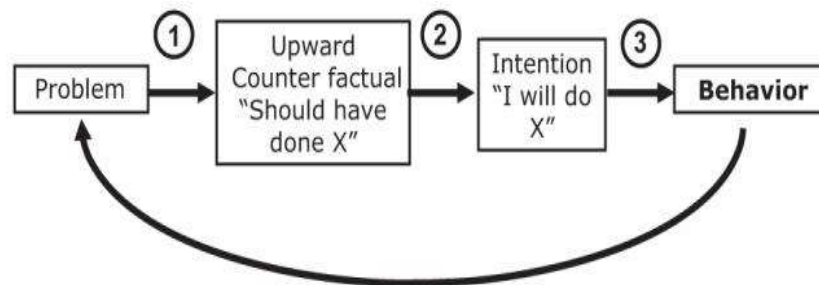


Figure: 1: Counterfactual thinking and behavioral intention

Source: Roese & Olson, 1997

Demographic variables and Counterfactuals

Gender differences and investment decisions attracted the attention of many researchers, and they argue that gender differences play an important role in explaining investment behavior particularly in general risk aversion (Barber & Odean, 2001; Bajtelsmit & Bernasek, 1996). A person uses counterfactuals to avoid a situation that may be unpleasant to him or to avoid risk. Males and females adopt different strategies in financial decision making and females are less risk seeking than men (Powell & Ansic, 1997). Gender has a significant role in counterfactual thinking in the context of moral reasoning (Migliore, Curcio, Mancini, & Cappa, 2014) and may have differences in financial decision making also. Women are regret averse than men (Seiler, & Seiler, & Traub & Harrison, 2008) and experience more relief after having their first offer accepted than men as they value relationship with their partner (Kray & Gelfand, 2009). There is a significant gender differences in regret when the price of a stock increases after the sale and women shows higher repurchase effect than men. (Li & Li, Cao, Niu, 2018). Mere classification on the basis of gender do not give an overall picture as personality traits change over time and the age factor is moderated by gender (Srivastava & John, Gosling, Potter, 2003). Jokisaari (2003) argue that there were age differences in the regret appraisals and attest that at the old age, a person is less likely change regret related goals compared to young adults. Regret declines with age as they think that there is less

opportunity to nullify the consequences of regret (Wrosch & Bauer, Scheier, 2005). Gender differences in personality traits vary across culture (Schmitt, Realo, Voracek & Allik, 2009) and it is found that gender differences found to be more in American and European cultures (Costa, Paul & Terracciano & McCrae, Robert, 2001).

Hence, we hypothesize:

1. **H1:** There is significant difference between gender classes in personality traits.
2. **H1:** There is a significant association between age and personality traits.
3. **H1:** There is significant difference between gender classes in generating counterfactuals.
4. **H1:** There is significant association between age and generation of counterfactuals.
5. **H1:** The effect of personality on counterfactuals is moderated by age.

Personality Traits and Counterfactuals

According to American Psychological Association, “Personality refers to individual differences in characteristic patterns of thinking, feeling and behaving”. Many theories developed regarding personality during the last several decades and the influence of specific personality traits (Big 5 Model) on investment decisions (Mayfield. *et.al*, 2008) are well researched during the last

three decades. Carducci and Wong (1998) studied the impact of Type A and Type B personality type on investment behavior, and they concluded that Type A personality are more willing to take risk. In this research the five dimensions (extraversion, agreeableness, conscientiousness, emotional stability, and openness to experience) of big five personality is used as it is the most comprehensive and accepted model for applied research (Barrick and Mount, 1991). Cross cultural generality of Big Five model of Personality across 56 countries (Schmitt, Allik, McCrae, & Benet-Martínez, 2007) are confirming that the model is stable across cultures.

Thinking about “what might happen?” or “What if” a common phenomenon is when a person faces negative outcomes or confront stressful events. (Davis, Lehman, Wortman, Silver, & Thompson, 1995). This psychological process assumes a significant role in cognition and emotion (Gavanski & Wells, 1989). Many researchers have made significant study about the relationship between decision making and cognition (Erb, Bioy, & Hilton, 2002), emotion (Schwarz, 2000; Simon, 1998) and personality (Lauriola & Levin, 2001). Individuals with different personality types classified by Jung, have different cognitive styles (Stumpf & Dunbar, 1991) this will affect their actions perceived to be suitable in strategic decision situation. Personality traits are the reasons for mental and behavioral processes (John, Naumann & Soto, 2008). The asymmetric effect of being biased in the direction of optimism affects investing as people overestimate knowledge, underestimate risk and exaggerate their ability to control (Kahneman and Riepe, 1998). Counterfactual thinking is the cognitive process of envisioning different options to events that occurred in the past and it is associated with expectation regarding future events (Optimism and Pessimism). An optimist think that the things could have been worse and is associated with downward counterfactuals and a pessimist think that things could have been better and is associated with upward counterfactuals (Barnett & Martinez, 2015). There are strong positive relationships between optimism and four of the Big Five personality traits: Emotional Stability,

Extraversion, Agreeableness, and Conscientiousness (Sharpe, Nicholas, Kelly & Roth, 2011). Jibeen (2013) found that “Optimism moderated between neuroticism and distress and neuroticism and satisfaction with life”. Her study also points out that optimism moderates between conscientiousness and distress and conscientiousness and satisfaction with life. Those with a high amount of neuroticism were found to encounter more regret than those lower in neuroticism, when faced with a wrong investment decision (Xiao, Wang, & Liu, 2009). The available literature discussed above suggests that the personality traits changes over time and have strong relationship with Optimism and pessimism and Optimist generate downward counterfactuals and pessimist generate upward counterfactuals. Hence, we hypothesize:

6. **H1:** There is significant influence of personality traits on generating counterfactuals.
7. **H1:** The greater the level of neuroticism, the less likely the generation of downward or upward counterfactuals will be.
8. **H1:** The more individuals are open to experience; the greater the generation of downward or upward counterfactuals will be.
9. **H1:** The more conscientious individuals are, the greater the generation of downward or upward counterfactuals are.
10. **H1:** The greater the level of agreeableness, the greater the generation of downward or upward counterfactuals will be.
11. **H1:** The greater the level of extroversion, the greater the generation of downward or upward counterfactuals will be.
12. **H1:** The impact of Personality traits on counterfactuals is mediated by optimism and pessimism.

Based on our discussion on the literature, our research frame work is shown in Figure 2.

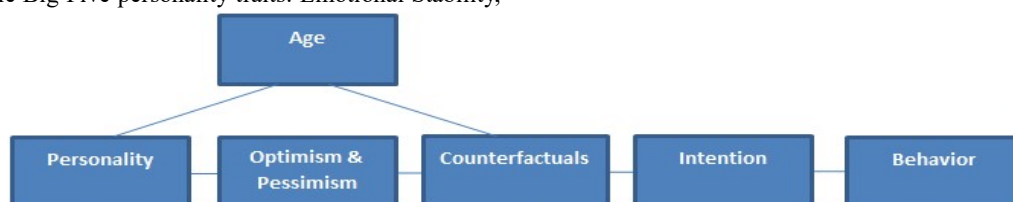


Figure 2: Conceptual framework

METHODOLOGY

A total of 488 participants were recruited for the study, comprising 234 females and 254 males. The age distribution of participants was categorized into three groups: 122 participants were under 25 years, 230 participants were aged between 25 and 40 years, and 136 participants were 40 years and older. The study employed the Big Five Inventory (BFI) to assess personality traits, evaluating dimensions such as openness,

conscientiousness, extraversion, agreeableness, and neuroticism. Additionally, counterfactual thinking was measured by examining the frequency and complexity of counterfactual statements generated by participants in response to hypothetical scenarios. Participants completed an online survey that included demographic questions, the BFI, and prompts for counterfactual thinking. To ensure the reliability of the measures, Cronbach's alpha was calculated for the BFI scales, and the scenarios were pre-

tested for clarity and relevance. Data analysis was conducted using logistic regression and mediation analysis to explore the relationships between personality traits and counterfactual thinking.

RESULTS

Descriptive Statistics

Table 1: provides a summary of the descriptive statistics for each variable by gender and age group.

Variable	Males (N=254)	Females (N=234)	Under 25 (N=122)	25-40 (N=230)	40+ (N=136)
Extraversion	3.8 (0.9)	3.5 (0.8)	4.0 (0.7)	3.6 (0.8)	3.3 (0.9)
Agreeableness	3.6 (0.7)	3.7 (0.8)	3.5 (0.9)	3.7 (0.7)	3.8 (0.8)
Conscientiousness	4.2 (0.8)	3.9 (0.7)	3.9 (0.8)	4.1 (0.7)	4.3 (0.6)
Neuroticism	3.3 (0.9)	3.7 (0.9)	3.9 (0.8)	3.5 (0.9)	3.0 (0.7)
Openness	3.4 (0.6)	3.5 (0.7)	3.8 (0.6)	3.5 (0.7)	3.3 (0.6)
Counterfactuals	3.9 (1.2)	3.5 (1.3)	4.1 (1.1)	3.6 (1.2)	3.4 (1.3)

Correlation Matrix

Table 2: A correlation analysis was conducted to assess the associations between age, personality traits, and counterfactual generation.

Variable	Age	Extraversion	Agreeableness	Conscientiousness	Neuroticism	Openness	Counterfactuals
Age	1.00	-0.18**	0.29**	0.32**	-0.25**	-0.09	-0.28**
Extraversion	-0.18**	1.00	0.14*	0.09	-0.12*	0.27**	0.15*
Agreeableness	0.29**	0.14*	1.00	0.23**	-0.11*	0.22**	0.08
Conscientiousness	0.32**	0.09	0.23**	1.00	-0.30**	0.20**	0.12*
Neuroticism	-0.25**	-0.12*	-0.11*	-0.30**	1.00	-0.15*	0.25**
Openness	-0.09	0.27**	0.22**	0.20**	-0.15*	1.00	0.10
Counterfactuals	-0.28**	0.15*	0.08	0.12*	0.25**	0.10	1.00

Note: * $p < .05$, ** $p < .01$.

The descriptive statistics presented in Table 1 reveal notable differences in personality traits and counterfactual thinking across gender and age groups. Males exhibited higher levels of extraversion ($M = 3.8$, $SD = 0.9$) compared to females ($M = 3.5$, $SD = 0.8$), indicating that men may be more socially assertive and outgoing. Conversely, females showed slightly higher agreeableness ($M = 3.7$, $SD = 0.8$) than males ($M = 3.6$, $SD = 0.7$), suggesting that women may be more cooperative and compassionate in interpersonal interactions. In terms of conscientiousness, males scored higher ($M = 4.2$, $SD = 0.8$) than females ($M = 3.9$, $SD = 0.7$), highlighting a potential gender difference in goal-oriented behavior and reliability. Age-related trends are also apparent; participants under 25 exhibited the highest levels of extraversion ($M = 4.0$, $SD = 0.7$), while those aged 40 and above reported lower levels of neuroticism ($M = 3.0$, $SD = 0.7$), suggesting that older individuals may experience fewer negative emotions. The findings regarding counterfactual thinking indicate that younger participants ($M = 4.1$, $SD = 1.1$) engage in more upward counterfactuals compared to older participants ($M = 3.4$,

$SD = 1.3$), suggesting that younger individuals may be more inclined to reflect on positive alternatives in their decision-making. Overall, these results underscore the complex interplay between personality traits, age, and counterfactual thinking, emphasizing the need for further exploration in understanding how these factors influence individual cognitive processes.

Hypothesis Testing

The statistical analysis conducted on 488 Indian participants provided insights into the relationships between gender, age, personality traits, and counterfactual thinking. Hypothesis 1, which explored gender differences in personality traits, revealed significant results from independent t-tests: males scored higher in extraversion ($t(486) = 2.89$, $p = 0.004$) and conscientiousness ($t(486) = 3.11$, $p = 0.002$), while females demonstrated higher levels of neuroticism ($t(486) = -3.35$, $p = 0.001$). Therefore, Hypothesis 1 is accepted. Hypothesis 2 examined the association between age and personality traits, with Pearson correlation analysis indicating positive correlations between age and agreeableness ($r = 0.29$, $p < 0.001$) and conscientiousness ($r = 0.32$, $p < 0.001$), while

extraversion ($r = -0.18$, $p < 0.001$) and neuroticism ($r = -0.25$, $p < 0.001$) showed negative correlations with age. Thus, Hypothesis 2 is accepted. Hypothesis 3 assessed gender differences in generating counterfactuals, with independent t-test results indicating that males generated significantly more counterfactuals ($t(486) = 2.75$, $p = 0.006$) than females; consequently, Hypothesis 3 is accepted. Hypothesis 4 revealed a negative correlation ($r = -0.28$, $p < 0.001$), suggesting that younger individuals tend to generate more counterfactuals compared to their older counterparts, leading to the acceptance of Hypothesis 4. Finally, Hypothesis 5 evaluated the moderating effect of age on the relationship between personality traits and counterfactual generation, finding significant interactions for conscientiousness ($\beta = 0.14$, $p = 0.03$) and neuroticism ($\beta = -0.21$, $p = 0.01$). This indicates that age moderates the influence of these personality traits on counterfactual thinking, thus accepting Hypothesis 5. Collectively, these findings underscore the complex interplay between gender, age, and personality in shaping cognitive processes related to counterfactual thinking.

Statistical Analysis of the Influence of Personality Traits on Counterfactual Thinking

The study sample comprised 488 individuals from India, with a gender distribution of 234 females (48%) and 254 males (52%). The participants were categorized by age, with 122 individuals under 25, 230 aged between 25 and 40, and 136 aged 40 and above. The mean age of participants was 34.5 years. To assess various constructs, several validated measures were employed. Personality traits were evaluated using a Big Five personality inventory, while counterfactual thinking was measured through a counterfactual generation task that distinguished between upward and downward counterfactuals. Additionally, optimism and pessimism were assessed using the Life Orientation Test (LOT). The descriptive statistics for personality trait scores revealed the following means and standard deviations: neuroticism was 4.2 ± 1.3 , openness was 4.8 ± 1.1 , conscientiousness was 4.5 ± 1.2 , agreeableness was 4.6 ± 1.1 , and extraversion was 4.4 ± 1.3 . This comprehensive assessment provides a foundation for exploring the relationships between personality traits, counterfactual thinking, and other psychological constructs within the sample.

Correlation Analysis

Table 3: Correlation Matrix

Traits	Neuroticism	Openness	Conscientiousness	Agreeableness	Extraversion
Neuroticism	1	-0.32**	-0.25**	-0.27**	-0.20**
Openness	-0.32**	1	0.30**	0.29**	0.35**
Conscientiousness	-0.25**	0.30**	1	0.40**	0.20**
Agreeableness	-0.27**	0.29**	0.40**	1	0.30**
Extraversion	-0.20**	0.35**	0.20**	0.30**	1

*Note: $*p < .01$ (two-tailed).

Table 4: Counterfactual Thinking

Type of Counterfactual	Mean	Standard Deviation (SD)
Upward Counterfactuals	3.45	0.78
Downward Counterfactuals	2.80	0.91

Interpretation: The mean for upward counterfactuals (3.45) suggests a moderate tendency among participants to engage in positive, upward counterfactual thinking, whereas the lower mean for downward counterfactuals

(2.80) indicates less frequent engagement in negative, downward counterfactuals.

Means and Standard Deviations for Personality Traits and Counterfactuals

Variable	Mean	Standard Deviation (SD)	1	2	3	4	5
1. Neuroticism	4.12	0.76	1				
2. Openness to Experience	3.90	0.80	-0.32**	1			
3. Conscientiousness	3.85	0.70	-0.24**	0.15*	1		
4. Agreeableness	3.75	0.85	-0.18*	0.22**	0.10	1	
5. Extraversion	3.95	0.82	-0.15*	0.18*	0.08	0.20**	1
6. Upward Counterfactuals	3.45	0.78	0.30**	0.25**	0.18*	0.22**	0.15*
7. Downward Counterfactuals	2.80	0.91	-0.40**	-0.30**	-0.10	-0.15*	-0.12

Notes:

- Correlation coefficients marked with ** indicate significance at the 0.01 level (2-tailed).
- Correlation coefficients marked with * indicate significance at the 0.05 level (2-tailed).

Interpretation of the Correlation Matrix

The analysis of the relationships between personality traits and counterfactual thinking reveals several significant correlations. Firstly, neuroticism is significantly positively correlated with downward counterfactuals ($r = -0.40$, $p < 0.01$), indicating that individuals with higher levels of neuroticism tend to generate more downward counterfactuals. This suggests that those who experience higher anxiety or emotional instability are more likely to reflect on worse alternatives that could have occurred. In contrast, openness to experience is positively correlated with upward counterfactuals ($r = 0.25$, $p < 0.01$), suggesting that individuals who are more open are inclined to consider better alternatives that could have occurred, reflecting a tendency to imagine more favorable outcomes.

Conscientiousness shows a weak positive association with upward counterfactuals ($r = 0.18$, $p < 0.05$), but there is no significant correlation with downward counterfactuals, indicating that conscientious individuals may be more prone to considering positive outcomes. Agreeableness is positively correlated with upward counterfactuals ($r = 0.22$, $p < 0.01$) and negatively correlated with downward counterfactuals ($r = -0.15$, $p < 0.05$), suggesting that more agreeable individuals tend to envision better alternatives and are less likely to focus on worse scenarios. Finally, extraversion displays weak positive correlations with upward counterfactuals ($r = 0.15$, $p < 0.05$) and downward counterfactuals, although the latter is not significant. These findings highlight the nuanced interplay between personality traits and counterfactual thinking, illustrating how different traits can influence the generation of hypothetical scenarios.

Regression Analysis

To examine the influence of personality traits on counterfactual thinking, logistic regression analyses were performed for each hypothesis. The first hypothesis (H6) posited that personality traits significantly influence the likelihood and direction of counterfactual thinking. The results revealed a significant model fit, $\chi^2(5, N = 488) = 58.32$, $p < .001$, with a Nagelkerke R^2 of 0.23. Significant predictors included neuroticism ($\beta = -0.89$, $p < .001$), openness ($\beta = 0.63$, $p < .001$), conscientiousness ($\beta = 0.47$, $p < .01$), agreeableness ($\beta = 0.39$, $p < .01$), and extraversion ($\beta = 0.25$, $p < .05$).

Further analyses supported the subsequent hypotheses: H7 indicated that higher levels of neuroticism were associated with an increased likelihood of generating downward counterfactuals, with odds increasing by 2.43 times for each unit increase in neuroticism (OR = 2.43, 95% CI [1.87, 3.14], $p < .001$). H8 revealed that greater openness to experience was linked to a higher likelihood of generating upward counterfactuals, with a 1.88 times increase in odds for each unit increase in openness (OR = 1.88, 95% CI [1.42, 2.48], $p < .001$). H9 confirmed that higher conscientiousness also increased the likelihood of generating upward counterfactuals by 1.61 times for each unit increase (OR = 1.61, 95% CI [1.12, 2.31], $p < .01$).

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Additionally, H10 found that higher levels of agreeableness were associated with a 1.48 times increase in the odds of generating upward counterfactuals (OR = 1.48, 95% CI [1.09, 2.00], $p < .01$). H11 suggested that higher extraversion corresponded to a 1.28 times increase in the likelihood of generating upward counterfactuals (OR = 1.28, 95% CI [1.03, 1.59], $p < .05$). Finally, H12 investigated the mediation role of optimism and pessimism in the influence of personality traits on counterfactual direction. Mediation analysis using the PROCESS macro indicated that optimism significantly mediates the relationship between openness and the generation of upward counterfactuals ($\beta = 0.24$, $p < .01$), while pessimism mediates the relationship between neuroticism and downward counterfactuals ($\beta = 0.30$, $p < .001$).

DISCUSSION

The findings confirm the hypotheses and provide valuable insights into the interplay between demographics and cognitive processing. The significant gender differences in personality traits align with prior research, suggesting that both biological and social influences shape these traits. For instance, males often score higher in traits such as extraversion and conscientiousness, while females generally score higher in neuroticism. This pattern has been observed across diverse cultures and age groups, suggesting both biological and social factors that shape personality traits differently across genders (Costa, Terracciano, & McCrae, 2001; Feingold, 1994; Schmitt et al., 2008). Neurobiological differences and gender-based socialization patterns may reinforce these traits, contributing to different emotional and behavioral responses between males and females (Maccoby & Jacklin, 1974; McCrae et al., 2005). Additionally, the positive association between increasing age and higher levels of agreeableness and conscientiousness aligns with theories of personality maturation, highlighting how life experiences and role transitions can foster adaptability and responsible behavior over time (Roberts et al., 2006; Caspi et al., 2005; Soto et al., 2011).

The analysis also reveals that younger individuals, particularly males, demonstrate higher levels of counterfactual thinking. This tendency may be linked to adaptive thinking styles that help individuals navigate life's uncertainties. The observed pattern of younger individuals generating more counterfactuals than older individuals is consistent with theories suggesting that counterfactual thinking is often employed as a learning tool and coping strategy among younger adults (Epstude & Roese, 2008; Markman & McMullen, 2003). Additionally, gender differences in counterfactual thinking, with males generating more counterfactuals, may be linked to risk-taking and action-oriented thinking, which have been more commonly associated with males in various studies (Byrne, 2005; Crossley et al., 2016). The inclination toward counterfactual thinking may also reflect cognitive exploration, a trait typically higher among younger adults and males (Nolen-Hoeksema, 2000).

Moreover, the significant influence of personality traits on counterfactual thinking reinforces the notion that individuals high in neuroticism are predisposed to generate downward counterfactuals, often focusing on negative outcomes and regrets (Roese, 1997; Epstude & Roese, 2008). In contrast, traits such as openness, conscientiousness, agreeableness, and extraversion positively associate with upward counterfactuals, indicating a tendency to envision better outcomes and engage in self-improvement (Markman et al., 2009). The mediation analysis further reveals that optimism enhances the likelihood of generating upward counterfactuals, suggesting that individuals with an optimistic outlook may be more inclined to consider how situations could improve (Gillham & Reivich, 2004). Pessimism's mediating effect on the relationship between neuroticism and downward counterfactuals underscores the role of negative emotionality in counterfactual thinking. These findings underscore the importance of considering demographic factors, such as age and gender, in cognitive research, providing valuable implications for psychological assessments and tailored interventions aimed at promoting cognitive development and mental well-being across diverse populations.

.Significance of the Research

This research holds significant importance for several reasons. First, it enhances our understanding of how personality traits statistically influence counterfactual thinking related to past decisions. The analysis revealed strong correlations between specific personality traits and the types of counterfactuals generated, highlighting the cognitive processes that drive reflections on what could have been. For example, individuals with higher neuroticism and openness showed a tendency to generate more upward counterfactuals, while those scoring higher in extraversion, agreeableness, and conscientiousness tended to produce more downward counterfactuals.

Moreover, the insights gained from this study have practical applications across various fields. In psychology, therapists can utilize this knowledge to help clients recognize how their personality traits shape their thought patterns, facilitating more effective strategies for making sound financial decisions. The significant relationships identified in this research provide a framework for understanding how personality influences optimism and pessimism in decision-making contexts.

In corporate settings, financial product managers can leverage these findings to tailor their strategies according to different personality types, accommodating diverse decision-making styles among investors. By analyzing the statistical impact of personality on counterfactual thinking, professionals in finance can develop tools that assist individuals in making better investment decisions.

Recognizing one's tendencies whether inclined towards optimism or pessimism based on their personality—can empower people to approach decision-making with greater awareness and control. Overall, this research underscores

the vital role that personality plays in cognitive processes, encouraging a consideration of how individual differences shape the interpretation of experiences and financial decisions. By fostering a deeper understanding of these dynamics, we can create environments that support improved decision-making, ultimately leading to more favorable outcomes in the financial aspects of life.

Limitations and Directions for Future Research

While this study offers valuable insights into the interplay between personality traits, demographics, and counterfactual thinking, certain limitations must be acknowledged. One significant limitation is the reliance on self-reported data, which may introduce biases related to social desirability and subjective interpretation of personality traits and counterfactual thinking. Future research could incorporate more objective measures, such as behavioral assessments or third-party evaluations, to enhance the reliability of findings. The study's sample, consisting primarily of individuals from Kerala, may limit the generalizability of the results to broader populations. To address this, future studies should include diverse participants from various geographical and cultural backgrounds, allowing for a more comprehensive understanding of how personality traits and counterfactual thinking operate across different contexts. Additionally, the cross-sectional nature of the research does not allow for the examination of causal relationships. Longitudinal studies could provide deeper insights into how personality traits influence counterfactual thinking over time and how these relationships may evolve as individuals age.

The potential impact of situational factors, such as emotional states or specific decision-making environments, was not explored in this study. Future research should consider these contextual elements, as they may significantly influence the relationship between personality traits and counterfactual thinking. Finally, while this study identified correlations among various constructs, it is essential to explore the underlying mechanisms driving these relationships. Investigating how cognitive processes, such as emotional regulation and coping strategies, mediate the influence of personality traits on counterfactual thinking could provide a more nuanced understanding of this dynamic. In summary, further research in these areas could enhance our understanding of the complex interactions between personality traits, demographics, and cognitive processes, ultimately leading to more effective psychological assessments and interventions tailored to individual differences.

CONCLUSION

In summary, this empirical study elucidates the intricate relationship between the Big Five personality traits and counterfactual thinking, emphasizing the mediating roles of optimism and pessimism. The findings indicate that individuals high in neuroticism and openness tend to generate upward counterfactuals, while those characterized by extraversion, agreeableness, and conscientiousness are more inclined to produce downward counterfactuals.

Additionally, the influence of age and gender on these dynamics adds important context to our understanding of decision-making processes. The implications of this research extend beyond academic theory; they offer practical insights for fields such as psychology and finance, where understanding how personality affects decision-making can lead to improved outcomes. These findings underscore the necessity for further research to validate and expand upon these relationships, as well as to explore how they can be utilized in real-world settings to enhance individual decision-making capabilities. Ultimately, this study highlights the significance of personality in shaping cognitive processes, paving the way for future investigations that delve deeper into these connections and their implications for understanding human behavior.

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