



Influence of Age and Investment Experience on Behavioural Biases of Equity Investors

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Abstract

Investors' psychology plays a crucial role in determining the behavior of investors. Traditional financial theories state that investors are rational. But, the decisions of investors are substantially influenced by psychological factor especially during the period of financial crisis. The investors will have to choose a confused decision while they undergo stress due to unexpected share market state. Most of the time the decision taken by the investors may not be appropriate because of the psychological factors of the investors termed as behavioural biases. This study aims to throw light on the relationship between demographic factors and behavioural biases such as overconfidence, loss aversion, herding and confirmation biases. The demographic variables considered for the study include age and experience, which show significant role on the behavioural biases of investors. From the findings of this study, it is obvious that the confirmation bias and loss aversion bias exhibit a crucial role in the decision making of investors. The investors with age more than 60 years are highly prone to loss aversion bias. Experienced investors show more overconfidence bias compared to the investors with lesser experience. The investors do not show any influence of the herding bias and confirmation bias in their investment decisions.

Key Words: *Rationality, Overconfidence, Loss aversion, Herding bias and Confirmation bias.*

1. Introduction

Behavioural biases are emotional beliefs or behaviours that can influence one's decision making process or judgment. It is generally affected by feelings rather than concrete facts. There are number of studies that have shown the investors make decisions, based on their feelings and emotions, without considering sufficient information and rational cogitation. The stability of stock market is depending on the decision making patterns of investors and traders in the market. The characteristics of equity investors change as per the demographic variables such as age, investment experience, etc. During the crisis situations the investors analyze the present situations what they are facing, even though some times their decisions are dominated by their psychological factors. This irrational behaviour of investors had made great volatility in stock market prices that led several stock market crashes.

The stock market and the economy of a country are closely related. Stock market is considered to be the economic barometer of the country. A booming stock market is a positive symptom of the growth and development of a country. Thus, decisions of investors in the stock market play a vital role in the development of the economy. This study examines the impact of behavioural biases on investor decisions at the National Stock Exchange and Bombay Stock Exchange in India.

2. Literature Review

There are numerous studies related to the behavioural biases of investors concerned about their investment decision. This section gives an overview of studies associated with the behaviour biases of investors.

Adam Szyszka (2010) conducted a study on behavioural anatomy of global financial crisis. The investors and the regulatory institutions are responsible for the stability of financial systems. These are highly influenced by the psychological traps. The investors, market-supporting entities and regulatory institutions had been affected drastically by the behavioral factors in the 2008 financial crisis. Isidore & Christie (2013) showed the relationship between the income earned by the investor and behavioural biases. They found less financial knowledge, poor education, lower income and low financial literacy level as the major reason for exhibiting the biases.

Amar kumar chaudhary (2013) exemplified that behavioural finance provides expositions for the reasons of irrational decisions of investors. It illustrates how emotions influence the decision making process of investors. Emotional factors have a strong impact on investors' decision making process. Important biases that influence behavior of investors are anchoring, over confidence, herd

behavior, loss aversion, over and under reaction. Behavioural finance provides many useful insights for those professionals who engaged in investments and also provide framework for developing strategies for investors. He added that investors can improve their performance by identifying those psychological biases and errors of judgment. Behavioural finance is to be refined as a good financial theory since it is a collection of ideas and thoughts that are descriptive and advisory in nature and also more studies are needed to indicate the limitations of it (Sharma, 2016). Both intellectuals and practitioners are thinking the behavioural finance as an evolving financial theory for a deeper comprehension of the psychological factors involved in financial decision making (Virigineni & Rao, 2017). Behavioural finance would have a great role in predicting the investor's conduct and human judgment in financial decision making. Lion's share of investors would sell a losing stock to invest on gaining one (Sahni, 2012). Investors' decisions are based on the rational assumptions that market would either show akin trend or contrary, if the sensex has been bullish or bearish for three consecutive days. In their study, they found that Indian investors depict loss aversion bias as they behave differently in case of losses and gain.

Ayman H. Metwally Omneya Darwish(2015) analysed the impact of overconfidence bias in Egyptian stock market. The Egyptian market is affected by psychological factors of the investors. Since they exhibit more overconfidence biased decisions, the increase in the overall monthly Egyptian market return increases number of share trades per month. Raja Rehan (2017) in his study found that several behavioural biases have an impact on investors' decisions. Like prior studies, the result of his study indicated that the risk aversion, over confidence, anchoring and regret aversion have a positive impact on investors' decisions. But contrary to his expectation, availability bias and mental accounting bias has no effect on investor's decisions.

Ady & Hidayat(2019) perused the investment decisions of young Surabaya's investors to investigate how those decisions are affected by behavioural biases such as financial literacy, regret aversion, overconfidence and risk tolerance. The results of this study concluded that most of young Surabaya's investors were not rational. Overconfidence bias alone shows significant impact on the investment decisions and also the combined effect of the biases shows significant impact on investment decisions.

Malik, Hanif & Azhar (2019) conducted a research to find the effect of overconfidence bias on investment decisions by the data collected from Pakistan Stock Exchange Islamabad and Lahore Stock Exchange Pakistan. According to their findings, the investors with overconfidence may take wrong decisions and may result in loss even though their risk tolerance is high. Hai Yue Liu, Aqsa Manzoor, Cang Yu Wang & others(2020) in their recent study revealed that COVID-19 outbreak has a significant negative effect on stock market returns across all affected countries and areas.

Stock markets of Asian countries reacted more quickly to the outbreak with some of them recovering slightly in the later stage of the pandemic. Investors' fear sentiment is proved to be a complete mediator and transmission channel for the COVID-19 outbreak's effect on stock markets.

After an extensive study of the literature on behavioral biases and stock market crashes, it is found that the application of behavioural finance theories is to make a successful investor making fewer mistakes and measures to be taken to control mental error and psychological roadblocks while investing in stock market. A disciplined trading strategy is required to control these mental roadblocks of all types of investors.

The common behavioural biases such overconfidence, loss aversion, herding bias, and confirmation biases are considered in the wake of the literature review.

3. Significance of the Study

The investment decisions made by the investors in the stock market are relied on lot of factors such as business, political, etc. Most of the time investors take awkward investment decisions as they were influenced by their behavioural biases. The decisions made by the investors would be futile, unless they could overcome their behavioural biases. This study aims at providing a precise direction to the new investors and the investors who are facing difficulty in taking investment decisions to overcome their behavioural biases. Apart from that, investors can benefit from understanding the effects of behavioral financial factors on stock investment decision-making.

4. Objective of the Study

The objective of this study is to analyze the impact of age and investment/trading experience of investors on overconfidence bias, loss aversion bias, herding bias and confirmation bias.

5. Hypotheses of the Study

The hypotheses considered in this study are:

H₀₁: The overconfidence bias is not affected by the age of investors.

H₀₂: The overconfidence bias is not affected by the investing or trading experience of investors.

H₀₃: The overconfidence bias is not affected combined effect of age and experience of investors.

H₀₄: The loss aversion bias is not affected by the age of investors.

H₀₅: The loss aversion bias is not affected by the investing or trading experience of investors.

H₀₆: The loss aversion bias is not affected combined effect of age and experience of investors.

H₀₇: The herding bias is not affected by the age of investors.

H₀₈: The herding bias is not affected by the investing or trading experience of investors.

H₀₉: The herding bias is not affected combined effect of age and experience of investors.

H₁₀: The confirmation bias is not affected by the age of investors.

H₁₁: The confirmation bias is not affected by the investing or trading experience of investors.

H₁₂: The confirmation bias is not affected combined effect of age and experience of investors

6. Research Methodology

Individual equity investors of BSE and NSE form the population and the data was collected from them as primary sources with the use of a structured questionnaire. As many as 122 samples were collected for this study. The analysis was made by the use of Mean, ANOVA and Post-hoc ANOVA.

7. Analysis and Discussion

This section deals with the analysis of various behavioural biases such as overconfidence, loss aversion, herding bias and confirmation biases, with respect to age and investment experience in stock market. Each variable was again subdivided into four groups as shown in Table 1. Five point Likert scale is used for rating the attitude of the respondents towards each statement of opinion concerning the biases.

Two Way ANOVA was performed, in order to test the hypothesis that age and investing experience of respondents had an effect on the behavioural biases. Assumptions of Normality were checked and the distribution was found normally distributed as assessed by Shapira-Wilk's test ($p > 0.05$). The assumption of Homogeneity of variances was tested and satisfied based on Leven's F-test.

Table 1

Classification of Respondents with respect to Age and Experience

| Age Group | Number of Respondents | Experience Group | Number of Respondents |
|-----------|-----------------------|------------------|-----------------------|
| Below 30 | 22 | Upto 5 Yrs | 80 |
| 30-45 | 72 | 6 to 10 Yrs | 24 |
| 46-60 | 22 | 11 to 15 Yrs | 12 |
| Above 60 | 6 | Above 15 Yrs | 6 |
| Total | 122 | Total | 122 |

Source: Primary Data

Role of Age and Investing/Trading Experience in Overconfidence Bias

Table 2 shows the result of two way ANOVA conducted to find the role of age and experience including their combined effects that are affecting their investment decisions due to overconfidence bias.

Table 2

Age and Experience on Overconfidence Bias – Two Way ANOVA

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|------------------|-------------------------|-----|-------------|-------|------|---------------------|
| Age | 7.455 | 3 | 2.485 | 3.020 | .033 | .077 |
| Experience | 13.735 | 3 | 4.578 | 5.564 | .001 | .133 |
| Age * Experience | 5.385 | 6 | .898 | 1.091 | .373 | .057 |
| Error | 89.697 | 109 | .823 | | | |
| Total | 1097.250 | 122 | | | | |
| Corrected Total | 127.283 | 121 | | | | |

Source: Primary Data

As per the result shown in Table 2, interaction effect of age and experience gives $F(6,109)=1.091$, $p=0.373$, and partial $\eta^2 = 0.57$. There was insufficient evidence to reject the null hypothesis of the interaction effect. Thus, the combined effect of the age and experience in the overconfidence bias is not significant. The p value of the main effect age was observed as 0.033 and that of experience as 0.001 which are less than the 0.05 confidence level. Thus, the null hypotheses are rejected for both cases. Since there were four subclasses in both age and experience factors, post hoc test is conducted to determine the actual group that depicts the overconfidence bias with respect to the other groups in both cases.

Post Hoc test for Age

The result of Post Hoc test conducted for age groups is shown in Table 3.

Table 3
Comparison Among Age Groups - Tukey HSD Post Hoc Test

| (I) Age Group | (J) Age Group | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|---------------|---------------|-----------------------|------------|-------|-------------------------|-------------|
| | | | | | Lower Bound | Lower Bound |
| xBelow 30 | 30-45 | -.8731 | .22098 | .001 | -1.4497 | -.2965 |
| | 46-60 | -1.2273 | .27351 | .000 | -1.9409 | -.5136 |
| | Above 60 | -1.2273 | .41780 | .021 | -2.3174 | -.1372 |
| 30-45 | Below 30 | .8731 | .22098 | .001 | .2965 | 1.4497 |
| | 46-60 | -.3542 | .22098 | .381 | -.9307 | .2224 |
| | Above 60 | -.3542 | .38546 | .795 | -1.3599 | .6515 |
| 46-60 | Below 30 | 1.2273 | .27351 | .000 | .5136 | 1.9409 |
| | 30-45 | .3542 | .22098 | .381 | -.2224 | .9307 |
| | Above 60 | .0000 | .41780 | 1.000 | -1.0901 | 1.0901 |
| Above 60 | Below 30 | 1.2273 | .41780 | .021 | .1372 | 2.3174 |
| | 30-45 | .3542 | .38546 | .795 | -.6515 | 1.3599 |
| | 46-60 | .0000 | .41780 | 1.000 | -1.0901 | 1.0901 |

Source: Primary Data

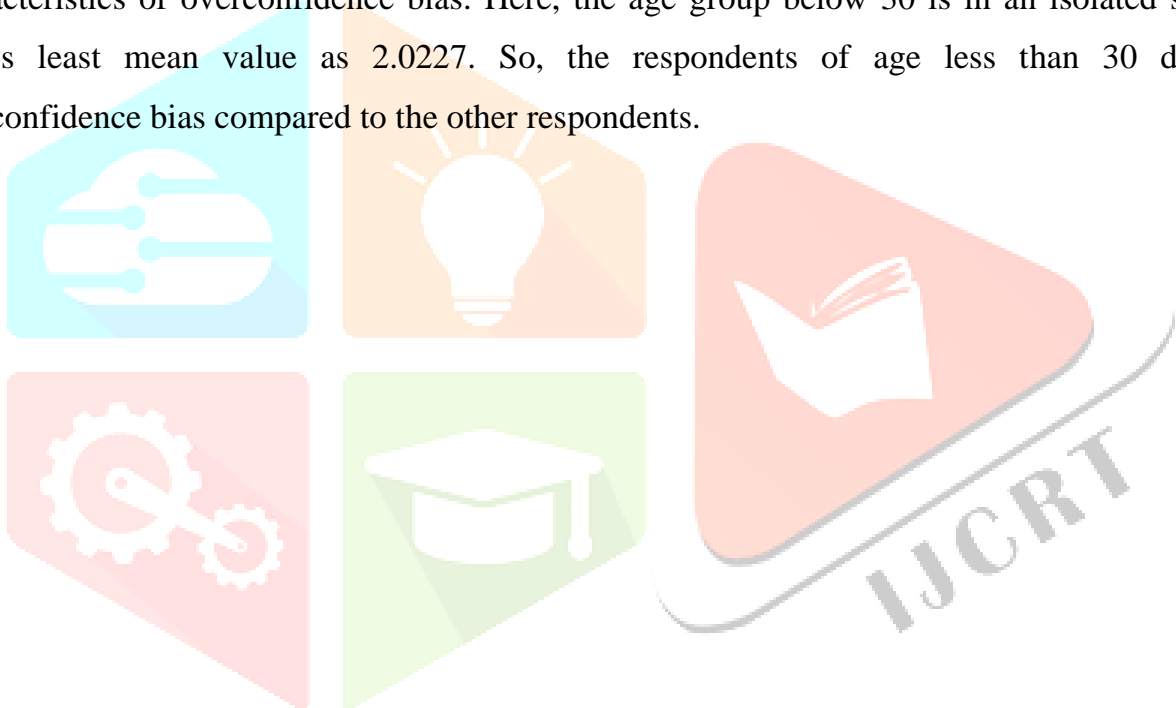
The p values of first age group (Below 30) against the other three groups are observed as 0.001, <0.001 and 0.021 respectively, which are less than 0.05 confidence level. The p value of other age groups are greater than 0.05. So, the null hypothesis is rejected only in the case of respondents whose age is below 30.

Table 4
Mean Values of Age Group

| Age Group | Number of Respondents | Subset | |
|-----------|-----------------------|--------|--------|
| | | 1 | 2 |
| Below 30 | 22 | 2.0227 | |
| 30-45 | 72 | | 2.8958 |
| 46-60 | 22 | | 3.2500 |
| Above 60 | 6 | | 3.2500 |
| Sig. | | 1.000 | 0.715 |

Source: Primary Data

Table 4 shows the mean values and the subsets that contain the respondents showing similar characteristics of overconfidence bias. Here, the age group below 30 is in an isolated subset and shows least mean value as 2.0227. So, the respondents of age less than 30 depict less overconfidence bias compared to the other respondents.



Post Hoc test for Experience

Table 5 shows the result of post hoc test conducted to find the exact group of respondents based on their experience.

Table 5

Comparison Among Respondents based on experience - Tukey HSD Post Hoc Test

| (I) Experience | (J) Experience | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|-------------------|-------------------|-----------------------------|---------------|------|-------------------------------|----------------|
| | | | | | Lower Bound | Lower Bound |
| Upto 5 Yrs | 6 to 10 Yrs | -.3667 | .2111 3 | .310 | -.9175 | .1842 |
| | 11 to 15 Yrs | .0917 | .2808 2 | .988 | -.6410 | .8244 |
| | Above 15 Yrs | -1.6583 | .3839 8 | .000 | -2.6602 | -.6565 |
| 6 to 10 Yrs | Upto 5 Yrs | .3667 | .2111 3 | .310 | -.1842 | .9175 |
| | 11 to 15 Yrs | .4583 | .3207 2 | .484 | -.3785 | 1.2951 |
| | Above 15 Yrs | -1.2917 | .4140 5 | .012 | -2.3720 | -.2114 |
| 11 to 15 Yrs | Upto 5 Yrs | -.0917 | .2808 2 | .988 | -.8244 | .6410 |
| | 6 to 10 Yrs | -.4583 | .3207 2 | .484 | 1.2951 | .3785 |
| | Above 15 Yrs | -1.7500 | .4535 7 | .001 | -2.9334 | -.5666 |
| Above 15 Yrs | Upto 5 Yrs | 1.6583 | .3839 8 | .000 | .6565 | 2.6602 |
| | 6 to 10 Yrs | 1.2917 | .4140 5 | .012 | .2114 | 2.3720 |
| | 11 to 15 Yrs | 1.7500 | .4535 7 | .001 | .5666 | 2.9334 |

Source: Primary Data

The p value of the most experienced group (Above 15 yrs) against the other three groups obtained as <0.001 , 0.012 and 0.001 respectively. Since they are less than the 0.05 level of confidence, the null hypothesis is rejected for the most experienced group. Whereas, the null hypotheses are accepted for the other three groups as their p values are greater than 0.05 confidence level.

Table 6
Mean Values of Experience Group

| Experience | Number of Respondents | Subset | |
|--------------|-----------------------|--------|--------|
| | | 1 | 2 |
| 11 to 15 Yrs | 12 | 2.5833 | |
| Upto 5 Yrs | 80 | 2.6750 | |
| 6 to 10 Yrs | 24 | 3.0417 | |
| Above 15 Yrs | 6 | | 4.3333 |
| Sig. | | .568 | 1.000 |

Source: Primary Data

Table 6 shows the mean value of the group (above 15 years' experience) as 4.3333 in an isolated subset, which is the highest mean as compared to other. Therefore, it is evident that the most experienced respondents exhibit higher level of overconfidence as compared to their counterparts.

Role of Age and Investing/Trading Experience in Loss Aversion Bias

The influence of age, experience and their combined effect on the loss aversion bias is tested via two way ANOVA and its result is shown in Table 7.

Table 7
Age and Experience on Loss Aversion Bias – Two Way ANOVA

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|------------------|-------------------------|-----|-------------|-------|------|---------------------|
| Age | 14.683 | 3 | 4.894 | 5.060 | .003 | .122 |
| Experience | 5.573 | 3 | 1.858 | 1.920 | .131 | .050 |
| Age * Experience | 2.181 | 6 | .363 | .376 | .893 | .020 |
| Error | 105.442 | 109 | .967 | | | |
| Total | 1245.600 | 122 | | | | |
| Corrected Total | 135.567 | 121 | | | | |

Source: Primary Data

The interaction effect of age and experience on loss aversion bias is observed as $F(6,109) = 0.967$, $p=0.893$, partial $\eta^2 = 0.20$. Since the p value is greater than 0.05, the null hypothesis of interaction effect is accepted. Therefore, it is evident that the combined effect of the age and experience in the loss aversion bias is not significant. Similarly, the p value of experience is $0.131 > 0.05$ and hence the null hypothesis is accepted. Whereas, the p value of the main effect age is observed as 0.003 which is less than the 0.05 confidence level. Thus, the null hypothesis is rejected.

But, a post hoc test is to be conducted in order to determine the exact age group that indicates significant difference with respect to the other age groups.

Post Hoc test for age

Table 8 represents the result of Post Hoc test conducted on age groups to find the significant group among them showing loss aversion bias.

Table 8
Comparison Among Age Groups - Tukey HSD Post Hoc Test

| (I) Age Group | (J) Age Group | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|---------------|---------------|-----------------------|------------|------|-------------------------|-------------|
| | | | | | Lower Bound | Upper Bound |
| Below 30 | 30-45 | -.5379 | .23960 | .118 | -1.1630 | .0873 |
| | 46-60 | -.0909 | .29655 | .990 | -.8646 | .6828 |
| | Above 60 | 1.2788 | .45299 | .029 | .0969 | 2.4607 |
| 30-45 | Below 30 | .5379 | .23960 | .118 | -.0873 | 1.1630 |
| | 46-60 | .4470 | .23960 | .249 | -.1782 | 1.0721 |
| | Above 60 | 1.8167 | .41793 | .000 | .7263 | 2.9071 |
| 46-60 | Below 30 | .0909 | .29655 | .990 | -.6828 | .8646 |
| | 30-45 | -.4470 | .23960 | .249 | -1.0721 | .1782 |
| | Above 60 | 1.3697 | .45299 | .016 | .1878 | 2.5516 |
| Above 60 | Below 30 | -1.2788 | .45299 | .029 | -2.4607 | -.0969 |
| | 30-45 | -1.8167 | .41793 | .000 | -2.9071 | -.7263 |
| | 46-60 | -1.3697 | .45299 | .016 | -2.5516 | -.1878 |

Source: Primary Data

Here, age group (Above 60) shows significant difference compared to other groups. The p values of the age group (Above 60) against the other three groups were observed as 0.029, <0.001 and 0.016 respectively which are less than 0.05 confidence level and hence the null hypothesis is rejected, whereas, the p value of other age groups are greater than 0.05.

Table 9
Mean Values of Age Group

| Age Group | Number of Respondents | Subset | |
|-----------|-----------------------|--------|--------|
| | | 1 | 2 |
| Above 60 | 6 | 1.4667 | |
| Below 30 | 22 | | 2.7455 |
| 46-60 | 22 | | 2.8364 |
| 30-45 | 72 | | 3.2833 |
| Sig. | | 1.000 | .450 |

Source: Primary Data

From Table 9, it is clear that age group above 60 shows least mean value as 1.4667 and it is showed in as isolated subset. So, the respondents who are greater than 60 years of age depict less loss aversion bias compared to the other respondents.

Role of Age and Investing/Trading Experience in Herding Bias

The test result of two way ANOVA conducted for herding bias with age and experience as factors is shown in Table 10. Apart from previous results, the p values in this table notify us that there is no significant difference in the herding bias with respect to age, experience and their combined effect.

Table 10
Influence of age and experience on Herding Bias – Two Way ANOVA

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|------------------|-------------------------|-----|-------------|-------|------|---------------------|
| Age | 4.317 | 3 | 1.439 | 1.717 | .168 | .045 |
| Experience | 6.410 | 3 | 2.137 | 2.549 | .060 | .066 |
| Age * Experience | 7.010 | 6 | 1.168 | 1.394 | .224 | .071 |
| Error | 91.367 | 109 | .838 | | | |
| Total | 1176.625 | 122 | | | | |
| Corrected Total | 111.377 | 121 | | | | |

Source: Primary Data

From Table 10, the interaction effect of age and experience notifies $F(6,109) = 1.394$, $p = 0.224$, partial $\eta^2 = 0.71$. Since the p value is greater than 0.05, null hypothesis for the interaction effect is accepted. The p value of age is $0.168 > 0.05$. Hence, the null hypothesis is accepted. Similarly, the null hypothesis that related to the experience is also upheld as the p value is $0.06 > 0.05$. Therefore, the factors age, experience and their combined effect are not significant in the case of herding bias.

Role of Age and Investing/Trading Experience in Confirmation Bias

The influence of age and experience on confirmation bias shows somewhat similar characteristics as with herding bias. Table 11 shows the result of two way ANOVA with age and experience as factors on the dependent variable confirmation bias.

Table 11

Influence of age and experience on Confirmation Bias – Two Way ANOVA

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|------------------|-------------------------|-----|-------------|-------|------|---------------------|
| Age | 1.989 | 3 | .663 | 1.910 | .132 | .050 |
| Experience | 1.278 | 3 | .426 | 1.227 | .303 | .033 |
| Age * Experience | .674 | 6 | .112 | .324 | .923 | .018 |
| Error | 37.843 | 109 | .347 | | | |
| Total | 816.500 | 122 | | | | |
| Corrected Total | 43.967 | 121 | | | | |

Source: Primary Data

The interaction effect of age and experience on the confirmation bias is obtained as $F(6,109)=0.324$, $p=0.923$, partial $\eta^2=0.018$. The p value of age is 0.132 and that of experience is 0.303. Since the observed p values are greater than 0.05, the null hypotheses associated with each case is accepted. Therefore, it is evident that there is no significant difference among the respondents with respect to their age and experience in the case of confirmation bias.

8. Suggestions, Summary and Conclusion

Application of financial theories with behavioural finance theories will help to take wise decisions during crisis situations. It is advisable that individual investors should consult professionals to manage their portfolios. It will help them to reduce the personal biases. Investors can also consult the opinion of capital market analysts and Information providers of BSE and NSE to take investment decisions while they are about to face stock market crisis. They can provide information about the trends of market and other crucial information about the stock market. The investors should update their knowledge and information about the factors affecting the stock market such as issues among different countries, pandemic situations and other disasters, company takeovers and mergers, and political affairs etc.

Traditional financial theories ignore the influence of behavioural financial factors on investors. During the crisis situations, the state of the investors may up in the air as they need to take a wise decision under the influence of the behaviour biases. This study was an attempt to analyze the influence of the behavioural financial factors on the decisions of investors. Here, the

study is conducted by considering four behavioural biases such as overconfidence, loss aversion, herding bias and confirmation bias with the demographic variables. The respondents whose age is less than 30 showed lower overconfidence bias in taking investment decisions compared to their counterparts. Whereas, the respondents who have more than 15 years of experience showed higher overconfidence bias than their counterparts with less experience. The respondents whose age is greater than 60 showed lower loss aversion bias. The herding bias and confirmation bias did not exhibit any significant difference with respect to age and investing/trading experience of respondents.

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