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## RESEARCH ARTICLE

### EFFECT OF SELECT COGNITIVE BIASES ON FINANCIAL AND GENERAL DECISION MAKING

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#### ABSTRACT

**Background:** People, everyday are inundated with making decisions whether they are big or small. Cognitive psychology plays a major role in how people make their choices. Cognitive bias is known to have an effect on decision making. These biases are based on memory which create a systematic deviation in thinking and processing information. **Objective:** This paper aims to identify the effect of select cognitive biases i.e., Overconfidence bias, Endowment bias, Ambiguity Aversion bias and Recency bias on General Decision Making of a person as well as Financial Decision Making. The study also explores the differences and similarities in cognitive biases working during general decision making and financial decision making. **Method:** For this study, a self-administered questionnaire was used to collect data from 416 people and analysis and conclusions were drawn based on it. **Results:** The results shows that there a significant difference in the style of decision making when financials are in consideration rather than routine decision making. Also Only Overconfidence bias has an influence on both Financial and General decision making. **Conclusion:** Any decision, be it financial or general is shaped by personality and behavioral characteristics of a person. And, people tend to make decision based on recent information registered in their mind.

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## INTRODUCTION

Decision making is intrinsically a cognitive activity resulting in rational or irrational thinking. Cognitive Biases act as major impediments in any decision-making process. Biases distort and disrupt objective examination of an issue by the introduction of influence into the decision-making process that is separate from the decision itself. Biases that can affect our judgment are generally unknown to us. The recent case of \$1.77 billion scam of one of the leading Nationalized Bank of India, where they did not keep any collateral from the Diamond merchant is a pure example of the interplay of Cognitive Biases in decision making. Cognitive biases in decision making led to the arrest of the owner of a digital marketing company in India that was accused of running a 3700 crore social trade Ponzi scheme in 2017. There are various cognitive biases that affect the decision making of a person, namely Confirmation, Availability heuristic, Overconfidence, Attentional, Ambiguity aversion, Endowment, Anchoring, Recency. But we will focus on Overconfidence bias, Endowment bias, Ambiguity aversion and Recency bias in this study. Overconfidence in decision making can lead to exaggerated results For example, it can contribute to unnecessary risk-taking through undue reliance on risk management models adjusted with limited data (Kaustia & Perttula, 2012).

Possible consequences of overconfidence as noted by financial experts are Too frequent trading (Barber and Odean, 2001), value-destroying corporate transactions (Malmendier and Tate, 2008), and the adoption of harmful financial regulation (Hirshleifer, 2008). Recency bias is the tendency to think that what's been happening lately will keep happening. The case of NSEL scam(2013) of \$845million is one such example in which the investors were tapped as most of the underlying commodities did not exist and buying and selling of commodities was being only conducted on papers. Endowment in decision making can lead to biased results, as an individual values something they already own than something they do not own. Let's say if someone asks for an advice to invest in mutual funds most of the people will recommend the mutual funds they already hold, just because they bought them and they think that's the best option. When individuals receive conflicting, incomplete, uncertain or excessive information, they experience the ambiguity and make contradictory decisions. When the complexity of decision making increases, people tend to expend less effort to actually make their decision, and select default options if available. For example majority of Indian households still believe gold as a safer investment option than mutual funds or equity shares as risk associated with securities is higher as compared to gold.

## Literature Review

Dowd et al. (2008) noted that Goldman Sachs incurred losses in one of the bank's flagship hedge funds by Over confident decisions. They took "25-standard deviation moves, several days in a row" when even a 0.1 SD move would not have predicted anything. They set their confidence intervals too narrowly and thus behaved Overconfidently. Mercer et.al. (2010) in their study displayed an experimental evidence that the SEC directed text warning against extrapolating from past mutual fund performance does not affect the subjects' mean behavior, nor expectations. Overconfident clients tend to put more emphasis on the winning stocks or mutual funds, whereas understating the significance of long term asset allocation. Morewedge (2009) study of mugs showed that the buyers were willing to pay as much the seller demanded when the buyer already owed an identical mug. Further, in his study, he proved that the buyer's broker and the seller's broker agreed on the price of the mug, but both traded at a higher price when they happen to own the mug they are trading. He concluded that the ownership caused the endowment effect in decision making. Thaler (1970) conducted a study in which he considered two scenarios, the first one in which a wine merchant offered to buy a bottle of wine from a man for \$100 which he originally bought for \$5 but he refuses to sell just because he feels that the value for him is much more. In an another scenario a man who mow's his own lawn received an offer from his neighbor's son to mow that lawn for \$8 the man refuses even though he would not mow the same size lawn for \$20 just because he thinks that the work he do is better and more valuable.

Kahneman et al. (1990) conducted a study of coffee cups in which he formed two groups, one with the coffee cups and other empty handed. The former group estimated the selling price and later the buying price. The objective was to find out that while the group with cups charge more and the research revealed that the first group with cups was unwilling to sell less than \$5.25 whereas the second group was unwilling to pay more than \$2.25-\$2.75. This study shows that endowment affects decision making. Strahilevitz and Loewenstein (1998), study shows that past ownership can affect the object valuation. The study further revealed that the value of an object increases with the duration of possession of that good and if not in possession past ownership also affects one's decision. Osmont et al. (2015) conducted a study in which 37 participants had to choose between a sure option and a gamble depicting either clear or ambiguous probabilities. The results revealed a clear preference for the sure option in the ambiguous condition irrespective of the frame.

Kaustia & Perttula (2012) conducted a study on 23 bankers and 123 students to measure over confidence among finance professionals in domain relevant knowledge and test for impact of different biasing methods. The result confirm over confidence in respondents in terms of probability calibration, better than average beliefs and unfounded confidence, they further found that de-biasing attempts help to reduce better than average beliefs but there was limited success with respect to probability calibration. In a study reported by Russo and Schoemaker (1992) of a company who tested its managers on over confidence and effect of counter argumentation the managers were over confident by 18% in choosing the correct answer for a probable current liability assessment task. The other set of managers was asked for their assessment as well as

for reasons as to why their assessment can be correct or wrong. It is found that assessment was 11% this shows a reduction of nearly 2/5<sup>th</sup> of over-confident judgement based on single counter argument.

## RESEARCH METHODOLOGY

### Objectives of the Study

- To study the impact of cognitive biases (over-confidence, recency, ambiguity aversion, endowment) on Financial Decision Making.
- To study the impact of cognitive biases (over-confidence, recency, ambiguity aversion, endowment) on General Decision Making.

**Sample:** This study was conducted on people from different background in the national capital region of India. Responses were collected from 416 respondents. These people were from different background, such as working professionals, home makers and students. The demographic profile of the respondents is, as mentioned in Table 1. The sample consists of 223 Males and 193 Females. Age wise, there were 143 respondents in the age range of 18-35 years termed as Young Adults, 220 respondents in the age range of 36-55 years termed as Mid Age Adults and 53 old age adults with age above 55 years. Marital status wise there were 233 respondents who were Unmarried, 135 respondents who were Married and 48 respondents who were Divorced. According to Family type 194 respondents had Joint Family, 188 respondents had Nuclear Family and 34 Single Parent. Socioeconomic status of 68 respondents was High, 305 had Middle Socio Economic Status and 43 respondents had Low Socio Economic Status. 156 of the respondents were Undergraduate, 245 of the respondents were Post Graduate and 15 respondents belong to others. An Income group of 110 respondents was up to 5 Lakhs, 186 respondents belonged to income group of 5.1-10 Lakhs, 112 respondents had an annual income between 10.1-20 Lakhs and 8 respondents had an annual income above 20 Lakhs. There were 180 respondents who had done schooling from Government School, 162 of the respondents had done their schooling from Convent School and 74 of the respondents had done their schooling from Public School. (Table1)

### Tools Used

**Cognitive Biases:** A self administered questionnaire was developed with 25 items on four different cognitive biases. There were 6 items to measure overconfidence bias, 6 items to measure endowment bias, 9 items to measure ambiguity aversion and 4 items that measured recency bias. The cronbach's alpha of the questionnaire was

**General Decision Making Styles:** Rowe's decision style inventory, with 20 items, was used to know the different styles of decision making used by different individuals. He identified four styles of decision making, namely, Directive, Analytical, Conceptual and Behavioral style.

**Financial Decision Making Styles:** Taking Rowe's decision style inventory as base, financial decision style inventory was developed which also had 20 items. On the basis of which people can be distinguished on four styles of financial decision making styles, namely, Financial Directive, Financial

Analytical, Financial Conceptual and Financial Behavioral style.

## RESULTS AND DISCUSSION

The sample of 416 respondents was collected through a self administered questionnaires and subjected to statistical analysis. After conducting Analysis of variance of various Cognitive Biases with respect to Financial and General Decision Making Styles. The results revealed that while making routine decision non of the biases plays a role on the other hand while making financial decision making only the overconfidence bias plays a significant role and all other biases in the study like recency, ambiguity aversion and endowment has no influence. Thus, people tend to overestimate the information received and their own predictive abilities while making financial decisions (Table 2).

Further, the sample was subjected to find out the mean difference of Cognitive Biases with respect to Financial and General Decision Making Styles. Again the results showed that only overconfidence bias has a significant difference that too only with respect to financial decision making. It must also be noted that, out of all the four styles of decision making, i.e., Financial Directive, Financial Analytical, Financial Conceptual and Financial Behavioral, the Financial behavioral decision making style is significantly different from the other three. Since, Overconfidence is an emotional bias which affects the behavioral aspect of a person's decision making (Table 3). In addition, the data were segregated on the basis of cases with similar financial and general decision making and different financial and general decision making. After segregating the data, it was subjected to 't' test to find out which cognitive biases have a significant difference.

**Table 1. Showing Demographic Profile of the Respondents**

Gender	Males	Females		
	223	193		
Age	Young Adults (18-35 Years of Age)	Mid Age Adults (36-55 years of Age)	Old Age Adults (Above 55 years)	
	143	220	53	
Marital Status	Unmarried	Married	Divorced	
	233	135	48	
Family Type	Joint Family	Nuclear Family	Single Parent	
	194	188	34	
Socio Economic Status	High SES	Middle SES	Low SES	
	68	305	43	
Education Background	Graduate	Post Graduate	Others	
	156	245	15	
Income Group (Annual Income)	Up to 5 Lakh	5.1-10 Lakh	10.1-20 Lakh	Above 20 Lakh
	110	186	112	8
Type of Schooling	Government School	Convent School	Public School	
	180	162	74	

**Table 2. Showing Analysis of Variance of various Cognitive Biases with respect to Financial and General Decision Making Styles**

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Financial Decision Making	Overconfidence	1.054	3	.351	2.875	.036

**Table 3. Showing Significant Mean Differences of Cognitive Biases with respect to Financial and General Decision Making Styles**

Dependent Variable	Financial Directive Decision Making	Financial Analytical Decision Making	Financial Conceptual Decision Making	Financial Behavioral Decision Making
Overconfidence	3.56 <sub>a</sub>	3.55 <sub>a</sub>	3.52 <sub>a</sub>	3.41 <sub>b</sub>

Note: Means with differing subscripts within rows are significantly different at the  $p < .05$  based on Duncan Multiple Range post hoc paired comparisons.

**Table 4. Showing Significant Mean Differences in Cognitive Biases in case of Similar/ Different Financial and General Decision Making Styles**

t	df	Sig.	N in case of Similar Financial and General Decision Making Styles	N in case of Different Financial and General Decision Making Styles	Mean in case of Similar Financial and General Decision Making Styles	Mean in case of Different Financial and General Decision Making Styles
Over confidence	2.160	.031	391	25	3.51	3.67

**Table 5. Showing Effect of Cognitive Biases on Financial and General Decision Making Styles**

				Unstandardized Coefficients	Standardized Coefficients		Beta	t	Sig.
	F (sig)	R <sup>2</sup>	Adjusted R <sup>2</sup>	B	Std. Error				
Financial Decision Making Style- Directive									
Overconfidence	6.64 (.001)	.021	.019	5.57	1.91	.141	2.91	.004	
Recency		.010	.007	2.68	1.28	.101	2.08	.038	
General Decision Making Style- Directive									
Overconfidence	7.69 (.001)	.025	.021	6.15	1.93	.154	3.18	.002	
Recency		.011	.010	2.803	1.29	.105	2.16	.031	
General Decision Making Style- Conceptual									
Overconfidence	3.887 (.049)	.009	.008	-4.64	2.35	-.096	-1.97	.049	

It is evident from the results, that overconfidence is the only bias out of the four biases under study, which had significant differences between people with Similar Financial and General Decision Making Styles and people with Different Financial and General Decision Making Styles (Table 4). Finally, the cognitive biases were regressed against financial and general decision making styles using regression analysis and the results shows that in case of financial decision making only overconfidence and recency bias have a significant impact that too only on Financial Directive style of decision making. Overconfidence bias contributes to 19% and recency bias contributes to 7% change in the financial decision making. Similarly, in case of general decision making, General Directive style of decision making is impacted by overconfidence and recency bias. Overconfidence bias contributes to 21% and recency bias contributes to 10% change in the decision making. And, General Conceptual style of decision making is impacted by only overconfidence bias with a contribution of 8% (Table 5).

### Conclusion

Decision making is a cognitive activity, which results in a thought process that comes up with either rational or irrational decision making. There are a number of cognitive biases which impacts the decision making. Individuals use different styles of decision making. There is also a difference in the style of decision making when financials are in consideration rather than routine decision making. To identify these differences, this study was conducted which concluded that from four cognitive biases under the study, namely, Overconfidence bias, endowment bias, ambiguity aversion bias and recency bias, only overconfidence bias which effects both financial and general decision making. Also, it is evident that recency bias also has an influence. Thus, the inference drawn from the study is that over-confidence bias being an emotional bias has a major role to play while making decisions. Any decision, be it financial or general is shaped by personality and behavioral characteristics of a person. And, people tend to make decision based on recent information registered in their mind.

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