



# Behavioural Biases of Individual Investors: A Survey of Smart City in M.P

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## Abstract

**Purpose-:** The purpose of this paper is to examine behavioural biases to individual investors, specifically Cognitive dissonance, Prospect theory, Disposition effect and mental accounting. It further examine role of demographic and investor sophistication affecting these biases, finally it reveals which biases influence most in decision making.

**Design/Methodology/Approach-:** For this purpose data has been collected from four major smart city of Madhya Pradesh i.e. Gwalior, Bhopal, Indore and Sagar. Data collected through structured questionnaires which later analysed with relevant statistical tools.

**Findings -:** Study reveals that behavioural biases are depend upon demographic profile of investors and their trading sophistication. Most influencing factors are age, profession and trading frequency. Each bias has specific set of investor and cognitive dissonance is most important bias in Indian individual investor context.

**Research limitation-:** The main limitation of present study is that responses from investors are socially desirable rather than based on actual market behaviour. Further due to time and resources constraints only individual investors belongs from four smart city of M.P taken into consideration for study.

**Practical Implication-:** Present study is most likely relevant for fund managers and financial advisors who deal with individual investors to understand psychology of individual investors.

**Original Value-:** The present study consider four behavioural biases i.e. Mental Accounting, Cognitive Dissonance, Prospect theory and Disposition effect which is not taken together in any previous study

**Key words -:** Cognitive Dissonance; Mental Accounting; Prospect theory; Disposition effects

## 1. Introduction

For investment in stock market it is believed that investors should have right kind of knowledge about market as well as firm in which he ready to invest. Lots of people think that those who are expert in investment know every movement about market and able to make large amount of profit. This concept is based standard finance which states on all investors are rational and never take irrational decision. However this statement is partially true because if it happens then all major experienced players in the market never lose their money. As per market history analysis it is found that some major player also suffers losses in case of adverse market condition. Many scholar and researcher believed that this happens due to investor's sentiment and emotions. These psychological factors influenced investor decision which is based on behavioural finance concept. Behavioural finance comes into picture when traditional or standard finance concept fails.

As Capital assets pricing model, efficient market hypothesis, and Modern portfolio theory are foundation of standard finance similarly stock market anomalies like overreaction, speculative bubbles and crashes are foundation of Behavioural finance. As per behavioural finance human investment decisions are influenced by many psychological factors. In this study we are taking into consideration four important behavioural biases which influenced investment decision making i.e. Cognitive Dissonance, Prospect theory, Disposition effects and mental accounting. For study of these behavioural biases we select investors belongs from four smart city of Madhya Pradesh i.e. Gwalior, Indore, Bhopal, and Sagar. We also investigate role of demographic and trading expertise or sophistication influencing these behavioural biases. So we are going to address four major research questions on which our present study based:-

*RQ1.* Are behavioural biases like Cognitive Dissonance, Prospect theory, Disposition effects and mental accounting present in investors belongs from four smart cities?

*RQ2.* Are behavioural biases influenced by demographic factors like age, gender, education and income?

*RQ3.* Are trading expertise or sophistication influence behavioural biases?

*RQ4.* Which behavioural biases influence most in investment decision making process?

For answering of these above research questions, a survey have been conducted on the investors of four smart cities belongs from Madhya Pradesh i.e. Gwalior, Bhopal, Indore, and Sagar. The study examine four behavioural biases, Cognitive Dissonance, Prospect theory, Disposition effect and Mental accounting in investors belongs from these smart city and how these biases influenced their investment decisions. Present study also tries to reveals that which biases impact most on investor's investment decision.

The rest of the paper divided as -: Section 2 belongs to literature review; in Section 3 we described Research Methodology, Section 4 reveals possible limitation of the study, Section 5 describe results and Interpretation and finally Section 6 states Conclusion and their Implementation.

## 2. Literature Review

During previous 15 year lots of research and development has been done in the area of behavioural finance. There are lots of research papers based on secondary data well as on empirical analysis. This section cover both types of paper and dived into three sub themes for review of literature. These are, Behavioural factors influencing investor's decisions, demographic effect and investor sophistication influencing investor behaviour and literature on behavioural biases i.e. Cognitive Dissonance, Prospect theory, Disposition effect and mental accounting.

### 2.1 Behavioural factors influencing investment decisions making process

Nagy and Obenberger (1994) use questionnnarie for determination of investor's behaviour that is influenced by factors such as corporate earnings, diversification needs, past performance of stock and stock broker's recommendations. AI Tamimi (2006) states the key aspects of investor behaviour of United Arab Emirates belong to five categories namely self/firm image coincidence, accounting information, neutral information, advocate recommendation and personal financial needs. Kim and Nofsinger(2007) reveals that behavioural profile of Japanese investors and find that they are risk takers, frequent traders, make poor trading decision and buy recent winners. Chandra and Kumar (2012) states about evidence that individual investors depend on heuristic for making investment decisions and their behaviour is slightly influenced by biases like overconfidence and representativeness.

### 2.2 Demographic effect and investor sophistication influencing investor behaviour

Barber and Odeon (2001) state that men trade more excessively than woman due to which their net return gets diminished. They conclude that woman is risk-averse while men are overconfident as they frequently rearrange their portfolio which leads to unwanted mistake and suffered from losses. Hon-Snir et al. (2012) describe effect of behavioural biases like disposition effect, hearding and avaiblity heuristic on Israiel Portfolio Manager and find that female investors are more affected by these biases. Hoever previous trading experience reduce this effect. Malmendier and Shanthikumar (2003) describe that smal investor in New York exchange get more influenced by optimistic stock recommodation by security analyst as compared to large investors.

### 2.3 Literature on behavioural biases

**2.3.1 Cognitive Dissonance.** It refers to the conflict caused by holding conflicting cognitions simultaneously. This concept was introduced by psychologist Festinger (1956). Because experience of dissonance is unplesent, the person is srive to reduce it by changing their belief. Later research show that when people get new information they want to keep their current understanding and reject or avoid new information. They want to convince themselve there is no conflict at all . Cognitive dissonance is considered as explanation of attitude change, it is a mental conflict investors have to deal with when they

realised they made mistake. Investor does not want to change their decision so they persuade themselves that they made rational decision.

*2.3.2 Prospect Theory.* The prospect theory states that people make decision based on potential value of losses and gain rather than final outcomes. Kahneman and Tversky (1979) give a critique of expected utility theory as a descriptive model of decision making under risk and develop an alternative model, which they call prospect theory. Thaler et al (1997) states that loss aversion has two implications. First investors accept risk easier if they evaluate their investment less often. Secondly when all paly off are increased enough to remove losses, investors will accept more risk. Prospect theory is behavioural economic theory that describes decision between different alternative that involve risk. The theory states that people make decision based on potential value of loss and gain rather than final outcome and thus will base decision on perceived gain rather than perceived losses. When a person given two equal choices one expressed in possible gain and other in loss, people will choice the first one. This theory is known as loss aversion theory.

*2.3.3 Disposition effect.* Another important behavioural bias is Disposition effect. According to Henderson (2012) Disposition effect is the tendency of investors to sell winners too early and hold losers too long. Shefrin and Statman (1985) reveals that disposition effect weaker at the end of the year because investor can control himself. In rational ways it could be said that investor recognise that realising loss can be advantageous for him as it save taxes. Irrationally, he disposes the tax consideration because he is driven by positive thought associated with realising gains. Bailey et al (2011) show that investors sell relatively more winners then losers which shows positive value of disposition effect. It is costly for higher income investors' to sell winner too soon and hold looser too long because of the fact that they face higher marginal rates. Thus disposition effects relates to tax incentives. Odeon (1998) shows evidence in favour of disposition effect. He concludes that investors are 50% more likely to realise gain than losses.

*2.3.4 Mental Accounting.* Thaler(1990) introduce concept of mental accounting. In 1999 he observes that mental accounting has three components. The first component reveals that how results are received and experienced and after that how decision are made and evaluated. The second part allocates the activities to specific accounts. Third component is about the frequency with which account will evaluate. This can be daily, weekly, monthly or yearly basis.

Generally people don't look at the decision problem as whole but they tend to treat these decision units called mental accounting. Shefrin and Thaler (1988) conclude that people divide their income in three categories and find the marginal propensity to spend the income differ among these categories.

### 3. Data and Methodology

#### 3.1 Survey design and sample composition

For present research work primary data has been collected by using survey based technique. According to objective of the study only specific segment of population selected. Therefore data has been collected "Subjectively but from relevant segment of population" (Gupta 1991, Davar & Gill 2007, Sahi & Arora 2012). Our target population is based on investment basis i.e. people having financial saving and capacity to invest in various financial segments (Sahi and Arora 2012). Further, respondent of smart city (Gwalior, Indore, Bhopal & Sagar) from Madhya Pradesh were selected for study. This region selected because of increasing investor base from these city from past decade. The next step is to narrow down the investor population in this region. As the official list of investors not available the study follow the approach given by previous researchers like Gupta (1991), Davar and Gill (2007), Sahi and Arora (2012). Sample composition decided on the basis of combination of judgment and snowball sampling (Sahi & Arora 2012). The criteria for selecting the respondent of the survey are as follow:-

1. The respondent should be resident of four smart cities (Gwalior, Indore, and Bhopal & Sagar) from Madhya Pradesh.
2. The respondent must invest in Indian stock market.
3. The respondent should belong to middle to higher income group (Annual income 5 Lakh or more)

Around 600 people were approach (150 from each city) for participating in the survey. Survey was based on mostly online basis because of Covid-19 situation of those 483 response were received of which 11 were incompletes in some way. So final number of response to be 472.

#### 3.2 Respondent profile (refer to Table I)

The respondents are differentiated on the basis of demographic as well as trading sophistication. The importance of demographics like age, gender, education, profession and annual income in influencing behavioural biases are highlighted by various researcher in the past (Barber and Odeon 2001; Hon-Snir et al. 2012; Malmeinder and Shantikumar 2003). Investor sophistication also plays important in influencing behavioural biases (Feng and Shesholes 2005). The composition of respondent in each categories is mentioned in table I and discussed below.

The summary statistics show that 64 percent respondent fall in the age group of 41 to 60 (with 28.82 percent in age group 41-50 and 30.72 percent in the age group of 51-60). The sample contains 67.37 percent male and 32.63 percent female. Approx 43.22 percent of respondent are post graduate and 41.74 percent are graduate with 31.14 percent population has annual income between 11 to 13 lakhs. Professionally 33.26 percent population belongs from PSU or Gov. Sectors and 27.97 percent are financial expert. Further, the trading experience of 35.59 percent population having more than 7 year experience. And only 3.18 percent belongs to less than 1 year of experience. on the basis of frequency of

trading 33.05 percent having 12 to 36 month of frequency of trading and only 3.18 percent belong to more than 36 month of frequency of trading experience.

**Table 1:- Descriptive Statistic of sample (Respondent Profile)**

Summary statistics	Code	Count	% Age	Cumulative (%)	Mean	S.D
Age Group ( year)					2.94	1.08
20-30	1	75	15.89	15.89		
31-40	2	96	20.34	36.23		
41-50	3	136	28.82	65.05		
51-60	4	145	30.72	95.77		
Above 60	5	20	4.23	100		
Gender					1.39	0.48
Male	1	318	67.37	67.37		
Female	2	154	32.63	100		
Educational Qualification					2.73	0.79
Undergraduate	1	27	5.72	5.72		
Graduate	2	197	41.74	47.46		
Post graduate	3	204	43.22	90.68		
Doctorate	4	44	9.32	100		
Current Profession					2.96	1.58
PSU/Gov.(excluding bank)	1	157	33.26	33.26		
Private( excluding bank)	2	69	14.62	47.88		
Bank	3	78	16.52	64.40		
Financial Expert	4	132	27.97	92.37		
Others	5	36	7.63	100		
Annual income(Lakhs)					3.04	1.67
5-7	1	92	19.49	19.49		
7-9	2	97	20.56	40.05		
9-11	3	109	23.09	63.14		
11-13	4	147	31.14	94.28		



Greater than 13	5	27	5.72	100		
Investment Type					3.79	1.25
Stocks/Mutual fund	1	137	29.03	29.03		
of new company in						
high growth	2	264	55.93	84.96		
Stock/mutual fund						
of old company in	3	19	4.02	88.98		
high growth	4	43	9.11	98.09		
Derivatives and						
Commodity Market	5	9	1.91	100		
High grade					3.72	1.21
Corporate bonds	1	15	3.18	3.18		
Others	2	36	7.63	10.81		
	3	102	21.61	32.42		
Trading Experience	4	151	31.99	64.41		
0-1	5	168	35.59	100		
1-3					2.97	1.28
3-5						
5-7	1	153	32.41	32.41		
Greater than 7	2	64	13.56	45.96		
	3	173	36.65	82.62		
	4	69	14.63	97.25		
Precursor of	5	13	2.75	100		
investment						
When surplus fund						
available						
Friend advice						
Market movement						
Analyst forecast						
Surplus and market						
movement						

### 3.3 Survey instruments

To investigate behavioural biases of individual investors, descriptive research is undertaken with help of structured questionnaire. There are 36 items divided into three sections. The first section consists of 10 items that provide personal information including details about name, gender, profession, annual income, trading experience. The rest of the items based on situational based which provide respondent a hypothetical situation related to stock market. The situation is constructed in such a manner that it reflects different behavioural biases of investors. These questions are divided into two parts, Part A and Part B. Part A contains some open ended as well as closed ended questions. For Part B five point Likert scale used. In all there are six items from cognitive dissonance, six items from prospect theory, five item from disposition effect, and seven items from mental accounting and two control item which verify the reliability of investor's responses. The item code with their behavioural biases is mentioned in table number –II. The reliability of questionnaires is verified with the help of Cronbach's alpha.

**Table –II :- Items code representing behavioural biases**

Item No.	Behavioural biases
A1	Cognitive Dissonance
A2	Cognitive Dissonance
A3	Prospect Theory
A4	Cognitive Dissonance
A5	Prospect Theory
A6	Cognitive Dissonance
A7	Disposition effect
A8	Disposition effect
A9	Mental Accounting
A10	Mental Accounting
B1	Prospect theory
B2	Prospect theory
B3	Propect theory
B4	Mental Accounting
B5	Prospect theory
B6	Disposition effect
B7	Cognitive dissonance
B8	Mental Acoounting
B9	Disposition effect
B10	Disposition effect
B11	Control item
B12	Control item
B13	Mental Accounting
B14	Mental Accounting
B15	Mental Accounting
B16	Cognitive Dissonance



### 3.4 Description of item in each bias category

This part describe survey instrument in detail. To the best knowledge there is no research which combined these four biases of investors. We try to tackle each biases individually and develop hypothetical situation based on previous literature.

3.4.1 Cognitive Dissonance. For investigating this bias investors are asked their view about Indian stock market (A1). They also asked to give estimated return and performance of stock in past 15 years. Investor's perspective also checked though return of stock with gold price variation (A4). According to investigation it has been observed that gold price increases in case of uncertainty in the stock market. Investor are asked to whether they increases their share in stock market (B7), and if market fall than it would recover in very short period (B16).

3.4.2 Prospect theory. For validation of prospect theory we asked the respondent question regarding variation of stock price in stock market. Here we first asked the investor about rigidity of price in stock market (A4 & A5).some item based on accuracy of knowledge (B1), ability to pick better stock (B2) and full control on their portfolio (B3) and efficacy of their knowledge about stock trading behaviour (B5).

3.4.3 Disposition effect. This bias has two sides where one side deal with investor tendency to keep stock that has less price and sold those stock which is in uptrend. The questions have been framed in the form of Likert Scale and respondent has been asked agree to disagree for the same (B9 and B12). We also placed two situation in the first situation value of stock has been dropped (A7) and in another situation value of share increased (A8). One item is based on their trading activity and investment sophistication in stock market (B6).

3.4.4 Mental Accounting. This bias based on investor ability to compute their profit or loss before trading activity so that they are able to manipulate their investment decisions (A7 & A8). Another item is based on how fast they move their investment or change their portfolio so that their net position remains same or in profitable situation (B14 & B15). How mental accounting impact on their investment pattern (B13).

### 3.5 Statistical tests

This part analyse the statistical techniques used to analyse the response collected from questionnaires.

3.5.1 *chi-square test*. This test conducted when categorical data present in for independent study. It reflects dependence of one variable with other variables. The statistic used to test the statistical significance of the observed association in a cross tabulation. In the present study responses from Part A and Part B vary with each demographic and investor sophistication variables. For this test null hypothesis as follow-:

H0<sub>1</sub> : There is no dependence between demographic variables and behavioural biases.

H0<sub>2</sub> : There is no dependence between investor sophistication and behavioural biases.

**3.5.2 One sample t-test.** By applying this test we are able to measure significance of mean value of distribution. It is applied to each item of Part A and Part B to analyze mean significance between variables.

**3.5.3 A ranking of mean value of importance.** To find out which bias has greatest importance given by respondent this techniques is to be used. Significance of each value checked according to sample t-test. The remaining item is classified according to value of their mean. Ranking of these item are done in three ways; first overall ranking of the entire item is to be conducted. Second method we divide all items into four group each representing a particular biases.

#### 4. Potential Limitations

The potential limitation of this research is responses given by respondent, generally their responses are not purely based on biases but these are socially desirable response. As respondent are not directly asked question regarding their biases but indirectly situation given such that their biases can be analysed. Further limitation is that our data is limited to four smart city of M.P due to time and resources constraints. Another concern is that responses from investor come in the relax environment rather than complex & stressful market condition.

#### 5. Result and Interpretation

The result and interpretation are based on responses given by respondent as per structured questionnaires. Further these choices unveil and Underlying behaviour of biases. A summary of behavioural biases corresponding to each item given in Table No.-III

##### 5.1. Result of Cronbach's alpha

The reliability of internal consistency for each bias checked separately. According to the result reliability of cognitive dissonance, prospect theory and mental accounting are more than benchmark limit i.e. 0.70, but reliability of disposition effect below the accepted benchmark i.e. 0.54. In the present study we don't remove this item as it is in accordance with literature of disposition effect.

**Table –III-: Reliability verified by Cronbach's alpha**

Name of behavioural biases	Cronbach's alpha value
Cognitive dissonance	0.73
Prospect theory	0.79
Disposition effect	0.54
Mental accounting	0.76

### 5.2 Results for chi-square test

Chi-square test verify dependence between behavioural biases and demographic and investor sophistication factors. Seven variables taken into consideration in all, where the factors like age, gender, professional qualification, income level these all constitutes demographic variables. Two variables related with trading experience and frequency which fall under investor sophistication. Table –IV describes details regarding these variables.

**5.2.1. Gender.** There is great difference between respondent profiles among these variables; these 16 item are represent all four behavioural biases. The results are verified at 5% and 1% significance level. This explains regarding behavioural biases and gender of respondent.

**5.2.2. Age.** Out of the total 26 items, response of 22 items varies as one move from age group 20-30 year to age group 51-60 years. The result reveals that there is strong association between age group and behavioural biases of respondent and confirmed by 1% significance level.

**5.2.3 Educational qualification.** This variable has four categories which includes, undergraduate, Graduate, post graduate and Doctorates. These six items will consider all four biases and result is significant at 1% and 5% level.

**Table IV-: Chi-square values for demographic variables; Gender, Age and Education**

Item	Gender $\chi^2$ Significance	Items	Age $\chi^2$ significance	Items	Education $\chi^2$ significance
A1	14.29      0.00**	A1	54.55      0.00**	A1	23.23      0.03*
A3	12.36      0.00**	A2	52.36      0.00**	A9	25.36      0.04*
A4	11.25      0.00**	A4	23.36      0.00**	B3	26.32      0.00**
A7	9.36      0.00**	A6	36.23      0.00**	B4	25.36      0.02*
A8	14.25      0.03*	A7	58.36      0.00**	B6	45.24      0.00**
A9	10.25      0.00**	A8	25.36      0.00**	B11`	29.32      0.03*
B2	30.25      0.00**	A9	85.12      0.00**		
B3	23.21      0.00**	A10	112.36      0.00**		
B5	82.35      0.00**	B1	23.25      0.00**		
B6	24.25      0.00**	B2	119.56      0.00**		
B9	18.36      0.04*	B3	69.31      0.00**		
B11	23.25      0.00**	B4	54.36      0.00**		
B12	9.37      0.00**	B5	85.32      0.00**		
B14	23.65      0.02*	B6	25.36      0.00**		
B15	25.79      0.00**	B7	54.32      0.00**		
B16	27.65      0.04*	B8	32.36      0.00**		
		B9	82.36      0.00**		
		B10	53.23      0.00**		
		B11	75.36      0.00**		
		B12	23.26      0.00**		
		B13	58.34      0.00**		
		B14	25.35      0.00**		
		B15	27.65      0.00**		
		B16	65.25      0.00**		

**NOTE-: \*Significant at 5% level; \*\*Significant at 1% level**

According to above table it is observed that chi-square test illustrate dependence between investor sophistication and demographic factors and behavioural biases of investors. All seven variables show association with the behavioural biases so both null hypotheses can be rejected. It is also observed that age of investors play major role in decision making.

## 6. Conclusion and Implications

In the past there is lots of variations in Indian stock market and there is series of ups and down during some year. So research based on investor biases become relevant and informatics. The present study reflects effort in this direction. Behavioural biases in Research also explore presence and effect of four biases in investment decision making. The behavioural biases capture current behavioural biases among investors belongs from four smart city of M.P. The highest influencing factors are age, education, gender and income. It has been observed that men are more men are less calculative than women so the behavioural bias mental accounting more effective for women rather than men.

**Table-V:- Individual ranks for each biases**

Cognitive Dissonance			Prospect Theory			Disposition effects			Mental Accounting		
Item	Mean	Rank	Item	Mean	Rank	Item	Mean	Rank	Item	Mean	Rank
B3	3.93	1	B7	3.56	1	B15	3.87	1	B6	3.36	1
B2	3.77	2	B16	3.42	2	B4	3.56	2	B12	3.12	2
B1	3.24	3				B14	3.35	3	B9	2.39	3
						B13	2.36	4			

**Table-VI:- Ranking of biases in order of effectiveness**

Bias Name	Mean	Rank
Cognitive Dissonance	3.66	1
Prospect Theory	3.49	2
Disposition effects	3.28	3
Mental Accounting	2.92	4

Similarly Cognitive ability bias also impact on gender as well as investor sophistication and their trading pattern. Another interesting observation is those investors having more experience are prone to all biases. Further old investor found to be highly sensitive and age group is prone to prospect theory. On the other hand disposition effect present in the middle aged investors who tends to invest according to their past experience. The other parameters on which these biases can be differentiated are annual income, profession and trading experience. Our main conclusion is that on ranking these biases in their of prevalence, cognitive dissonance become most important bias among these four in Indian stock market.

According to this study there is some implication for investment managers to understand behavioural biases of investors and take decision accordingly. It helps to recognise psychological aspect of investors so that investment managers act accordingly. It helps them to modify portfolio of high net worth individual to get maximum return as well as satisfaction for the investors. It also helps investment bankers to understand market sentiment and invest accordingly. It assist financial planner to get better plan for investors. Finally knowledge of behavioural biases by every individual help them for better investment decision and to better understand sentiment of market movement.

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