MAKÜ | SOBED

Mehmet Akif Ersoy Üniversitesi
Sosyal Bilimler Enstitüsü Dergisi
SOBED 2026, Sayı 43, 278-301
Mehmet Akif Ersoy University Journal of
Social Sciences Institute
SOBED 2026, Issue: 43, 278-301

e-ISSN: 1309-1387
https://dergipark.org.tr/tr/pub/makusobed

OPEN ACCESS

Araştırma Makalesi
Research Article

DOI: https://doi.org/10.20875/makusobed.2008555
Geliş Tarihi /Received: 01.08.2026
Revizyon / Revision: 12.10.2026
Kabul Tarihi /Accepted: 23.10.2026
Yayın Tarihi / Publication Date: 28.10.2026

Behavioral biases of individual investors across demographic variables: Evidence from Kırklareli

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Abstract

This study empirically investigates the behavioral biases shaping the decision-making processes and financial preferences of individual retail investors across demographic and experiential characteristics. The sample comprises 368 active individual investors in Kırklareli, selected via convenience sampling. Using a quantitative research framework, we collected data with a structured questionnaire and analyzed them using independent-samples t-tests, one-way ANOVA, and Welch robust ANOVA. To control for Type I error accumulation (False Discovery Rate) inherent in testing multiple hypotheses, we applied the Benjamini–Hochberg correction procedure. The results indicate that age and portfolio review frequency did not significantly differentiate any behavioral bias dimension, and the unadjusted difference in loss aversion by marital status was not statistically significant after the multiple-testing correction. Gender significantly differentiated herding behavior, regret aversion, representativeness, and loss aversion, but not overconfidence. Education level significantly differentiated all five behavioral bias dimensions. Following the Benjamini–Hochberg correction, investment experience significantly differentiated overconfidence, herding behavior, and representativeness. Overall, the findings indicate that demographic and experiential characteristics were not uniformly associated with all behavioral bias dimensions; instead, education and investment experience were associated with different patterns of behavioral bias.

Keywords: Behavioral biases, demographic variables, Kırklareli, ANOVA.

"Cite this article: Akgüneş, A. O. and Bayrak, Y. K. (2026). Behavioral biases of individual investors across demographic variables: Evidence from Kırklareli. *Burdur Mehmet Akif Ersoy Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 43, 278-301.
Atıf: Akgüneş, A. O. ve Bayrak, Y. K. (2026). Davranışsal eğilimlerin demografik değişkenler açısından incelenmesi: Kırklareli örneği. *Mehmet Akif Ersoy University Journal of Social Sciences Institute*, 43, 278-301.
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Davranışsal eğilimlerin demografik değişkenler açısından incelenmesi: Kırklareli örneği

Özet

Bu araştırma, bireysel yatırımcıların karar mekanizmalarını ve finansal tercihlerini etkileyen davranışsal eğilimleri demografik ve deneyimsel değişkenler çerçevesinde ampirik olarak incelemek amacıyla yapılmıştır. Araştırmanın örneklemini, Kırklareli ilinde aktif olarak finansal işlem yürüten ve kolayda örnekleme yöntemiyle belirlenen 368 bireysel yatırımcı oluşturmaktadır. Nicel araştırma tasarımına uygun olarak yürütülen çalışmada veriler yapılandırılmış anket tekniğiyle toplanmış; bağımsız örneklem t testi, tek yönlü varyans analizi (ANOVA) ve Welch ANOVA tekniklerinden yararlanılmıştır. Çoklu hipotez testlerinden kaynaklanan Tip I hata riskini (False Discovery Rate) kontrol etmek amacıyla analizlerde Benjamini–Hochberg düzeltmesi uygulanmıştır. Analiz sonuçları, yaş ve portföy kontrol sıklığının davranışsal eğilim boyutlarında anlamlı bir farklılık oluşturmadığını; medeni duruma göre kayıptan kaçınmada gözlenen ham farkın çoklu test düzeltmesi sonrasında anlamlılığını yitirdiğini göstermiştir. Cinsiyet, sürü davranışı, pişmanlıktan kaçınma, temsil etme ve kayıptan kaçınma boyutlarını anlamlı biçimde farklılaştırırken, aşırı güven boyutunda farklılık yaratmamıştır. Eğitim düzeyi tüm davranışsal eğilim boyutlarını anlamlı biçimde farklılaştırmıştır. Yatırım deneyimi ise çoklu test düzeltmesi sonrasında aşırı güven, sürü davranışı ve temsil etme boyutlarında anlamlı farklılık göstermiştir. Genel olarak bulgular, demografik ve deneyimsel özelliklerin davranışsal eğilim boyutlarıyla tekdüze bir şekilde ilişkili olmadığını; eğitim ve yatırım deneyiminin ise farklı davranışsal eğilim örüntüleriyle ilişkili olduğunu göstermektedir.

Anahtar Kelimeler: Davranışsal eğilimler, demografik değişkenler, Kırklareli, ANOVA.

1. Introduction

For decades, mainstream approaches in the finance literature have predominantly analyzed financial markets, price formation processes, and investor preferences within a strictly rational paradigm. Foundational theories such as Harry Markowitz's Modern Portfolio Theory, William Sharpe's Capital Asset Pricing Model, and Eugene Fama's Efficient Market Hypothesis assume that market participants are rational economic agents (homo economicus) who consistently make optimal decisions to maximize utility under all conditions. Within this classical framework, investors are presumed to incorporate new information immediately, objectively, and costlessly into asset prices. Consequently, the risk-return relationship is subjected to rigorous mathematical optimization, theoretically precluding the persistent existence of irrational anomalies or speculative price bubbles in financial markets.

However, a historical analysis of global financial markets reveals numerous anomalies—such as systematic deviations, speculative bubbles, abrupt and severe market crashes, and calendar effects that conventional finance theories, grounded in rationality axioms, fail to adequately explain. Events ranging from the Great Depression of 1929 and Black Monday in 1987 to the Dot-Com Bubble of 2000 and the Global Financial Crisis of 2008 underscore the limitations of the assumption that market participants act as perfectly rational agents. In practice, investors face significant cognitive constraints, often driven by emotional impulses and relying on heuristics rather than complex probabilistic reasoning. This divergence between theoretical predictions and observed market behaviors has exposed a fundamental gap in traditional economic models. Consequently, systematic and predictable behavioral biases that mainstream finance has not accounted for have contributed to the emergence of behavioral finance, an interdisciplinary field that integrates insights from psychology, sociology, and finance (Ateş, 2007; Shleifer, 2000).

The behavioral finance approach recognizes that the human brain operates under bounded rationality. In the complex, dynamic, and uncertainty-laden structure of financial markets, individual investors rely on mental shortcuts to reduce cognitive load and make rapid decisions. While these heuristics often

support everyday functioning, they can also produce severe systematic errors, perceptual distortions, and irrational tendencies in financial decision-making (Tversky & Kahneman, 1974). Regret over past choices, overconfidence, unquestioned conformity to the majority, and loss aversion all diverge markedly from the assumptions of the rational economic agent. Consequently, empirically identifying and mapping these psychological biases is essential both for the healthy deepening of capital markets and for the accurate allocation of savings by individual investors.

Against this backdrop, this study aims to empirically identify the behavioral tendencies that shape the decision-making mechanisms of individual investors actively engaged in financial investment activities in the province of Kırklareli. With its rapidly developing industrial infrastructure and well-established agricultural base, Kırklareli hosts a heterogeneous and dynamic investor profile. Within the scope of the study, the levels of overconfidence, herding behavior, regret aversion, representativeness, and loss aversion are measured, and the study examines whether these behavioral bias dimensions differ across selected demographic and experiential groups. The resulting empirical findings are intended to illuminate the dynamics of irrational tendencies at the local level and offer strategic recommendations to support more rational decision-making for both financial advisors and individual investors in the region. By evaluating each behavioral bias dimension separately, the study aims to reveal whether demographic and experiential characteristics generate uniform or dimension-specific differences in investor behavior.

This study makes three distinct and significant contributions to the behavioral finance literature. First, Kırklareli offers an empirical context in the Thrace region, where a transitional economic structure merges an expanding industrial base with deep-rooted agricultural capital accumulation. However, the research design does not test the causal effect of the province's economic structure on behavioral tendencies; rather, Kırklareli serves as an empirical setting that offers demographic and experiential diversity within a single, well-defined regional population.

Examining investor psychology in this regional setting provides empirical evidence on behavioral bias patterns within a socioeconomically diverse local investor population. Second, the research hypotheses draw on Kahneman and Tversky's (1979) Prospect Theory and Simon's (1955) Bounded Rationality framework. These theoretical anchors suggest that investors rely on cognitive heuristics (representativeness, overconfidence) and emotional reflexes (loss aversion, regret aversion, herding) because of information-processing limitations. Third, this study rigorously addresses Type I error inflation, a crucial methodological flaw largely overlooked in regional behavioral finance studies in Türkiye, by employing the Benjamini–Hochberg False Discovery Rate procedure across multiple hypothesis tests.

2. Literature review and conceptual framework

The theoretical foundations of financial decision-making have historically been shaped by a scholarly debate between two major paradigms. Conventional finance is built on the "Rational Man" (Homo Economicus) model, which assumes decision-makers have complete information, process it without bias, and consistently act to maximize utility (Tekin, 2016). Establishing the theoretical foundations of this paradigm, Harry Markowitz (1952) was the first scholar to define risk as a measurable mathematical construct, namely variance and standard deviation, through Modern Portfolio Theory (MPT). Markowitz argued that investors could minimize portfolio risk for a given level of expected return by diversifying across assets with low or negative return correlations rather than investing in a single asset. Building upon this framework, William Sharpe (1964) and John Lintner (1965) formalized the linear relationship between risk and expected return through the Capital Asset Pricing Model (CAPM), which is based on non-diversifiable systematic risk, represented by beta. Extending these ideas to the broader market level,

Eugene Fama (1970) proposed the Efficient Market Hypothesis (EMH). According to Fama, asset prices in an efficient market fully and rapidly incorporate available information. Consequently, no investor can consistently achieve abnormal returns by exploiting publicly available information.

However, empirical findings from experimental economics and psychology challenged conventional finance's mathematically elegant framework. Through their investigations of decision-making under risk and uncertainty, Maurice Allais (1953) and Daniel Ellsberg (1961) demonstrated that individuals systematically violate the axioms of expected utility theory. The Allais Paradox revealed that people tend to overweight certain outcomes relative to probabilistic ones, a phenomenon known as the certainty effect, whereas the Ellsberg Paradox showed that individuals generally prefer known risks over situations involving unknown probabilities, a tendency referred to as ambiguity aversion. Building on these findings, Daniel Kahneman and Amos Tversky (1979) introduced Prospect Theory, a seminal framework that integrated psychological insights into economic and financial decision-making and is widely regarded as the cornerstone of behavioral finance. Prospect Theory suggests that individuals evaluate gains and losses relative to a subjective reference point rather than absolute wealth levels. One of its most influential findings is the asymmetric value function, which holds that losses are experienced more intensely than equivalent gains. In other words, the psychological pain of a loss is substantially greater than the pleasure of an equivalent gain. This phenomenon, known as loss aversion, has become a central explanation for various investor biases and market anomalies, including the disposition effect, whereby investors tend to hold losing stocks for too long while selling winning stocks prematurely (Shefrin & Statman, 1985). Tversky and Kahneman (1981) further showed that logically equivalent choices can lead to different preferences depending on how they are framed. Extending these psychological foundations to consumer choice and mental framing, Thaler (1980, 1985, 1999) demonstrated how individuals deviate from standard economic rationality by categorizing financial decisions into distinct mental accounts. At the market level, Shleifer (2000) argued that, because arbitrage is limited, mispricing driven by investor sentiment need not be eliminated by rational traders and can persist; Thaler's (2005) studies extended this evidence to a broad range of market anomalies and investor behaviors.

Recent empirical studies have further enriched the behavioral finance literature by examining interactions among investor demographics, financial literacy, and psychological biases in emerging markets (Erbek Dertli & Yükselen, 2025; Zengin, 2024). For instance, Zengin (2024) reported that behavioral tendencies varied across selected demographic and financial characteristics. Similarly, Erbek Dertli and Yükselen (2025) emphasized the mediating roles of financial literacy and risk perception in the relationship between behavioral tendencies and individual investment decisions.

More recent research continues to document how sensitive behavioral bias measurement is to sample and instrument choice. Using the Behavioral Finance Scale across a sample of 401 investors in İstanbul, Çanakkale, and İzmir, a 2025 study found that financial literacy mediates the relationship between financial risk perception and behavioral finance tendencies, with demographic and socioeconomic characteristics forming a distinct sub-dimension of the scale. Similarly, a 2024 study of 403 individual investors found that investment preferences varied significantly by demographic characteristics, reinforcing the relevance of demographic segmentation in behavioral finance research in the Turkish context. Building on these recent empirical developments, the present study uses structured scale items validated in prior behavioral finance research (Wood & Zaichkowsky, 2004; Ngoc, 2014; Gül et al., 2017; Baker et al., 2018) to capture multidimensional psychological tendencies.

Baker and Nofsinger (2002) analyzed individual investors' saving and investment tendencies from a behavioral finance perspective, arguing that decision-making processes cannot be explained solely by

economic parameters. Their study emphasized that financial choices are shaped by complex psychological and social dynamics alongside rational data. The authors classified investor errors into two fundamental categories, cognitive and behavioral, and identified tendencies such as overconfidence, optimism bias, and regret aversion as central to these errors. The findings showed that individuals' social interactions and internal psychological frameworks intensify these behavioral deviations, while also highlighting the limitations of conventional rational finance models.

Ateş (2007) examined the profiles of individual investors in Türkiye and the cognitive and emotional processes that shape them from a behavioral finance perspective. In this study, conducted with 400 participants at Konya Selçuk University, researchers analyzed questionnaire data using the chi-square test and cross-tabulations. The findings reveal a significant correlation between investors' financial instrument choices and their behavioral tendencies. Specifically, the study found that sociocultural factors play a dominant role in the decisions of investors who prefer fixed-income securities, such as government bonds and treasury bills. Consequently, the study shows that investment preferences cannot be explained solely through economic rationality and that psychological and social variables are fundamental to decision-making.

Early domestic studies established that individual investors in Türkiye systematically deviate from rational decision-making. Döm (2003) found that emotional motivations often outweigh rational criteria among investors across six provinces, while Pompian and Longo (2004) linked personality type and gender to loss aversion and disposition effect tendencies. Subsequent studies extended these findings to specific regional and methodological contexts: Chuang and Lee (2006) demonstrated that overconfident investors adopt more aggressive, high-risk trading strategies, and Gervais et al. (2007) showed that overconfidence similarly increases managers' willingness to undertake risky investment projects; Ateş (2007), Böyükaslan (2012), and Birgili (2013) each confirmed that psychological and demographic factors rather than technical or economic indicators alone predominantly shape investment decisions in regional Turkish samples.

Further regional evidence reinforces this pattern: Küçük (2014) found that investors in Osmaniye relied more on intuition and emotional motivation than rational models, though noted that a single-province design limited generalizability, a limitation also relevant to the present study's design. Ateş (2014) showed that lower financial literacy among Istanbul-based investors increased vulnerability to psychological biases, underscoring financial literacy as a protective factor against behavioral deviation.

Kendirli and Kaya (2016) comparatively analyzed the demographic and psychological dynamics influencing individual investors' financial decision-making mechanisms in Çorum and Yozgat. Based on data from 400 participants across two provinces with different levels of economic development, the research found that although investors showed interest in similar financial instruments, the intensity of their use differed statistically. The study's most striking finding was a linear relationship between education level and investment instrument preference. Individuals with higher education levels tended to gravitate toward more sophisticated and complex financial instruments, whereas investors with lower education levels mostly maintained conventional investment vehicles. The findings suggest that education is a critical determinant of financial literacy and portfolio diversification capacity.

Gül, Ekşi, and Sürme (2017) analyzed the financial decision-making mechanisms of professionals in Gaziantep's jewelry sector from a behavioral finance perspective. The study examined overconfidence, optimism bias, the representativeness heuristic, loss aversion, and regret aversion as core behavioral dimensions. The findings reveal that investors distinctly display a loss aversion reflex, while also experiencing high levels of anxiety regarding future market uncertainties. The study also found that investor attitudes differ statistically by variables such as education level, firm operating period, and

professional experience. Conversely, demographic factors such as age and capital size did not significantly affect decisions. By identifying the psychological tendencies of professionals engaged in gold trading, this study contributes to the literature by confirming the impact of sectoral experience on cognitive biases.

Öztopçu and Aytekin (2017) examined the irrational financial attitudes of individual investors and the psychological variables underlying these behaviors in a study conducted with 326 participants in Balıkesir. The study found that social interactions and emotional factors play a more decisive role in investors' decision-making than rational, objective data. The findings suggest that individual investors systematically deviate from rational decision-making processes under psychological pressure. This supports the view that investor preferences in financial markets are shaped by specific, predictable tendencies described in behavioral finance theory.

Hırka (2020) examined the behavioral finance elements shaping financial decision-making in a study of 400 individual investors investing in gold in Gümüşhane. The study analyzed the effects of psychological factors such as uncertainty and risk aversion, overconfidence, fear of regret, herding behavior, extreme optimism, and self-attribution bias on investment preferences. The findings revealed that these behavioral tendencies are significantly associated with demographic parameters such as education level, income distribution, and investment experience. The results demonstrate that financial decisions cannot be explained solely through technical indicators and confirm that psychological biases play a decisive role in bypassing investor rationality, even in assets regarded as safe havens, such as gold.

Özmerdivanlı (2023) analyzed the behavioral factors influencing the decision-making processes of investors residing in Karaman and found that participants clearly displayed core psychological tendencies such as overconfidence, optimism bias, the availability heuristic, regret aversion, and loss aversion. The questionnaire data were analyzed using independent-samples t-tests and ANOVA. The results confirmed that these behavioral deviations are statistically significantly related to demographic variables such as age, gender, and education level. The findings show that the behavioral bias scores differed across selected demographic characteristics.

Üstün (2024) examined the interaction between the demographic profiles and behavioral tendencies of individual investors in a sample from Samsun. The findings show that psychological factors such as overconfidence, optimism bias, and regret aversion differ significantly by variables such as age, income level, and professional expertise. However, one notable finding was that gender did not play a statistically decisive role in investment decision-making. These results confirm the selective impact of demographic factors on psychological deviations, while also indicating that the elements shaping investor behavior may have a relatively homogeneous structure.

Erbek Dertli and Yükselen (2025) analyzed the effect of behavioral finance biases on investment decisions, along with the mediating roles of financial literacy and risk perception, in a large-scale study involving 841 individual investors in İstanbul. The findings show that cognitive and emotional biases such as overconfidence, illusion of control, herding behavior, and regret aversion directly influence investor choices. Furthermore, the research determined that individuals' financial knowledge levels and subjective risk perceptions are critical variables that modify the effect of these biases on the decision-making process. The findings suggest that the impact of psychological deviations on investment decisions is dynamic, shaped by investors' financial literacy levels and risk tolerance.

Overall, prior studies show that demographic characteristics are not uniformly associated with behavioral biases. Gender, education, age, and investment experience produce different results across

samples and behavioral dimensions. This inconsistency supports examining each behavioral bias dimension separately rather than assuming a general demographic effect. Accordingly, the present study tests non-directional hypotheses for five behavioral bias dimensions across six demographic and experiential characteristics.

3. Data and Methodology

This study examines whether behavioral biases in individual investors' decision-making differ across selected socio-demographic and experiential groups. Theoretical grounds for each demographic and experiential factor draw on bounded rationality and prospect theory. Education and investment experience are expected to differentiate behavioral bias because formal education and repeated market exposure alter information-processing capacity and self-perceived competence (Simon, 1955; Gervais & Odean, 2001). Gender is expected to differentiate herding and loss-averse tendencies, given documented differences in risk-related social behavior (Barber & Odean, 2001). Age, marital status, and portfolio review frequency are included as exploratory demographic controls, given mixed evidence regarding their association with behavioral bias in prior studies (Gül et al., 2017; Özmerdivanlı, 2023).

The study's target population consists of participants residing within the provincial borders of Kırklareli who actively invest in at least one financial instrument, such as stocks, foreign exchange, gold, crypto assets, or deposits. Because physical and time constraints prevented reaching the full population, the study used convenience sampling, a non-probability sampling method. Accordingly, 368 individual investors who completed the questionnaire fully and consistently constituted the study's final empirical dataset. Table 1 presents the behavioral finance bias variables used in the study.

Table 1. *Variables and references*

Variables	References	Questions
Overconfidence	Wood & Zaichkowsky (2004), Gül et al. (2017)	3
Herding Behavior	Ngoc (2014)	3
Regret Aversion	Gül et al. (2017)	3
Representativeness	Baker et al. (2018)	3
Loss Aversion	Gül et al. (2017)	3

The measurement items were adapted from multiple sources. The overconfidence items were adapted from Wood and Zaichkowsky (2004) and Gül et al. (2017); the herding behavior items from Ngoc (2014); the regret aversion and loss aversion items from Gül et al. (2017); and the representativeness items from Baker et al. (2018).

A total of 30 sub-hypotheses were tested simultaneously across six independent variables. Testing multiple hypotheses on the same dataset creates the multiple-testing problem and increases the expected false discovery rate (FDR). To control this risk and limit Type I errors, the Benjamini–Hochberg (1995) procedure was applied. Unlike traditional correction methods, such as the Bonferroni adjustment, which may substantially reduce statistical power because of their conservative nature, the Benjamini–Hochberg procedure controls the FDR while retaining greater power to detect meaningful differences. In this study, the five sub-hypotheses associated with each independent variable were treated as a separate hypothesis family. Adjusted p-values (q-values) were calculated within each five-test family, and hypothesis decisions were based on the criterion of $q < .05$.

The research model examines whether overconfidence, herding behavior, regret aversion, representativeness, and loss aversion differ across selected demographic and experiential groups. In this

context, Table 2 presents the hypotheses based on the research model. We examined each demographic and experiential characteristic through five sub-hypotheses corresponding to the five behavioral bias dimensions.

Table 2. Research hypotheses

H_{1a}	The overconfidence behavioral bias of individual investors differs significantly by gender.
H_{1b}	The herding behavioral bias of individual investors differs significantly by gender.
H_{1c}	The regret aversion behavioral bias of individual investors differs significantly by gender.
H_{1d}	The representativeness behavioral bias of individual investors differs significantly by gender.
H_{1e}	The loss aversion behavioral bias of individual investors differs significantly by gender.
H_{2a}	The overconfidence behavioral bias of individual investors differs significantly by age group.
H_{2b}	The herding behavioral bias of individual investors differs significantly by age group.
H_{2c}	The regret aversion behavioral bias of individual investors differs significantly by age group.
H_{2d}	The representativeness behavioral bias of individual investors differs significantly by age group.
H_{2e}	The loss aversion behavioral bias of individual investors differs significantly by age group.
H_{3a}	The overconfidence behavioral bias of individual investors differs significantly by education level.
H_{3b}	The herding behavioral bias of individual investors differs significantly by education level.
H_{3c}	The regret aversion behavioral bias of individual investors differs significantly by education level.
H_{3d}	The representativeness behavioral bias of individual investors differs significantly by education level.
H_{3e}	The loss aversion behavioral bias of individual investors differs significantly by education level.
H_{4a}	The overconfidence behavioral bias of individual investors differs significantly by portfolio review frequency.
H_{4b}	The herding behavioral bias of individual investors differs significantly by portfolio review frequency.
H_{4c}	The regret aversion behavioral bias of individual investors differs significantly by portfolio review frequency.
H_{4d}	The representativeness behavioral bias of individual investors differs significantly by portfolio review frequency.
H_{4e}	The loss aversion behavioral bias of individual investors differs significantly by portfolio review frequency.
H_{5a}	The overconfidence behavioral bias of individual investors differs significantly by years of investment experience.
H_{5b}	The herding behavioral bias of individual investors differs significantly by years of investment experience.
H_{5c}	The regret aversion behavioral bias of individual investors differs significantly by years of investment experience.
H_{5d}	The representativeness behavioral bias of individual investors differs significantly by years of investment experience.
H_{5e}	The loss aversion behavioral bias of individual investors differs significantly by years of investment experience.
H_{6a}	The overconfidence behavioral bias of individual investors differs significantly by marital status.
H_{6b}	The herding behavioral bias of individual investors differs significantly by marital status.
H_{6c}	The regret aversion behavioral bias of individual investors differs significantly by marital status.
H_{6d}	The representativeness behavioral bias of individual investors differs significantly by marital status.
H_{6e}	The loss aversion behavioral bias of individual investors differs significantly by marital status.

The raw data obtained after the data collection process were analyzed using the SPSS 24 software package. In the data analysis, descriptive statistics, including frequency, percentage, arithmetic mean, and standard deviation, were computed first. We then examined skewness and kurtosis coefficients to test the dataset's normality. The independent samples t-test was conducted to examine the effect of two-category demographic variables on behavioral dimensions, whereas one-way analysis of variance (ANOVA) was applied to analyze the effects of variables with three or more categories.

Hypothesis decisions were made separately for each behavioral bias dimension. To control the false discovery rate arising from the simultaneous examination of five behavioral bias dimensions, the Benjamini–Hochberg procedure was applied separately within each demographic and experiential variable. Accordingly, the five tests corresponding to each general hypothesis were treated as a distinct hypothesis family. Both unadjusted p-values and Benjamini–Hochberg-adjusted p-values (q-values) were reported. A sub-hypothesis was considered supported when the corresponding q-value was below .05; otherwise, it was considered not supported. General hypotheses involving multiple behavioral bias dimensions were classified as fully supported, partially supported, or not supported according to the results of the corresponding sub-hypotheses.

Before conducting independent-samples t-tests and one-way ANOVA analyses, we examined the homogeneity-of-variance assumption using Levene's test. When the homogeneity assumption was met, we applied standard ANOVA and the Tukey HSD post-hoc test. When the assumption was violated, Welch's robust ANOVA and the Games-Howell post-hoc procedure were used. Given the unequal group sizes, robust test results were prioritized where necessary.

The magnitude of group differences was evaluated using partial eta squared (ηp^2). For standard one-way ANOVA results, ηp^2 was calculated from the omnibus F statistic and its degrees of freedom. For Welch's robust ANOVA results, F-derived ηp^2 values were reported as approximate effect-size estimates and interpreted cautiously. Effect sizes below .01 were considered negligible, values between .01 and .059 small, values between .06 and .139 medium, and values of .14 or above large.

The demographic and experiential variables included in the hypothesis tests were gender, marital status, age, education level, portfolio review frequency, and years of investment experience. Other variables collected solely for descriptive sample profiling were not included in the inferential analyses because they were not specified in the a priori research model.

4. Results and discussion

The frequency and percentage distributions of the socio-demographic characteristics of the 368 individual investors who participated in the study were examined, and the results are reported in Table 3.

Table 3. *Frequency and percentage results of demographic variables*

Variables		Frequency	Percentage %
Gender	Male	191	51.9
	Female	177	48.1
Marital Status	Married	204	55.4
	Single	164	44.6
Age	19-25	78	21.2
	26-35	123	33.4
	36-45	94	25.5
	46+	73	19.8
Education	Primary Education	29	7.9
	High School	73	19.8
	Associate Degree	65	17.7
	Bachelor's Degree	143	38.9
	Graduate Degree	58	15.8
Portfolio Review Frequency	Hourly	22	6
	Daily	105	28.5

	Weekly	100	27.2
	Monthly	141	38.3
Years of Investment Experience	Less than 1 year	90	24.5
	1-3 years	95	25.8
	4-6 years	77	20.9
	7-9 years	41	11.1
	10 years +	65	17.7
Sample size (n): 368			

According to Table 3, 51.9% of the participants were male (n = 191), while 48.1% were female (n = 177). Married participants accounted for 55.4% of the sample (n = 204), whereas single participants accounted for 44.6% (n = 164). Regarding age, 21.2% of the participants were aged 19–25, 33.4% were aged 26–35, 25.5% were aged 36–45, and 19.8% were aged 46 or over. In terms of education, bachelor's degree holders constituted the largest group (38.9%), followed by high school graduates (19.8%), associate degree holders (17.7%), graduate degree holders (15.8%), and participants with primary education (7.9%). Regarding investment experience, 24.5% had less than one year of experience, 25.8% had 1–3 years, 20.9% had 4–6 years, 11.1% had 7–9 years, and 17.7% had ten years or more of experience. Table 4 presents descriptive statistics for participants' responses to the behavioral finance dimensions.

Table 4. *Descriptive statistics*

Variables	Mean	Std. Deviation	Variance	Skewness	Kurtosis
Overconfidence	3.1241	1.11495	1.243	-.259	-.797
Herding Behavior	2.8922	1.14820	1.318	-.038	-1.084
Regret Aversion	3.0199	1.05390	1.111	-.074	-.750
Representativeness	3.2926	1.10479	1.221	-.517	-.621
Loss Aversion	3.3614	1.14183	1.304	-.517	-.711

Table 4 shows that loss aversion has the highest arithmetic mean (3.3614) among the behavioral biases of individual investors in the Kırklareli sample. This is followed by the representativeness heuristic (3.2926) and overconfidence (3.1241), respectively. Conversely, participants agreed least with herding behavior (2.8922). To assess the dataset's statistical distribution, skewness and kurtosis values were examined. The skewness and kurtosis coefficients fell within the acceptable range of −1.5 to +1.5, indicating no substantial deviation from normality (Kline, 2011).

To assess inter-item correlations within the scales and the adequacy of the research sample, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity were conducted. Subsequently, the factor loadings of the items were computed, and Cronbach's alpha coefficients were calculated to test the internal consistency reliability of the scales. Table 5 presents the factor analysis results for the variables.

Table 5. *Factor analysis, reliability, and convergent validity results*

Variables	Factor	Cronbach's	Eigenvalue	CR	AVE	√AVE
Overconfidence		0.847	2.305	0.908	0.768	0.876
OC1	0.898					
OC2	0.888					
OC3	0.842					
Herding Behavior		0.855	2.33	0.913	0.778	0.882
HB1	0.907					
HB2	0.907					
HB3	0.829					
Regret Aversion		0.647	1.76	0.810	0.587	0.766
RA1	0.770					
RA2	0.770					
RA3	0.759					
Representativeness		0.815	2.20	0.892	0.734	0.857
RE1	0.845					
RE2	0.896					
RE3	0.828					
Loss Aversion		0.815	2.192	0.890	0.731	0.855
LA1	0.859					
LA2	0.843					
LA3	0.862					
KMO (Kaiser-Meyer-Olkin)	0.876					
Bartlett's test of sphericity χ^2 (105):	2626.521					
Bartlett (Significance)	<0.001					
Extraction Method	Principal Components					
Rotation Method	Varimax					

The KMO test result, obtained from the analysis conducted to evaluate the scale's construct validity, indicates the correlations among the variables and the suitability of the data for factor analysis. The KMO value ranges between 0 and 1 and reaches 1 when a variable can be perfectly predicted by the other variables. KMO values of 0.80 and above are considered excellent (Büyüköztürk, 2002). The KMO and Bartlett's test results indicate that the dataset is suitable for factor analysis. The five-factor structure explained 71.91% of the total variance, indicating that the extracted dimensions accounted for a substantial proportion of the variance in the measurement items.

Cronbach's alpha values were calculated as 0.847 for overconfidence, 0.855 for herding behavior, 0.815 for representativeness, 0.815 for loss aversion, and 0.647 for regret aversion. Although the regret aversion dimension's Cronbach's alpha fell below the conventional 0.70 threshold, its CR (0.810) and AVE (0.587) values met the recommended criteria (Hair et al., 2019); the construct was therefore retained, though related findings were interpreted with caution.

Furthermore, to evaluate the discriminant validity of the behavioral bias constructs, the Fornell-Larcker criterion (Fornell & Larcker, 1981) was applied. Under this criterion, discriminant validity is established when the square root of the Average Variance Extracted (√AVE) for each latent construct exceeds its inter-construct correlations with any other latent variable in the model. Furthermore, the Composite Reliability (CR) values should exceed the recommended threshold of 0.70, and the AVE values should be at least 0.50 to ensure adequate convergent validity (Hair et al., 2019). Table 6 presents the inter-construct correlations and the square roots of the AVE values on the diagonal.

Table 6. *Fornell-Larcker discriminant validity matrix*

	Overconfidence	Herding Behavior	Regret Aversion	Representativeness	Loss Aversion
Overconfidence	**(0.876)**				
Herding Behavior	0.051	**(0.882)**			
Regret Aversion	0.157**	0.462**	**(0.766)**		
Representativeness	0.253**	0.540**	0.687**	**(0.857)**	
Loss Aversion	0.022	0.558**	0.511**	0.540**	**(0.855)**

Notes: **, * show the significance at the 1% and 5% levels, respectively.

As shown in Table 6, the square roots of the AVE values (bolded on the diagonal) for overconfidence, herding behavior, regret aversion, representativeness, and loss aversion are all greater than the off-diagonal correlation coefficients corresponding to their respective rows and columns. This confirms that each behavioral bias construct shares more variance with its own indicators than with any other construct, thereby providing evidence of discriminant validity among the five behavioral bias dimensions.

After establishing the scales' reliability and validity, we analyzed differences across groups between behavioral biases and demographic variables. In this context, Table 7 presents the t-test results for the two-category demographic variables, namely gender and marital status.

Table 7. *Independent samples t-test results*

Gender		p	BH-FDR q	Hypothesis
	Overconfidence	0.226	0.226	Not Supported
	Herding Behavior	<0.001	<0.002*	Supported
	Regret Aversion	<0.001	<0.002*	Supported
	Representativeness	<0.001	<0.002*	Supported
	Loss Aversion	0.002	0.003	Supported
Marital Status				
	Overconfidence	0.286	0.477	Not Supported
	Herding Behavior	0.543	0.578	Not Supported
	Regret Aversion	0.578	0.578	Not Supported
	Representativeness	0.269	0.477	Not Supported
	Loss Aversion	0.032	0.160	Not Supported

Notes: p-values represent unadjusted significance levels, whereas q-values represent Benjamini–Hochberg-adjusted p-values calculated within each five-test hypothesis family. Hypothesis decisions were based on $q < 0.05$. Values reported by SPSS as .000 are presented as $p < 0.001$.

According to the independent samples t-test results, no statistically significant gender difference was found in overconfidence; therefore, H_{1a} was not supported. In contrast, statistically significant gender differences were observed in herding behavior, regret aversion, representativeness, and loss aversion. Male investors reported higher mean scores than female investors in all four dimensions; therefore, H_{1b}, H_{1c}, H_{1d}, and H_{1e} were supported. Accordingly, the general gender hypothesis was partially supported.

Our finding that male investors reported higher levels of herding behavior, regret aversion, representativeness, and loss aversion differs from Üstün (2024), who found no statistically significant

gender difference in investment decisions. Erbek Dertli and Yükselen (2025) emphasized the mediating roles of financial literacy and risk perception in the relationship between behavioral tendencies and investment decisions. Taken together, these findings suggest that gender-related differences may vary by sample, regional context, financial literacy, and risk perception. Consistent with this variability, Üstün's (2024) study of 404 individual investors in Samsun similarly examined gender-based differences in behavioral tendencies using the Investor Sentiment Scale, reinforcing the view that gender effects on behavioral bias are sample- and instrument-dependent rather than universal.

The observed gender differences may reflect sample-specific or regional contextual characteristics. However, the present study did not directly measure socio-economic roles, financial literacy, or risk perception. Similarly, the higher overconfidence reported by highly experienced investors may indicate an experience-related confidence effect. Since perceived competence and self-attribution were not directly measured, these explanations should be regarded as tentative interpretations requiring further investigation.

Regarding marital status, we observed no statistically significant differences in overconfidence, herding behavior, regret aversion, or representativeness. Although the unadjusted result for loss aversion was statistically significant ($p = 0.032$), this difference was no longer significant after the Benjamini–Hochberg correction ($q = 0.160$). Therefore, H_{6a}–H_{6e} were not supported, and the general marital status hypothesis was not supported. This result aligns with prior evidence that marital status is a comparatively weak and inconsistent predictor of behavioral bias across studies, in contrast to more consistently significant variables such as education level (Özmerdivanlı, 2023; Hırka, 2020).

Table 8. *Levene's test results for homogeneity of variances*

	Overconfidence	Herding Behavior	Regret Aversion	Representativeness	Loss Aversion
	Levene stat. (df_1, df_2) (p)	Levene stat. (df_1, df_2) (p)	Levene stat. (df_1, df_2) (p)	Levene stat. (df_1, df_2) (p)	Levene stat. (df_1, df_2) (p)
Age	2.566 (3,364) (0.054)	6.608 (3,364) (0.001)	5.694 (3,364) (0.001)	4.533 (3,364) (0.004)	2.872 (3,364) (0.036)
Education	0.782 (4,363) (0.537)	1.571 (4,363) (0.181)	1.615 (4,363) (0.170)	3.691 (4,363) (0.006)	2.202 (4,363) (0.068)
Years of Investment Experience	2.207 (4,363) (0.068)	3.644 (4,363) (0.006)	3.824 (4,363) (0.005)	1.691 (4,363) (0.151)	0.862 (4,363) (0.487)
Portfolio Review Frequency	1.251 (3,364) (0.291)	2.027 (3,364) (0.110)	1.040 (3,364) (0.375)	4.330 (3,364) (0.005)	3.410 (3,364) (0.018)

Notes: Values in parentheses are p-values. A p-value below 0.05 indicates a violation of the homogeneity-of-variances assumption.

The Levene's test results indicated that the homogeneity of variances assumption was satisfied for overconfidence across age groups; for overconfidence, herding behavior, regret aversion, and loss aversion across education levels; for overconfidence, representativeness, and loss aversion across investment experience groups; and for overconfidence, herding behavior, and regret aversion across portfolio review frequency groups. Conversely, the assumption was violated for herding behavior, regret aversion, representativeness, and loss aversion across age groups; for representativeness across education levels; for herding behavior and regret aversion across investment experience groups; and for representativeness and loss aversion across portfolio review frequency groups. Accordingly, standard

one-way ANOVA was employed when the homogeneity assumption was satisfied, whereas Welch's robust ANOVA was used when the assumption was violated. The corresponding omnibus test results are presented in Table 9.

Table 9. *ANOVA and Welch ANOVA tests across demographic variables*

Age	F-Welch F	df1, df2	p	q	ηp²
Overconfidence	2.281	3,364	0.079	0.395	0.018
Herding Behavior	0.623[W]	3,187.182	0.601	0.751	0.010
Regret Aversion	0.805[W]	3,186.001	0.493	0.751	0.013
Representativeness	0.112[W]	3,187.935	0.953	0.953	0.002
Loss Aversion	1.349[W]	3,186.888	0.260	0.650	0.021
Education					
Overconfidence	11.363	4,363	<0.001	<0.001	0.111
Herding Behavior	2.994	4,363	0.019	0.031	0.032
Regret Aversion	5.181	4,363	<0.001	<0.001	0.054
Representativeness	2.829[W]	4,121.580	0.028	0.031	0.085
Loss Aversion	2.686	4,363	0.031	0.031	0.029
Portfolio Review Frequency					
Overconfidence	0.759	3,364	0.518	0.647	0.006
Herding Behavior	1.990	3,364	0.115	0.363	0.016
Regret Aversion	1.486	3,364	0.218	0.363	0.012
Representativeness	0.056[W]	3,87.372	0.982	0.982	0.002
Loss Aversion	1.551[W]	3,88.099	0.207	0.363	0.050
Years of Investment Experience					
Overconfidence	10.029	4,363	<0.001	<0.001	0.100
Herding Behavior	3.476[W]	4,158.384	0.009	0.016	0.081
Regret Aversion	2.511[W]	4,158.252	0.044	0.055	0.060
Representativeness	3.457	4,363	0.009	0.016	0.037
Loss Aversion	1.432	4,363	0.223	0.223	0.016

Notes: W indicates Welch's robust ANOVA. p-values represent unadjusted significance levels, whereas q-values represent Benjamini–Hochberg-adjusted p-values calculated separately within each five-test hypothesis family. Hypothesis decisions were based on $q < .05$. ηp^2 denotes partial eta squared. For Welch's ANOVA, F-derived ηp^2 values are approximate and should be interpreted cautiously.

The ANOVA and Welch ANOVA results indicated that age groups did not significantly differentiate any of the five behavioral bias dimensions after the Benjamini–Hochberg correction. Accordingly, H2a–H2e were not supported. This null finding for age is consistent with Gül et al. (2017), who similarly found no significant effect of age on behavioral finance attitudes among professional investors, suggesting that age alone may be a weaker predictor of behavioral bias than education or experience. Education level significantly differentiated overconfidence, herding behavior, regret aversion, representativeness, and loss aversion after the correction; therefore, H3a–H3e were supported. Portfolio review frequency did not produce statistically significant differences in any behavioral bias dimension, and H4a–H4e were not supported. Investment experience significantly differentiated overconfidence ($q < .001$), herding behavior ($q = .016$), and representativeness ($q = .016$). Although the unadjusted result for regret aversion was significant at the 5% level ($p = .044$), it was no longer significant after the

Benjamini–Hochberg correction (q = .055). No significant difference in loss aversion was observed (q = .223). Therefore, H5a, H5b, and H5d were supported, whereas H5c and H5e were not supported. At the general hypothesis level, the age and portfolio review frequency hypotheses were not supported; the education hypothesis was fully supported, and the investment experience hypothesis was partially supported.

The effect-size estimates indicated medium-sized effects of education level on overconfidence (ηp^2 = .111) and representativeness (ηp^2 = .085). Investment experience also had medium-sized effects on overconfidence (ηp^2 = .100), herding behavior (ηp^2 = .081), and regret aversion (ηp^2 = .060). Although statistically significant after the Benjamini–Hochberg correction, education's associations with herding behavior (ηp^2 = .032), regret aversion (ηp^2 = .054), and loss aversion (ηp^2 = .029) were small-to-medium in magnitude according to Cohen's (1988) conventions, indicating that education plays a comparatively limited practical role in these three dimensions relative to overconfidence and representativeness. The remaining effects were generally small or negligible. Although the regret aversion effect reached a moderate magnitude, it did not remain statistically significant after the Benjamini–Hochberg correction.

The education-related findings reveal a non-monotonic and bias-specific pattern. Participants with bachelor's and graduate degrees reported higher overconfidence than selected lower-education groups, whereas participants with primary education reported higher levels of herding and regret aversion than several higher-education groups. Education had a medium-sized association with overconfidence and representativeness, while its associations with the remaining dimensions were small. These results suggest that education does not uniformly reduce behavioral biases. Instead, different education groups may be susceptible to different forms of bias. Because financial literacy and perceived competence were not directly measured, future research should examine the psychological mechanisms underlying these differences.

Based on the ANOVA results, Tukey HSD was used for dimensions satisfying the homogeneity of variances assumption, whereas Games-Howell comparisons were used for dimensions in which the assumption was violated. Table 10 presents the post-hoc test results.

Table 10. *Post-hoc test results*

Education					
Overconfidence	Primary Education	High School	Associate Degree	Bachelor's Degree	Graduate Degree
Bachelor's Degree	1.004*	0.548*			
Graduate Degree	1.304*	0.847*	0.714*		
Herding Behavior					
Primary Education		0.741*	0.683*	0.631*	0.856*
Regret Aversion					
Primary Education		0.912*	0.792*	0.895*	0.954*
Representativeness					
Primary Education					0.758*
Loss Aversion					
Primary Education			0.741*	0.622*	0.787*
Years of Investment Experience	Less than 1 year	1-3 years	4-6 years	7-9 years	10+
Overconfidence					
10+	1.013*	0.834*	0.842*		

Herding Behavior	
Less than 1 year	0.675*
Representativeness	
Less than 1 year	0.698*

Notes: * shows significance at the 5% level. Games–Howell comparisons were used for education–representativeness and investment experience–herding behavior because the homogeneity of variances assumption was violated. Tukey HSD was used for the other reported comparisons.

The post-hoc comparisons indicated that the direction of education-related differences varied across behavioral bias dimensions. Participants with graduate education showed higher overconfidence than certain lower-education groups, whereas participants with primary education showed higher herding behavior and regret aversion than several higher-education groups. Significant education-related differences were also observed in representativeness and loss aversion. These findings indicate that education does not uniformly reduce behavioral biases; rather, different education levels appear to be associated with different forms of bias.

These findings are broadly consistent with Baker et al. (2018), who reported that demographic characteristics and financial knowledge may be associated with different behavioral biases rather than producing a uniform reduction in bias. This pattern also parallels Özmerdivanlı's (2023) findings from Karaman, where education level was statistically significantly related to overconfidence, optimism bias, and loss aversion among individual investors, and Hırka's (2020) results from Gümüşhane, where education level was associated with differences in overconfidence, herding behavior, and self-attribution bias among gold investors. The higher overconfidence observed among some highly educated groups also supports the view that greater knowledge or perceived competence may coexist with confidence-related bias. However, formal education and financial literacy are conceptually distinct. Because the present study did not directly measure financial literacy, the findings should be interpreted as education-related differences rather than direct financial-literacy effects.

Investors with more than ten years of investment experience reported higher levels of overconfidence than those with less than one year, one to three years, and four to six years of experience. This finding is partly consistent with the learning-based model of Gervais and Odean (2001), which suggests that market experience may coexist with increasing overconfidence when investors attribute successful outcomes disproportionately to their own ability. However, their model also predicts that investors may develop a more accurate assessment of their abilities over longer periods; therefore, the present cross-sectional evidence should not be interpreted as demonstrating a linear causal effect of experience on overconfidence. Investors with less than one year of experience also reported higher herding behavior and representativeness than those with seven to nine years of experience.

The herding result differs from Sabir et al. (2019), who found that past investment experience was positively associated with herding behavior among individual investors in the Pakistan Stock Exchange. This dimension-specific pattern is also consistent with Gül et al.'s (2017) finding that professional experience was significantly related to behavioral attitudes among gold-sector professionals in Gaziantep, suggesting that the relationship between experience and behavioral bias is not linear but varies by occupational and regional context. This divergence may reflect differences in market structure, sample characteristics, financial literacy, or how investment experience is operationalized. The higher representativeness observed among novice investors further indicates that experience-related differences may be specific to particular behavioral bias dimensions. Nevertheless, because perceived competence, self-attribution, and information-processing strategies were not directly measured, these mechanisms

should be regarded as possible explanations rather than confirmed causal processes. Although an unadjusted difference initially appeared for regret aversion, it was not statistically significant after the Benjamini–Hochberg correction and was therefore not interpreted as a confirmed finding. Table 11 presents the resulting hypothesis decisions.

Table 11. *Hypothesis decision status*

H_{1a}	The overconfidence behavioral bias of individual investors differs significantly by gender.	Not Supported
H_{1b}	The herding behavioral bias of individual investors differs significantly by gender.	Supported
H_{1c}	The regret aversion behavioral bias of individual investors differs significantly by gender.	Supported
H_{1d}	The representativeness behavioral bias of individual investors differs significantly by gender.	Supported
H_{1e}	The loss aversion behavioral bias of individual investors differs significantly by gender.	Supported
H_{2a}	The overconfidence behavioral bias of individual investors differs significantly by age group.	Not Supported
H_{2b}	The herding behavioral bias of individual investors differs significantly by age group.	Not Supported
H_{2c}	The regret aversion behavioral bias of individual investors differs significantly by age group.	Not Supported
H_{2d}	The representativeness behavioral bias of individual investors differs significantly by age group.	Not Supported
H_{2e}	The loss aversion behavioral bias of individual investors differs significantly by age group.	Not Supported
H_{3a}	The overconfidence behavioral bias of individual investors differs significantly by education level.	Supported
H_{3b}	The herding behavioral bias of individual investors differs significantly by education level.	Supported
H_{3c}	The regret aversion behavioral bias of individual investors differs significantly by education level.	Supported
H_{3d}	The representativeness behavioral bias of individual investors differs significantly by education level.	Supported
H_{3e}	The loss aversion behavioral bias of individual investors differs significantly by education level.	Supported
H_{4a}	The overconfidence behavioral bias of individual investors differs significantly by portfolio review frequency.	Not Supported
H_{4b}	The herding behavioral bias of individual investors differs significantly by portfolio review frequency.	Not Supported
H_{4c}	The regret aversion behavioral bias of individual investors differs significantly by portfolio review frequency.	Not Supported
H_{4d}	The representativeness behavioral bias of individual investors differs significantly by portfolio review frequency.	Not Supported
H_{4e}	The loss aversion behavioral bias of individual investors differs significantly by portfolio review frequency.	Not Supported
H_{5a}	The overconfidence behavioral bias of individual investors differs significantly by years of investment experience.	Supported
H_{5b}	The herding behavioral bias of individual investors differs significantly by years of investment experience.	Supported
H_{5c}	The regret aversion behavioral bias of individual investors differs significantly by years of investment experience.	Not Supported
H_{5d}	The representativeness behavioral bias of individual investors differs significantly by years of investment experience.	Supported

H_{5e}	The loss aversion behavioral bias of individual investors differs significantly by years of investment experience.	Not Supported
H_{6a}	The overconfidence behavioral bias of individual investors differs significantly by marital status.	Not Supported
H_{6b}	The herding behavioral bias of individual investors differs significantly by marital status.	Not Supported
H_{6c}	The regret aversion behavioral bias of individual investors differs significantly by marital status.	Not Supported
H_{6d}	The representativeness behavioral bias of individual investors differs significantly by marital status.	Not Supported
H_{6e}	The loss aversion behavioral bias of individual investors differs significantly by marital status.	Not Supported

At the general hypothesis level, H1 and H5 were partially supported, H3 was fully supported, and H2, H4, and H6 were not supported.

5. Conclusion

This study empirically examined the behavioral biases shaping the decision-making processes of individual investors in Kırklareli. The findings indicate that investor decisions may deviate from the fully rational homo economicus model, with loss aversion emerging as the most pronounced behavioral bias. This result is consistent with Prospect Theory (Kahneman & Tversky, 1979).

The study's main contribution is showing that demographic and experiential characteristics are not uniformly associated with all behavioral bias dimensions. Education and investment experience appear to differentiate the type of bias to which investors may be susceptible rather than consistently reducing behavioral bias. This dimension-specific pattern also shows the importance of evaluating overconfidence, herding, regret aversion, representativeness, and loss aversion separately, rather than treating behavioral bias as a single aggregate tendency. The Benjamini–Hochberg procedure further strengthens this interpretation by reducing the risk of false-positive conclusions from multiple hypothesis tests. Barber and Odean (2001) documented gender differences in overconfidence and trading behavior. In contrast, the present study found no statistically significant gender difference in overconfidence, while male participants reported higher scores in herding behavior, regret aversion, representativeness, and loss aversion. Therefore, the present findings do not fully replicate the gender–overconfidence pattern reported by Barber and Odean (2001); instead, they suggest that gender-related differences may emerge in other behavioral bias dimensions.

Taken together, the gender- and experience-related findings indicate that demographic and experiential effects on behavioral bias are dimension-specific rather than uniform. This reinforces the study's central argument that investor profiling should rely on bias-specific indicators rather than a single aggregate behavioral score, and that demographic classification alone provides an incomplete picture of investor psychology.

Based on these empirical insights, this study proposes practical and strategic recommendations for market participants, financial institutions, and policymakers. Retail investors may benefit from rule-based investment strategies, periodic portfolio rebalancing, and diversification practices to counteract emotional impulses, particularly loss aversion and social proofing (herding). Investment advisors and brokerage firms should tailor their advisory services based on investor profiles (Pompian, 2006, 2011). Rather than assuming that educated or experienced clients are inherently rational, advisors should watch for signs of overconfidence in high-education segments and offer targeted behavioral guardrails. Public

financial literacy programs should extend beyond technical and fundamental analysis to include behavioral training. National financial education initiatives should integrate modules that specifically address cognitive biases.

Limitations of the study include its cross-sectional design, reliance on self-reported survey data, and focus on a single geographic region (Kırklareli) via convenience sampling. Future research may employ longitudinal, experimental, and mixed-method designs to examine the mechanisms underlying behavioral biases more directly.

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Financial Support:	*The study received no financial support from any institution or project.*
Conflict of Interest:	*No conflict of interest.*
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Genişletilmiş özet

Kavramsal Çerçeve

Geleneksel finans yaklaşımı, yatırımcıların mevcut bilgiyi tutarlı bir biçimde değerlendirdiği ve faydasını en üst düzeye çıkarmaya çalıştığı varsayımına dayanır. Markowitz'in (1952) Modern Portföy Teorisi, Sharpe'ın (1964) Sermaye Varlıkları Fiyatlama Modeli ve Fama'nın (1970) Etkin Piyasalar Hipotezi, finansal kararların bilgi, risk ve beklenen getiri ekseninde açıklanabileceği analitik bir çerçeve sunmuştur. Ancak piyasalarda aşırı tepki, düşük tepki, sürü hareketleri ve spekülatif fiyat oluşumları gibi düzenli örüntülerin gözlenmesi, finansal kararların psikolojik yönüne ilişkin araştırmaları güçlendirmiştir.

Davranışsal finans, geleneksel finansı reddetmek yerine, yatırımcıların bilgi işleme kapasitesinin sınırlı olduğunu ve belirsizlik altında bilişsel kestirmelerden ve duygusal tepkilerden yararlandığını dikkate alarak bu çerçeveyi tamamlar. Simon'un (1955) sınırlı rasyonellik yaklaşımı, bireylerin tüm seçenekleri eksiksiz değerlendiremediğini; Tversky ve Kahneman'ın (1974) sezgisel kestirmeler yaklaşımı ise belirsizlik altındaki yargıların sistematik yanlılıklar içerebileceğini göstermektedir. Kahneman ve Tversky'nin (1979) Beklenti Teorisi bireylerin sonuçları mutlak servet yerine bir referans noktasına göre değerlendirdiğini ortaya koyarken, zihinsel muhasebe yaklaşımı (Thaler, 1999) finansal kararların bütüncül biçimde değil, ayrı zihinsel kategoriler içinde değerlendirildiğini açıklamaktadır.

Çalışma, bireysel yatırımcı davranışını beş boyutta ele almaktadır. Aşırı güven, yatırımcının bilgi ve öngörü yeteneğini olduğundan daha yüksek değerlendirmesini; sürü davranışı, bireysel analiz yerine diğer piyasa katılımcılarının kararlarını izleme eğilimini; pişmanlıktan kaçınma, olası pişmanlığı azaltmaya yönelik tercihleri; temsil etme, sınırlı veya yakın dönem bilgilerine dayanarak bir varlığı belirli bir örüntünün temsilcisi olarak kabul etmeyi; kayıptan kaçınma ise kayıplara kazançlardan daha fazla önem vermeyi ifade etmektedir. Bu eğilimlerin tek bir psikolojik yapı gibi ele alınması boyuta özgü farklılıkları görünmez kılabileceğinden, her davranışsal eğilim ayrı bir bağımlı değişken olarak incelenmiştir.

Araştırmanın özgün katkısı üç noktada toplanmaktadır. İlk olarak, çalışma Türkiye'deki davranışsal finans araştırmalarına Kırklareli'deki bireysel yatırımcılar üzerinden bölgesel kanıt sunmaktadır. Sanayi ve tarımsal faaliyetlerin birlikte görüldüğü bu il, farklı sosyo-demografik ve deneyimsel profillerin incelenmesine olanak sağlamaktadır; ancak araştırma tasarımı ilin ekonomik yapısının davranışsal eğilimler üzerindeki nedensel etkisini test etmemektedir. İkinci olarak, beş davranışsal eğilim cinsiyet, yaş, eğitim düzeyi, portföyü kontrol etme sıklığı, yatırım deneyimi ve medeni durum bakımından eş zamanlı olarak değerlendirilmiştir. Üçüncü olarak, 30 alt hipotezin sınanmasından doğabilecek yanlış pozitif bulgu riskini azaltmak amacıyla Benjamini–Hochberg yanlış keşif oranı düzeltmesi kullanılmıştır. Böylece farklı davranışsal boyutların hangi gruplarda farklılaştığı daha kontrollü bir istatistiksel çerçevede ortaya konmaktadır.

Yöntem

Araştırmanın evreni, Kırklareli'de yaşayan ve hisse senedi, döviz, altın, kripto varlık veya mevduat gibi en az bir finansal araca aktif olarak yatırım yapan bireylerden oluşmaktadır. Nicel ve kesitsel tasarıma sahip çalışmada kolayda örnekleme kullanılmış; anketi eksiksiz ve tutarlı biçimde yanıtlayan 368 yatırımcı nihai örneklemi oluşturmuştur. Aşırı güven maddeleri Wood ve Zaichkowsky (2004) ile Gül vd. (2017); sürü davranışı maddeleri: Ngoc (2014); pişmanlıktan ve kayıptan kaçınma maddeleri: Gül vd. (2017); temsil etme maddeleri ise Baker vd. (2018) temel alınarak uyarlanmıştır.

Analizlerde betimsel istatistiklerin ardından cinsiyet ve medeni durum için bağımsız örneklem t testi; yaş, eğitim, portföyü kontrol etme sıklığı ve yatırım deneyimi için tek yönlü varyans analizi kullanılmıştır. Varyansların homojenliği sağlanmadığında Welch ANOVA ve Games–Howell; sağlandığında ise standart ANOVA ve Tukey HSD uygulanmıştır. Grup farklılıklarının büyüklüğü kısmi eta-kare ile değerlendirilmiştir. Bağımsız değişkenler kavramsal olarak birbirinden ayrı sınandığı ve tüm 30 testin tek bir ailede birleştirilmesi istatistiksel gücü gereğinden fazla azaltacağı için, her bağımsız değişkene ait beş alt hipotez ayrı bir hipotez ailesi olarak kabul edilmiş ve Benjamini–Hochberg prosedürü bu aileler içinde uygulanmıştır (Benjamini & Hochberg, 1995).

Bulgular

Katılımcıların %51,9'u erkek, %48,1'i kadın; %55,4'ü evli, %44,6'sı bekârdır. En büyük yaş grubunu 26-35 yaş aralığındaki katılımcılar (%33,4), en büyük eğitim grubunu ise lisans mezunları (%38,9) oluşturmaktadır. Davranışsal eğilimler arasında en yüksek ortalama kayıptan kaçınmada görülmüştür; bunu temsil etme, aşırı güven, pişmanlıktan kaçınma ve sürü davranışı izlemiştir.

Cinsiyete göre aşırı güven düzeyinde anlamlı bir farklılık bulunmamış; erkeklerin sürü davranışı, pişmanlıktan kaçınma, temsil etme ve kayıptan kaçınma ortalamaları kadınlardan daha yüksek bulunmuştur. Yaş, medeni durum ve portföyü kontrol etme sıklığı, BH-FDR düzeltmesi sonrasında hiçbir davranışsal boyutta anlamlı bir farklılık yaratmamıştır; medeni duruma göre kayıptan kaçınmada gözlenen ham fark da düzeltme sonrasında anlamlılığını yitirmiştir.

Eğitim düzeyi beş boyutun tamamında anlamlı farklılık göstermiştir; aşırı güven ve temsil etme boyutlarındaki etki büyüklükleri orta düzeyde bulunmuştur. Lisans ve lisansüstü mezunları bazı düşük eğitim gruplarından daha yüksek aşırı güven sergilerken, ilköğretim mezunlarının sürü davranışı, pişmanlıktan kaçınma ve kayıptan kaçınma

puanları çeşitli yüksek eğitim gruplarından daha yüksektir. Bu sonuç, eğitimin bütün davranışsal eğilimleri doğrusal biçimde azaltmadığını göstermektedir.

Yatırım deneyimine göre aşırı güven, sürü davranışı ve temsil etme boyutlarında anlamlı farklılıklar saptanmış; pişmanlık ve kayıptan kaçınma boyutlarında ise anlamlı bir farklılık saptanmamıştır. Post-hoc karşılaştırmalar, 10 yıl ve üzeri yatırım deneyimine sahip katılımcıların aşırı güven puanlarının 1 yıldan az, 1–3 yıl ve 4–6 yıl deneyime sahip katılımcılardan daha yüksek olduğunu göstermiştir. Bir yıldan az deneyime sahip yatırımcıların sürü davranışı ve temsil etme puanları, 7–9 yıl deneyime sahip yatırımcılarınkilerden daha yüksektir.

Sonuç ve Öneriler

Araştırma, demografik ve deneyimsel özelliklerin davranışsal eğilimleri tekdüze bir biçimde ayırt etmediğini ortaya koymuştur. Cinsiyet ve yatırım deneyimi hipotezleri kısmen, eğitim hipotezi ise tamamen desteklenmiş; yaş, medeni durum ve portföyü kontrol etme sıklığı hipotezleri ise desteklenmemiştir. Kayıptan kaçınmanın en yüksek ortalamaya sahip boyut olması Beklenti Teorisi'yle uyumludur. Bununla birlikte, bulgular demografik özelliklerin genel bir yanlılık göstergesi olarak kullanılmaması gerektiğini ve her davranışsal eğilimin ayrı ayrı değerlendirilmesi gerektiğini göstermektedir.

Uygulamada finansal danışmanlar ve aracı kurumlar, yatırımcıları yalnızca demografik özelliklerine göre sınıflandırmak yerine davranışsal eğilimleri de içeren profiller kullanabilir. Eğitimli ve deneyimli yatırımcılarda aşırı güvene karşıt senaryo analizi ve önceden belirlenmiş işlem kuralları; düşük eğitimli veya deneyimsiz yatırımcılarda ise bilgi kaynaklarını doğrulama ve sosyal medya yönlendirmelerini eleştirel biçimde değerlendirme becerileri öne çıkabilir. Finansal okuryazarlık programlarının bilişsel yanlılıkları ve karar kontrol araçlarını da kapsaması faydalı olabilir. Bu öneriler, doğrudan test edilmiş müdahaleler değil; bulgulardan türetilen uygulama çıkarımlarıdır.

Verilerin tek bir ilde kolayda örneklemle toplanması, sonuçların genellenebilirliğini ve nedensel olarak yorumlanmasını sınırlandırmaktadır. Gelecekteki araştırmalarda farklı bölgeleri kapsayan olasılıklı örneklemler kullanılabilir; finansal okuryazarlık, gelir, risk toleransı ve yatırım aracı türü modele eklenebilir. Boylamsal ve deneysel tasarımlar ile anket verilerinin görüşmeler veya işlem kayıtlarıyla desteklenmesi, davranışsal eğilimlerin daha kapsamlı bir biçimde açıklanmasına katkı sağlayacaktır.