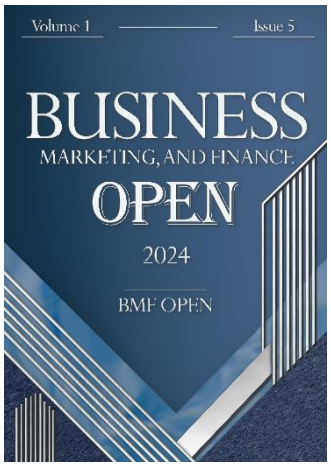
Examining the Impact of Investors' Mental Accounting Behavioral Bias on Financial Policies in the Iranian Stock Market



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Abstract: Among various behavioral biases, mental accounting is an economic concept introduced for the first time by Richard Thaler in 1985. One of the most significant consequences of this mental mechanism is that individuals assign different values to the same monetary unit. The aim of this research is to examine the impact of investors' mental accounting behavioral bias on financial policies in the Iranian stock market. The statistical population of the study includes 14 top investment companies and their investee companies, comprising a total of 109 companies during the period from 2014 to 2020. Panel data models and STATA software were used for data analysis. The results indicated that investors' mental accounting does not have a significant interactive effect on the relationship between growth opportunities and the growth of total fixed assets and long-term investments. Although mental accounting leads to loss aversion and a tendency toward the mean reversion of stock returns, resulting in decreased stock returns and consequently reducing companies' ability for new investments in the form of growth in total fixed assets and long-term investments, the negative impact of mental accounting is not strong enough to alter the relationship between growth opportunities and the fourth investment index. Therefore, the first hypothesis of the study, which posits that investors' mental accounting significantly impacts the relationship between growth opportunities and the growth of total fixed assets and long-term investments, was not confirmed. In general, adopting financial policies for profitable investments and appropriate financing plays a crucial role in the growth of companies.

Keywords: Behavioral bias, mental accounting, investors, financial policies, Iranian stock market

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1. Introduction

Mental accounting is a psychological phenomenon that causes individuals to mentally categorize money into different accounts, such as money for bills and money for vacations. People enjoy the psychological comfort of having money in the bank, even when transferring money from savings to pay off a credit card incurs a percentage of their income. Instead of giving cash as a gift, they buy gift cards for others. This limits the utility of money, but in the mental account of the recipient, it serves the purpose of a gift and satisfies the recipient's utility [1-5].

Mental accounting studies how individuals interpret information to make decisions based on their analysis of events in their minds, which may deviate from the general principle of rationality. Mental accounting suggests that individuals tend to make financial decisions in separate mental accounts [3]. Ignoring the rational assumption that it is better to make all decisions within a single portfolio, mental accounting practically overlooks the interaction between different decisions. Additionally, mental accounting leads to the disposition effect. Theoretical and empirical findings from researchers and market analysts confirm the existence of a unique and puzzling phenomenon in financial markets. It appears that investors (both individual and institutional) are reluctant to recognize their losses but eager to realize their gains. In other words, investors are more inclined to quickly sell their winning (profitable) stocks and hold on to their losing (unprofitable) stocks [4].

On the other hand, understanding how corporate managers decide on adopting appropriate financial policies to meet a company's financial needs is a critical subject in accounting. Companies' ability to determine suitable financial policies for creating investment opportunities is a primary factor in their growth and development. Thus, adopting financial policies for profitable investments and appropriate financing plays a significant role in company growth [6-10]. Undoubtedly, investors' mental accounting behavioral bias can impact corporate financial policies, including financing and investment policies [11-13].

Furthermore, one of the most critical decisions faced by corporate managers is financing. Financing is an essential component of any business operation. Without access to financing sources, a company's growth potential is jeopardized, especially in the current competitive and growing environment where companies need to expand their activities through new investments. Managers decide which financing methods to use. In this study, financial policy is measured using five criteria: (1) financial leverage, (2) cash dividends, (3) debt ratio, (4) debt maturity, and (5) the ratio of long-term debt to equity. Additionally, several factors, such as agency problems, information asymmetry, company size, financial distress, and others, influence managers' decisions. Besides these internal factors, some behavioral biases of investors, such as mental accounting, are also crucial factors in determining financial policies [14-17].

On the other hand, investment decisions are among the most critical responsibilities of corporate managers. If managers can correctly identify valuable investment opportunities in the market and allocate appropriate resources to each, they can contribute to company growth and increase shareholder wealth. Understanding the factors influencing investment policies and applying them can help managers achieve optimal investment levels and satisfy shareholders [11, 18]. The over- and under-investment hypothesis suggests that managers' investment policies either involve over-investment or under-investment. Companies investing below the optimal level suffer from under-investment, while those investing above the optimal level face over-investment issues [13, 19-21]. According to the over/under-investment model, a company's growth opportunities should justify its investment policies. In other words, appropriate investment policies correlate positively with growth opportunities and new corporate investments. These new investments include four criteria: (1) growth in tangible fixed assets, (2) growth in non-current assets, (3) growth in long-term investments, and (4) growth in total fixed assets and long-term investments. Undoubtedly, like other financial policies, behavioral biases of investors, such as mental accounting, can affect the relationship between growth opportunities and new investments [22-26].

The literature on behavioral biases in investment decisions highlights various psychological and contextual factors influencing investor behavior. Pakdel et al. (2016) identified cognitive biases such as anchoring, availability heuristic, confirmation bias, projection, halo effect, market sentiment, optimism, regret theory, price anomalies, and narrow framing as significant determinants of inexperienced investors' decisions [1]. Shams and Esfandiari

Moghaddam (2017) showed that herding behavior negatively affects all performance criteria, such as Jensen, Sharpe, and Treynor ratios [27]. Azar et al. (2018) used simulation scenarios to model shareholder behavior in Iran's stock market, noting high volatility in the short term due to underdeveloped mechanisms like price fluctuation limits, though efficiency improved over time [28]. Finally, Delshad and Sadeghi Sharif (2018) found that the presence of institutional investors does not significantly alter the relationship between managerial myopia and abnormal returns or the market's reaction to managerial myopia [29]. This body of research underscores the complex interplay between psychological, behavioral, and contextual factors shaping investment behaviors and market dynamics.

Given the significance of these topics, this study examines the impact of investors' mental accounting behavioral bias on the financial policies—specifically, financing and investment policies—of companies listed on the Tehran Stock Exchange.

2. Methodology

In this study, to test the research hypotheses, the following relationships are estimated using panel data models:

Hypothesis Test 1:

$$NEWINVST2_{it} = \beta_0 + \beta_1 MA_{it} + \beta_2 CASH_{it} + \beta_3 Size_{it} + \beta_4 Growth_{it} + \beta_5 MA_{it} \times Growth_{it} + \beta_6 FlowLiqu_{it} + \beta_7 Debtbank_{it} + \beta_8 LiquAs_{it} + \varepsilon_{it}$$

Hypothesis Test 2:

$$NEWINVST3_{it} = \beta_0 + \beta_1 MA_{it} + \beta_2 CASH_{it} + \beta_3 Size_{it} + \beta_4 Growth_{it} + \beta_5 MA_{it} \times Growth_{it} + \beta_6 FlowLiqu_{it} + \beta_7 Debtbank_{it} + \beta_8 LiquAs_{it} + \varepsilon_{it}$$

Hypothesis Test 3:

$$NEWINVST4_{it} = \beta_0 + \beta_1 MA_{it} + \beta_2 CASH_{it} + \beta_3 Size_{it} + \beta_4 Growth_{it} + \beta_5 MA_{it} \times Growth_{it} + \beta_6 FlowLiqu_{it} + \beta_7 Debtbank_{it} + \beta_8 LiquAs_{it} + \varepsilon_{it}$$

The statistical population of this study includes investment companies listed on the Tehran Stock Exchange and their investee companies during the period from 2014 to 2020, meeting the following criteria:

1. To ensure data comparability, the fiscal year-end of the companies must be the last day of March.
2. To maintain homogeneity, banks and insurance companies are excluded from the research sample.
3. Their stock trading must not have been suspended for more than three months during the study period.
4. Data on the selected variables in this study must be accessible.
5. Companies should not have experienced operational or fiscal year-end changes during the research period.

Based on these criteria, the statistical population includes 14 top investment companies that account for more than 50% of the total stock trading value (according to the Tehran Stock Exchange Statistics Department) and their

investee companies, which are part of the investment companies' portfolios and are listed between March 21, 2014, and March 20, 2020.

3. Findings and Results

Initially, the data is described, followed by hypothesis testing using outputs from the STATA statistical software. Finally, research questions are addressed based on the conducted analyses.

Hypothesis 1 Test: *Investors' mental accounting has a significant impact on the relationship between growth opportunities and the growth of non-current assets.*

To select an appropriate model specification, the Poolability, Hausman, and Breusch-Pagan tests were applied. The results of these tests for the first research model are presented in the table below:

Table 1. Results of Poolability, Hausman, and Breusch-Pagan Tests for the First Research Model

Test Type	Test Statistic	Test Statistic Value	P-Value
Poolability	F Limer	515.08	***0.0018
Breusch & Pagan	LM Test	311.29	***0.0029
Hausman	LM Test	26.07	**0.0421

***Significant at 1% level - **Significant at 5% level - *Significant at 10% level - NS Not significant

Since the calculated F-statistic for the Poolability test for the first model (dependent variable: second investment index—growth of non-current assets [NEWINVEST2]) is 515.08, and its P-value is less than 0.05, the null hypothesis is rejected. In other words, the OLS model is inefficient for this model, and a panel data model should be used.

Additionally, the findings of the Breusch-Pagan test indicate that the test statistic for the first model is 311.29, and its P-value is less than 0.05. Thus, the null hypothesis is rejected, indicating the presence of random effects in the model. Similarly, the Hausman test results show that the test statistic for the first model is 26.07, and its P-value is less than 0.05. Therefore, the null hypothesis for the Hausman test is rejected, and the fixed-effects model is more efficient than the random-effects model. Consequently, the first research model is estimated using the fixed-effects method as follows:

Table 2. Fixed-Effects Model for Specifying the First Model (Dependent Variable: NEWINVEST2)

Independent Variables	Coefficient	t-Statistic
MA	-0.159	**-2.448
CASH	-0.189	*-1.783
Size	-0.449	***-3.822
Growth	0.212	*1.907
MA × Growth	0.155	*1.842
FlowLiqu	-0.178	***-3.292
Debtbank	-0.055	NS -1.285
LiquAS	0.132	NS 1.139

Intercept (c0)	2.032	***3.231

***Significant at 1% level - **Significant at 5% level - *Significant at 10% level - NS Not significan; R^2: 0.85; F-statistic: 515.08; Sargan Test (χ^2): 1.63 (P = 0.27, NS); Arellano & Bond Serial Correlation (Z): -0.44 (P = 0.52)

The above findings indicate that, based on the F-statistic, the overall regression is significant. Furthermore, the R^2 value demonstrates that 85% of the variations in the dependent variable (second investment index, NEWINVEST2) are explained by the independent and control variables in the model.

On the other hand, the results of the Sargan test indicate that the null hypothesis is accepted, confirming that the variables used in the model are appropriate, and there is no need to use instrumental variables. Additionally, the results of the Arellano and Bond test based on the Z-test for detecting autocorrelation show that the null hypothesis is accepted, indicating no autocorrelation in the error terms of the model.

Furthermore, the results reveal that the Wald test statistic is 705.33 and is significant at the 1% level. This indicates the presence of heteroscedasticity in the error terms of the model.

The estimation findings of the model show that the cash holdings variable (CASH) has a moderately negative and significant impact (at the 5% level) on the second investment index (NEWINVEST2) of the companies. This is because an increase in corporate cash holdings reduces the free financial resources available for investment.

The firm size variable (Size) exhibits a strongly negative and significant impact (at the 1% level) on the second investment index (NEWINVEST2). This is because an increase in company assets decreases the free financial resources available for investment.

The future growth opportunities variable (Growth) has a weakly positive and significant impact (at the 10% level) on the second investment index (NEWINVEST2). This is because an increase in future growth opportunities encourages companies to pursue new investments.

The cash flow variable (FlowLiqu) has a strongly negative and significant impact (at the 1% level) on the second investment index (NEWINVEST2). This is because an increase in the liquidity requirements of companies reduces their capacity for new investments.

The variables for debt to banks (Debtbank) and liquid assets (LiquAS) do not have a significant impact on the second investment index (NEWINVEST2).

Finally, the estimation results of the model show that the coefficient of the interaction term between mental accounting and future growth opportunities (MA × Growth) is positive and significant at the 10% level. This indicates that investors' mental accounting has a weakly positive interactive effect on the relationship between growth opportunities and the growth of non-current assets. This is because mental accounting reduces stock returns, consequently limiting companies' ability to make new investments in the form of NEWINVEST2 (growth of non-current assets), as evidenced by the negative sign of the mental accounting variable in the model. Additionally, the negative impact of mental accounting significantly weakens the positive relationship between growth opportunities and the second investment index. In other words, mental accounting weakens the positive relationship between growth opportunities and the second investment index. Therefore, the seventh research hypothesis, which posits that investors' mental accounting significantly impacts the relationship between growth opportunities and the growth of non-current assets, is confirmed.

Hypothesis Test 2: *Investors' mental accounting significantly impacts the relationship between growth opportunities and the growth of long-term investments.*

To select an appropriate model specification, the Poolability, Hausman, and Breusch-Pagan tests were applied. The results of these tests for the second research model are presented in the table below:

Table 3. Results of Poolability, Hausman, and Breusch-Pagan Tests for the Second Research Model

Test Type	Test Statistic	Statistic Value	P-Value
Poolability	F Limer	521.45	***0.0017
Breusch & Pagan	LM Test	316.29	***0.0028
Hausman	LM Test	24.33	**0.0419

***Significant at 1% level - **Significant at 5% level - *Significant at 10% level - NS Not significant

Since the calculated F-statistic for the Poolability test for the second model (dependent variable: third investment index—growth of long-term investments [NEWINVEST3]) is 521.45, and its P-value is less than 0.05, the null hypothesis is rejected. In other words, the OLS model is inefficient, and a panel data model should be used.

Additionally, the Breusch-Pagan test was applied to check for random effects. The table above shows that the test statistic for the second model is 316.29, and its P-value is less than 0.05. Thus, the null hypothesis is rejected, indicating the presence of random effects in the model. The Hausman test was then applied to choose between fixed effects and random effects. The results indicate that the test statistic for the second model is 24.33, and its P-value is less than 0.05. Therefore, the null hypothesis for the Hausman test is rejected, and the fixed-effects method is more efficient than the random-effects method. Consequently, the second research model is estimated using the fixed-effects method as follows:

Table 4. Fixed-Effects Model for Specifying the Second Model (Dependent Variable: NEWINVEST3)

Independent Variables	Coefficient	t-Statistic
MA	-0.149	**-2.219
CASH	-0.187	***-3.301
Size	-0.203	***-2.889
Growth	0.145	*1.802
MA × Growth	0.136	*1.906
FlowLiqu	-0.216	***-3.230
Debtbank	0.148	NS 1.355
LiquAS	-0.189	NS -1.522
Intercept (c0)	1.917	***3.415

***Significant at 1% level - **Significant at 5% level - *Significant at 10% level - NS Not significant; R^2: 0.89; F-statistic: 521.45; Sargan Test (χ^2): 1.69 (P = 0.23, NS); Arellano & Bond Serial Correlation (Z): -0.49 (P = 0.51)

The above findings indicate that, based on the F-statistic, the overall regression is significant. Additionally, the R^2 value shows that 89% of the variations in the dependent variable (third investment index, NEWINVEST3) are explained by the independent and control variables in the model.

On the other hand, the results of the Sargan test indicate that the null hypothesis is accepted, confirming that the variables used in the model are appropriate and there is no need for instrumental variables. Additionally, the results of the Arellano and Bond test based on the Z-statistic for autocorrelation detection show that the null hypothesis is accepted, indicating no autocorrelation in the model's error terms.

Furthermore, the results indicate that the Wald test statistic is 717.06 and is significant at the 1% level. This signifies the presence of heteroscedasticity in the error terms of the model.

The estimation results show that the cash holdings variable (CASH) has a moderately negative and significant impact (at the 5% level) on the third investment index (NEWINVEST3) of companies. This is because an increase in cash holdings reduces the free financial resources available for investment.

The firm size variable (Size) has a strongly negative and significant impact (at the 1% level) on the third investment index (NEWINVEST3). This is because an increase in company assets decreases the free financial resources available for investment.

The future growth opportunities variable (Growth) has a weakly positive and significant impact (at the 10% level) on the third investment index (NEWINVEST3). This is because an increase in future growth opportunities encourages companies to pursue new investments.

The cash flow variable (FlowLiqu) has a strongly negative and significant impact (at the 1% level) on the third investment index (NEWINVEST3). This is because an increase in the liquidity requirements of companies reduces their capacity for new investments.

The variables for debt to banks (Debtbank) and liquid assets (LiquAS) do not have a significant impact on the third investment index (NEWINVEST3).

Finally, the estimation results show that the coefficient of the interaction term between mental accounting and future growth opportunities (MA × Growth) is positive and significant at the 10% level. This indicates that investors' mental accounting has a weakly positive interactive effect on the relationship between growth opportunities and long-term investments. As previously mentioned, mental accounting reduces stock returns, thereby limiting companies' ability to make new investments in the form of NEWINVEST3 (growth of long-term investments), as evidenced by the negative sign of the mental accounting variable in the model. Additionally, the negative impact of mental accounting significantly weakens the positive relationship between growth opportunities and the third investment index. In other words, mental accounting weakens the positive relationship between growth opportunities and the third investment index. Therefore, the second research hypothesis, which posits that investors' mental accounting significantly impacts the relationship between growth opportunities and long-term investments, is confirmed.

Hypothesis Test 3: *Investors' mental accounting significantly impacts the relationship between growth opportunities and the growth of total fixed assets and long-term investments.*

To select an appropriate model specification, the Poolability, Hausman, and Breusch-Pagan tests were applied. The results of these tests for the third research model are presented in the table below:

Table 5. Results of Poolability, Hausman, and Breusch-Pagan Tests for the Third Research Model

Test Type	Test Statistic	Statistic Value	P-Value
Poolability	F Limer	555.03	***0.0016
Breusch & Pagan	LM Test	336.12	***0.0027

Hausman	LM Test	26.07	**0.0396

***Significant at 1% level - **Significant at 5% level - *Significant at 10% level - NS Not significant

Since the calculated F-statistic for the Poolability test for the third model (dependent variable: fourth investment index—growth of total fixed assets and long-term investments [NEWINVEST4]) is 555.03, and its P-value is less than 0.05, the null hypothesis is rejected. This indicates that the OLS model is inefficient, and a panel data model should be used.

Additionally, the Breusch-Pagan test was applied to check for random effects. The table above shows that the test statistic for the third model is 336.12, and its P-value is less than 0.05. Thus, the null hypothesis is rejected, indicating the presence of random effects in the model. The Hausman test was then applied to choose between fixed effects and random effects. The results indicate that the test statistic for the third model is 26.07, and its P-value is less than 0.05. Therefore, the null hypothesis for the Hausman test is rejected, and the fixed-effects method is more efficient than the random-effects method. Consequently, the third research model is estimated using the fixed-effects method as follows:

Table 6. Fixed-Effects Model for Specifying the Third Model (Dependent Variable: NEWINVEST4)

Independent Variables	Coefficient	t-Statistic
MA	-0.123	*-1.902
CASH	-0.144	*-1.744
Size	-0.412	***-2.813
Growth	-0.136	NS -1.426
MA × Growth	-0.149	NS -1.578
FlowLiqu	-0.269	**-2.202
Debtbank	-0.179	NS -1.126
LiquAS	0.138	NS 1.233
Intercept (c0)	1.696	**3.136

***Significant at 1% level - **Significant at 5% level - *Significant at 10% level - NS Not significant; R^2: 0.86; F-statistic: 555.03; Sargan Test (χ^2): 1.69 (P = 0.21, NS); Arellano & Bond Serial Correlation (Z): -0.42 (P = 0.51).

The above findings indicate that, based on the F-statistic, the overall regression is significant. Additionally, the R^2 value shows that 86% of the variations in the dependent variable (fourth investment index, NEWINVEST4) are explained by the independent and control variables in the model.

On the other hand, the results of the Sargan test indicate that the null hypothesis is accepted, confirming that the variables used in the model are appropriate and there is no need for instrumental variables. Additionally, the results of the Arellano and Bond test based on the Z-statistic for autocorrelation detection show that the null hypothesis is accepted, indicating no autocorrelation in the model's error terms.

Furthermore, the Wald test statistic is 715.03 and is significant at the 1% level, indicating the presence of heteroscedasticity in the error terms of the model.

The estimation results show that the cash holdings variable (CASH) has a weakly negative and significant impact (at the 10% level) on the fourth investment index (NEWINVEST4) of companies. This is because an increase in cash holdings reduces the free financial resources available for investment.

The firm size variable (Size) has a strongly negative and significant impact (at the 1% level) on the fourth investment index (NEWINVEST4). This is because an increase in company assets decreases the free financial resources available for investment.

The future growth opportunities variable (Growth) does not have a significant impact on the fourth investment index (NEWINVEST4). While it might be expected that an increase in future growth opportunities would encourage companies to pursue new investments, the results indicate that growth opportunities have not generated sufficient motivation to affect the fourth investment index, which represents changes in fixed assets and long-term investments.

The cash flow variable (FlowLiqu) has a moderately negative and significant impact (at the 5% level) on the fourth investment index (NEWINVEST4). This is because an increase in liquidity needs reduces the ability of companies to make new investments.

The variables for debt to banks (Debtbank) and liquid assets (LiquAS) do not have a significant impact on the fourth investment index (NEWINVEST4).

Finally, the estimation results show that the coefficient of the interaction term between mental accounting and future growth opportunities (MA × Growth) is positive but not significant at the 5% level. This implies that investors' mental accounting does not have a significant interactive effect on the relationship between growth opportunities and the growth of total fixed assets and long-term investments. While mental accounting induces loss aversion and a tendency toward mean reversion of stock returns, leading to reduced stock returns and consequently diminishing companies' ability to make new investments in the form of NEWINVEST4 (growth of total fixed assets and long-term investments), the negative effect of mental accounting is not substantial enough to alter the relationship between growth opportunities and the fourth investment index. Therefore, the third research hypothesis, which posits that investors' mental accounting significantly impacts the relationship between growth opportunities and the growth of total fixed assets and long-term investments, is not confirmed.

4. Discussion and Conclusion

The results of testing the first hypothesis show that investors' mental accounting has a weakly inverse interactive effect on the relationship between growth opportunities and the growth of non-current assets. This is because mental accounting reduces stock returns, which in turn diminishes companies' ability to make new investments in the form of growth in non-current assets. Additionally, the negative effect of mental accounting significantly reduces the positive relationship between growth opportunities and the second investment index. Thus, the first hypothesis, which posits that investors' mental accounting significantly impacts the relationship between growth opportunities and the growth of non-current assets, is confirmed.

The results of testing the second hypothesis indicate that investors' mental accounting has a weakly inverse interactive effect on the relationship between growth opportunities and the growth of long-term investments. Mental accounting reduces stock returns, which consequently limits companies' ability to make new investments in the form of growth in long-term investments. Moreover, the negative effect of mental accounting significantly reduces the positive relationship between growth opportunities and the third investment index. Therefore, the

second hypothesis, which posits that investors' mental accounting significantly impacts the relationship between growth opportunities and the growth of long-term investments, is confirmed.

The results of testing the third hypothesis show that investors' mental accounting does not have a significant interactive effect on the relationship between growth opportunities and the growth of total fixed assets and long-term investments. While mental accounting induces loss aversion and a tendency toward mean reversion of stock returns, leading to reduced stock returns and diminished company capacity for new investments in the form of growth of total fixed assets and long-term investments, its negative effect is not substantial enough to alter the relationship between growth opportunities and the fourth investment index. Thus, the third hypothesis, which posits that investors' mental accounting significantly impacts the relationship between growth opportunities and the growth of total fixed assets and long-term investments, is not confirmed.

No prior study has explicitly examined the impact of mental accounting on financial and investment policies. However, the findings of this study indirectly align with some theoretical and empirical research by financial market researchers and analysts [6, 10, 30-32] who identified a unique and puzzling phenomenon in financial markets. They found that investors (both individual and institutional) are more inclined to recognize gains but reluctant to acknowledge losses.

Finally, the findings of this study are also indirectly consistent with the results of Shams et al. (2010), who investigated the relationship between the disposition effect, cash flows, and performance of investment companies listed on the Tehran Stock Exchange. They concluded that disposition-based behavior in investment companies has a significantly negative impact on risk-adjusted returns.

Authors' Contributions

Authors equally contributed to this article.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

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Conflict of Interest

The authors report no conflict of interest.

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