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"Revisiting the Decoy Effect under Attribute Transparency: Evidence from Digital Learning Platforms"

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ABSTRACT
This research paper examines the decoy effect on the choice of online courses when the course factors are displayed transparently over online learning platforms. With the behavioral decision-making theory, the study will analyze how consumers react to transparent course information in an online learning setting. The survey design was experimental with two questionnaires; Questionnaire X showed the respondents the target courses and the competitor courses; Questionnaire Y added a decoy choice. The sample population of 217 university students in Pakistan was used to gather data. The exact test and Chi-square were used to compare the difference in choice behavior under conditions and measure the association between demographic variables (age and employment status) and decision outcome. The findings show no decoy effect when the course features are specified well, meaning that the attribute transparency is less prone to manipulation of choices. In addition, age and employment status did not play a big role in determining the direction of decisions. This research broadens the decoy effect literature to a less-researched area of consumption by targeting online courses presented via digital learning platforms. The results have significant consumer policy implications by demonstrating how information disclosure can help to improve rational decision-making and consumer protection in digital markets.

Keywords: Behavioral economics, Decoy effect, Limits of decoy effect, Digital Learning Platform

1. Introduction

Nowadays, consumers have multiple choices regarding a product or service, from which they choose the option that will best suit their needs. Businesses always try to learn why consumers choose a specific product from multiple options available and leave the rest (Chan, 2024). Though there is no mathematical formula available to inform us why consumers make certain choices but if we study the similarities among consumer behavior,

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it will help us to understand the factors that can affect consumer choices (Milos Bujisic et al., 2024).

There are two economic theories that can help us understand consumer decision-making. The first one is a rational theory. According to this theory, consumer decisions are completely rational and they choose the product/service that best suits them according to their needs (Joshua Lanier et a.l, 2024). In contrast, behavioral economics states that consumer decisions are not completely rational and there are various factors that can influence the way consumers choose one product/service from multiple options available (Mir-Artigues, 2022). One such factor that can influence consumer choices is that they do not analyze things with their absolute advantage rather they look at things in relation to other things present around them and make comparison between different things and then choose the one that looks superior than others (Cialdini R. , 2021). It is important for businesses not only to create a sort of comparison in their offerings but also to create it in such a way that it will be beneficial for them. For example, businesses have some competitive products and some target products. If consumers make a comparison between these two kinds of offerings, the chances of choosing both products may be 50/50 (Bateman et al., 2008; Sun, 2023), and in some cases, they are even less for target products (Bruno Uekane Okumura et al. T. P., 2023).

Here comes the decoy effect as a solution for businesses. This effect can be created by including an inferior option in the choice set to make the target product look more attractive (Ariely D. , 2008). This effect basically shifts the contrast from competitor-target to decoy-target, and because consumers compare products that are easy to compare, they will be more likely to choose the target product because it will seem like a more beneficial deal. The purpose of a decoy is to make the targeted product/service (that businesses actually want to sell to consumers) look more attractive, reasonable, and beneficial (Denise Lovett et al., 2024). The decoy effect, also known as the attraction effect, is created by adding an inferior option in the choice set (Huber et al., 1982). It is an effective nudge because it makes it easy for customers to choose the target product. It has been used by businesses for many years (Sun, 2023). Prior research has proved that the decoy effect has the potential to manipulate consumer choices. For example, restaurants use decoy pricing in menu bundling to make a targeted option look more valuable and beneficial (Milos Bujisic et al., 2024) An online market retailer has also seen an increase in profit with the help of the decoy effect (Wu and Cosgunar, 2020). Despite the effectiveness of the decoy effect, all these studies have been conducted in a controlled environment and lack ecological validity.

Moreover, these studies were conducted only relying on two product dimensions: price levels and quality levels (Huber et al., 1982; Huber, 1983; Simonson I. , 1989; Pettibone, 2012; Ariely D. , 2008). For example, in the famous popcorn study, products were simply named as small, medium, and large along with their prices. Researchers found that the decoy effect has many bounds, like the effect is only evident when product dimensions are numerically presented, and the effect can be mitigated when attribute description is presented (Shane Fredrick et al., 2014; Yang, 2014). It means that the decoy effect will not be equally effective for all businesses. There are many businesses that cannot rely only on numeric values, but rather have to provide product descriptions. For example, any service provider cannot simply present the name of its service and its price, but rather has to present a description of the attributes/dimensions of that service. And in this case, the decoy effect has less chance to influence the decision of consumers; rather, the effect can be completely eliminated or reversed.

Attributing transparency in digital marketplaces has been popularized as a fundamental

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consumer protection device to enhance information asymmetry and restrict the capacity of manipulative choice structures (Hariharan & Ruban, 2025). The solid presentation of the price, quality, duration, and comparative functionality will allow consumers to consider all options in a more rational way and reinforce the informed decision-making (Turetski et al., 2023). As a consumer policy, transparency is not just a form of information power but a regulatory power that protects behavioral biases inherent in platform design (Mertens et al., 2022). In this context, the inability or the weak vigor of the decoy effect in high attribute transparency ought not to be regarded as a theoretical dispute of behavioral economics (Chen et al., 2024). Instead, decoy failure is policy success, which means that transparency interventions can overcome context-dependent choice manipulation (Mertens et al., 2022). This study redefines the null effects as indications of the effectiveness of information disclosure policies in online course selection by showing that the presentation of transparent attributes can reduce the decoy effect in web-based course selection (Turetski et al., 2023).

Despite the extensive literature available on the effectiveness of the decoy effect in the context of products whose dimensions were numerically presented, there is only a limited amount of research that investigates the decoy effect on products/services whose qualitative dimensions must be presented. For example, in the education sector, an institution or platform cannot simply name their courses as basic or advanced courses and present their prices; rather, they have to present other dimensions of the course that they are offering, like duration, skills taught, certification process, and mode of learning.

In order to fill this gap in the literature, the main goal of the study is to experiment on the presence of the decoy effect in online course selection, where attribute information is made transparent on online learning platforms. One of the secondary goals is to determine whether individual factors (age and employment status) can be helpful in predicting the patterns of making decisions in situations of high transparency of attributes.

To answer these research questions, experimental research was conducted, and two questionnaire models were developed. The data analysis was performed using Fisher's exact test and the chi-square test. This study contributes to the literature by analyzing the decoy effect under the condition where product attributes are highly transparent. It will help researchers as well as businesses to better understand the implications of the decoy effect.

2. Literature review

Classical rational theory states that consumers are completely rational and they make logical choices to maximize their benefits (FararoT.J, 1992). Therefore, various strategies in economics, like pricing strategies, were made with the help of mathematical formulas, considering various factors like cost-plus, break-even, profit margin, product category, and geographic locations. etc (Milos Bujisic et al., 2024; Kruel, 1982). Despite being easy to apply, the main problem in these strategies was that they may not be psychologically pleasing because these strategies ignore various other psychological factors that can influence consumer decision-making (Milos Bujisic et al., 2024; Kruel, 1982). In contrast to these strategies, behavioral economics blends economics and psychology and considers strategies that take into account various psychological factors that can influence consumer decision-making (Sun, 2023). Behavioral economics procured massive attention after the introduction of dual-process theory, which was proposed by Tversky and Kahneman (Kahneman, 2003). This theory differentiated between intuition and reasoning by stating that there are two systems that exist in the human mind, referred as System 1 and System 2 (Kahneman, 2003; Stanovich, 2003; Kahneman., 2011). System 1 was marked as being

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fast and automatic towards intuition, and System 2 was marked as being effortful but slow, also finding decision-making errors (Kahneman., 2011). People are more likely to rely on System 1 because System 2 requires more time and effort (Kahneman & Tversky, 1973). This theory later provided the foundations for nudge theory. Nudge theory means that if you want customers to make a certain decision, then make that decision look the most beneficial and easy option for them (Rothlisberger, 2020).

An important factor that can influence consumer choices is that consumers do not analyze things with their absolute advantage rather they look at things in relation to other things present around them. This is also called the phenomenon of relativity (Ariely D. , 2008). According to this phenomenon, consumers do not look at things as individuals but in the form of sets, and they tend to make comparisons between those things (Cialdini R. B., 2021).

Businesses mostly have some target products and some competing products. They use various nudges to make their target product look more attractive. One of the most widely used nudges is the decoy effect. This effect is created by offering an inferior option in the choice set that will be close in price to the target product, but will offer much less value than that (Ariely D. , 2008). This effect basically shifts the contrast from the competition-target products to the decoy-target product (Cialdini R. B., 2021) making the target product more attractive and easier to choose (Sun, 2023). By introducing additional alternatives, it basically modifies consumer choice patterns (Simonson T. a., 1993).

Decoy effect was introduced by (Huber et al., 1982). It has been seen as an effective nudge in behavioral economics because it makes the target option look more beneficial and easy to choose (Sun, 2023) by creating contrast between the decoy product and the target product (Cialdini R. B., 2021). In order to create this effect, a business must have a choice set of at least three options (Denise Lovett et al., 2024). There are two types of decoys known as dominated decoys and non-dominated decoys (Rothlisberger, 2020). Dominated decoys are those that are dominated by other alternative options. Features of these decoys are worse than those of the competing options, and in this way, they create an attraction effect by making the target option look more beneficial and easier to choose. The second type of decoy is non-dominated decoys. These are basically used to extend the range of evaluation. In this case, the target option is placed in the middle of the competition, and the decoy option is used to create a compromise effect. These types of decoys work on the phenomenon that consumers tend to avoid extreme options.

The decoy effect has been studied in marketing (Auntunes, 2020), economics (Ariely D. , 2008) and in psychology (Li et al, 2019) literature. Dan Ariely conducted experiments to analyze the influence of the decoy effect on consumers making their subscription decisions. Consumers were given three options to choose from. These included competitor option, decoy option, and target option. As a result of this experiment, it was found that more consumers choose the target product in the presence of a decoy. But when the decoy was absent, and only two choices (competitor and target offer) were given, more consumers chose the competition product (Ariely D. , 2008). In the hospitality industry decoy effect also seemed to change consumer choices by making them choose the high-priced option (Milos Bujisic et al., 2024). Recent research has proved that the decoy effect can manipulate consumer choices when choosing their broadband packages (Denise Lovett et al., 2024) and also while making investment decisions (Bruno Uekane Okumura et al. T. P., 2023).

Recent studies challenge the relevance of behavioral nudges in the case of increased transparency. As shown by Effenson et al. (2020), the impact of nudges can be easily decreased in case they are made public because people become more thoughtful and

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resistant to being manipulated in their choices. In like manner, Sunstein (2021) posits that transparency will act as a corrective tool limiting exploitative nudges and ensuring consumer freedom, specifically in digital choice settings. Recent research also shows that systematic failures of choice architecture occur in some circumstances. Bruns et al. (2018) demonstrate that in some cases, nudges can backfire or go to waste when the consumer perceives them as manipulative or in situations where the context of the decision-making process has clear and similar information. Furthering on this point, Caraban et al. (2019) remind that the effectiveness of nudges is very situational and can easily fail in open and informationalized environments.

Despite all these studies where the decoy effect creates a significant change in recent research, some studies have questioned the practical implications of the decoy effect, stating that all those previous studies were conducted in a controlled environment, and product dimensions were also presented numerically (Shane Fredrick et al., 2014; Yang, 2014). Moreover, these studies suggested that the decoy effect can be eliminated completely when product attributes are presented clearly. The problem here is that in the real world, there are many businesses like service providers who cannot merely rely on numeric dimensions, but they have to present a description of the attributes of those services. These bounds question the practical implications of the decoy effect.

Although massive research has been done on the influence of the decoy effect on consumer choices, the topic did not receive much attention in the fields where it is not possible to rely only on numerical attributes of products; rather, businesses have to add clear product dimensions, as in the field of services. This study addresses this research gap by inquiring into the decoy effect in the context of online course selection offered by a digital learning platform, where high attribute transparency is crucial. For this purpose, null and alternative hypotheses are stated below:

H0: Implementation of the decoy effect does not significantly increase the number of participants choosing the target option when course attributes are clearly mentioned.

H1: Implementation of the decoy effect significantly increases the number of participants choosing the target option even when the course attributes are clearly mentioned.

Moreover, studies have also revealed that the magnitude of the decoy effect is dependent on situational variables like the size of the choice set (Denise Lovett et al., 2024) as well as individual-specific variables such as thinking style and demographic factors like income that are connected with consumers' characteristics (Kubalova, 2020). It means that consumers' personal traits determine how and to what extent the external stimuli (presence of decoy product in a choice set) will affect them (Kubalova, 2020). Moreover, researchers revealed that the success rate of the decoy effect can be influenced by various demographic factors. Age level can also influence the magnitude of the decoy effect (Hasher, 2005; Fukushi et al., 2021), and Kubalova (2020) reveals that the decoy effect manipulates the decisions of elders more than those of young individuals. Considering the results of these studies, we formulate our second and third hypotheses.

H2: Employment status (employed vs. unemployed) moderates how decoy offers (present vs. absent) affect student likelihood of choosing target course.

H3: The Decoy effect is verified when classifying respondents according to their age.

Conceptual model is given below:

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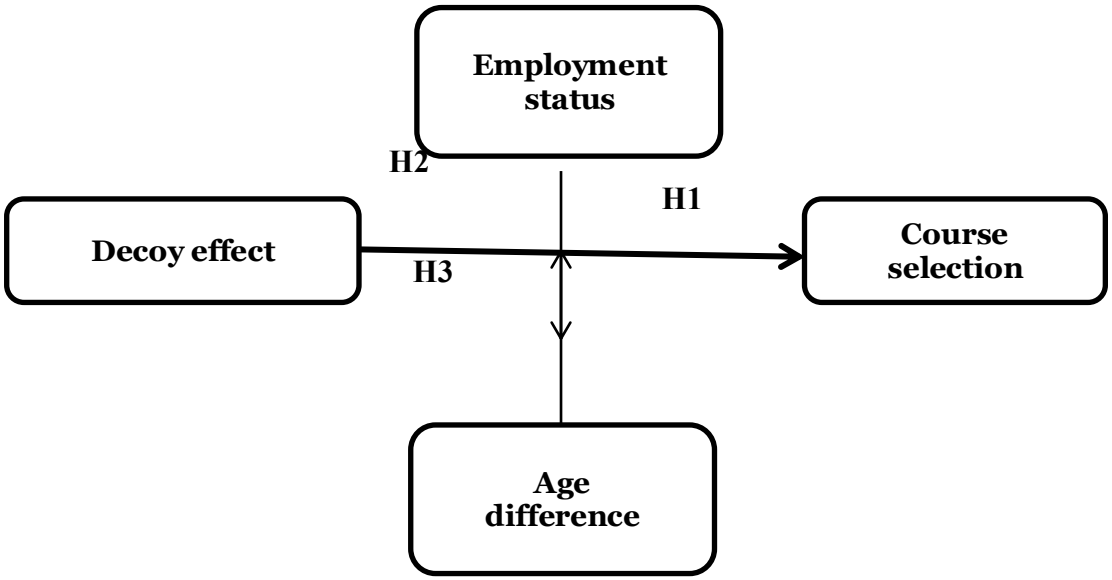

3. Methodology:

3.1 Research design

This research was characterized by experimental research. This study analyzes the influence of the decoy effect on course selection in the context of digital learning platforms. Age difference and employment status (employed vs. unemployed) are considered as moderators.

3.2 Population and sample

The target population for this research was undergraduate and post-graduate students of Pakistan. This research used a convenience sampling method, and 217 students from the University of Okara were selected as the sample.

3.3 Data collection

After selecting the sample, the next step was to collect data. For this purpose, a structured questionnaire was adapted from (Bruno Uekane Okumura et al. T. P., 2023). The questionnaire included a request for corporation, respondent classification information, instructions, and information requested from respondents. The questionnaire topics were displayed in two blocks. The first block consists of requests for corporation and respondent classification information, like age and employment status. It was also decided not to identify participants by their name to ensure anonymity, and it was also needed to. The second block initially presented instructions. Afterwards, courses with the description of their attributes were introduced, and respondents were asked to choose one option. The attributes used to represent courses included topic duration, topics covered, tools taught, certification, and price.

Two questionnaire templates were created in order to analyze the influence of the decoy effect on students' choices. These were called questionnaire X and questionnaire Y. Questionnaire X contained only two choices of courses from which the respondents had to choose one. This questionnaire did not include any decoy option. There was one target course and one competitor course option. Whereas questionnaire Y contained three course options. It consisted of a competitor course, a decoy course, and a target course. The strategy was to give the impression that the target option is much more worth it in

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questionnaire Y by shifting the contrast from competitor-target to decoy and target option. If the decoy effect works regardless of product/service dimensions, then more students should choose the target course option from questionnaire Y than from questionnaire X. Each participant answered only one questionnaire template. The structure of the questionnaire is given below:

First Block **(General information)**	Request for cooperation and respondent classification information	**Respondent classification information** • **Age** • **Employment status**
Second Block **(Questions)**	**Course Information:** • Duration • Topics covered • Learning mode • Support • Certification • Price	**Questionnaire X** • Course 1 (competitor) • Course 2 (target) **Questionnaire Y** • Course 1 (competitor) • Course 2 (decoy) • Course 3 (target)

3.4 Analytical procedure

In order to analyze the decoy effect, an alternative option (decoy) was added in one of the questionnaires. The idea was to assess whether the presence of a decoy can alter the response pattern or not. The analysis involved the following three steps:

The first step was to analyze the response pattern of questionnaire X concerning courses A and B for age and employment status. Because both of the variables were categorical, Fisher's exact test at the significance level of 5% was performed. The test assessed whether the row and column variables were independent or not.

In the second step, the response pattern of questionnaire Y was analyzed. This questionnaire contained three course options, one of which was the decoy. Fisher's exact and Chi-square tests were performed at a significance level of 5%. The purpose was to identify the relationship between age and employment status with student choices.

The third step was to analyze the difference between the choices made in questionnaire X and those of questionnaire Y. The purpose was to determine whether a decoy has the potential to change student choices even when product attributes are clearly mentioned or not. For this purpose, again Fisher's exact test and Chi-square test were used.

4. Results

A total of 217 responses were collected against questionnaires X and Y from students of undergraduate and postgraduate programs. Two questionnaires were not completely filled so they were taken out before analysis. So a total of 215 responses were taken for analysis. Participants were concentrated around 21-30 years. The average indicates that 78% of the participants were unemployed, while the other 22% were either doing jobs or running businesses.

4.1- Step 1

The table below presents the data of the respondents of questionnaire X. From 102 total participants, only 28 (27.5%) were employed, and the remaining 74 (72.5%) were unemployed. After characterizing the participants on the basis of their employment status, the statistical association between the courses chosen and employment status was analyzed. Fisher's exact test was used for this purpose, and the significance level of 5%

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was considered. According to the results, of the 28 employed participants, 13 (25%) chose course A and 15 (30%) chose course B. On the other hand, of the 74 unemployed participants, 39 (75%) chose course A and 35 (70%) chose course B. The p-value obtained was 0.659, which indicates that there is no statistically significant relationship between employment status and chosen course.

Table 1

		employment status:		
Course options		**Employed/ business**	**Unemployed**	**Total**
Course A	Observed	13	39	52
	% within row	25.0%	75.0%	100.0 %
	% within column	46.4%	52.7%	51.0%
Course B	Observed	15	35	50
	% within row	30.0%	70.0%	100.0 %
	% within column	53.6%	47.3%	49.0%
Total	Observed	28	74	102
	% within row	27.5%	72.5%	100.0 %
	% within column	100.0%	100.0%	100.0 %
Fisher's test	(p-value= 0.659)			

After that, participants were categorized on the basis of their age. Results showed that most of our participants were 21-30 years. Table 2 presents the statistical relationship between participants' age and the types of choices. The *p*-value of 0.578 shows that there is no significant relationship between these two variables.

Table 2

		Your age :			
Course Options		**20-30**	**31-40**	**Above 40**	**Total**
Course A	Observed	52	1	0	53
	% within row	98.1%	1.9%	0.0%	100.0%
	% within column	52.5%	50.0%	0.0%	52.0%
Course B	Observed	47	1	1	49
	% within row	95.9%	2.0%	2.0%	100.0%

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Table 2

Course Options		Your age : 20-30	31-40	Above 40	Total
	% within column	47.5%	50.0%	100.0%	48.0%
Total	Observed	99	2	1	102
	% within row	97.1%	2.0%	1.0%	100.0%
	% within column	100.0%	100.0%	100.0%	100.0%
Fisher's test	(*p*-value= 0.587)				

4.2- Step 2

The second step of analysis was to analyze questionnaire Y. This questionnaire consisted of 3 course options, of which one was a decoy. The purpose was to identify the relationship between employment status and student choices in the presence of the decoy effect. A total of 113 participants filled out this questionnaire, of which 24 (21.2%) were employed, and 89 (78.8%) were unemployed. From 113 students, Course A was chosen by 45 students, course B was chosen by 20 students and course C was chose by 48 students. The p-value of 0.169 indicates that there is no statistically significant relationship between student choices and employment status in the presence of decoy.

Table 3

course options		employment status: Employed/ business	Unemployed	Total
Course A	Observed	10	35	45
	% within row	22.2%	77.8%	100.0%
	% within column	41.7%	39.3%	39.8%
Course B	Observed	7	13	20
	% within row	35.0%	65.0%	100.0%
	% within column	29.2%	14.6%	17.7%
Course C	Observed	7	41	48
	% within row	14.6%	85.4%	100.0%
	% within column	29.2%	46.1%	42.5%
Total	Observed	24	89	113
	% within row	21.2%	78.8%	100.0%

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Table 3

course options		employment status: Employed/ business	Unemployed	Total
Fisher's test	% within column	100.0% p-value = 0.169	100.0%	100.0%

presents the data regarding the respondents' ages who answered the questionnaire Y. The main motive here was to analyze whether there is an association between respondents' age and their decisions. Because the age was categorized into groups: 20-30, 30-40, and above 40. So Fisher's exact test was performed for analysis, considering a significance level of 5%.

Table 4

Course Options		Your age : 20-30	31-40	Above 40	Total
Course A	Observed	45	1	0	46
	% within row	97.8%	2.2%	0.0%	100.0%
	% within column	40.9%	50.0%	0.0%	40.7%
Course B	Observed	19	1	0	20
	% within row	95.0%	5.0%	0.0%	100.0%
	% within column	17.3%	50.0%	0.0%	17.7%
Course C	Observed	46	0	1	47
	% within row	97.9%	0.0%	2.1%	100.0%
	% within column	41.8%	0.0%	100.0%	41.6%
Total	Observed	110	2	1	113
	% within row	97.3%	1.8%	0.9%	100.0%
	% within column	100.0%	100.0%	100.0%	100.0%
Fisher's test	p-value= 0.482				

So from the analysis of both questionnaire X and Y, the second and third hypothesis of this study was rejected because in both cases the p-value found with Fisher's exact test was above the threshold value of 0.05. This attests that there is no significant relationship

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between student choices and their employment status.

4.3- Step 3

The third step was to compare the choices made in Questionnaire X with those of Questionnaire Y. The purpose was to investigate whether the presence of a decoy can manipulate choices even when product attributes were clearly mentioned, or if the effect would mitigate. The percentage of participants choosing Course A (competition option) and Course B (target option) was compared from Questionnaire X and Y. The p-value of 0.832 from Table 3 shows that there is no significant change in the choice pattern even when a decoy was introduced.

Table 5

		Experiment		
course options		**No decoy**	**decoy**	**Total**
Course A	Observed	52	45	97
	% within row	53.6%	46.4%	100.0%
	% within column	51.0%	49.5%	50.3%
Course B	Observed	50	46	96
	% within row	52.1%	47.9%	100.0%
	% within column	49.0%	50.5%	49.7%
Total	Observed	102	91	193
	% within row	52.8%	47.2%	100.0%
	% within column	100.0%	100.0%	100.0%
Fisher's test		p-value = 0.832		

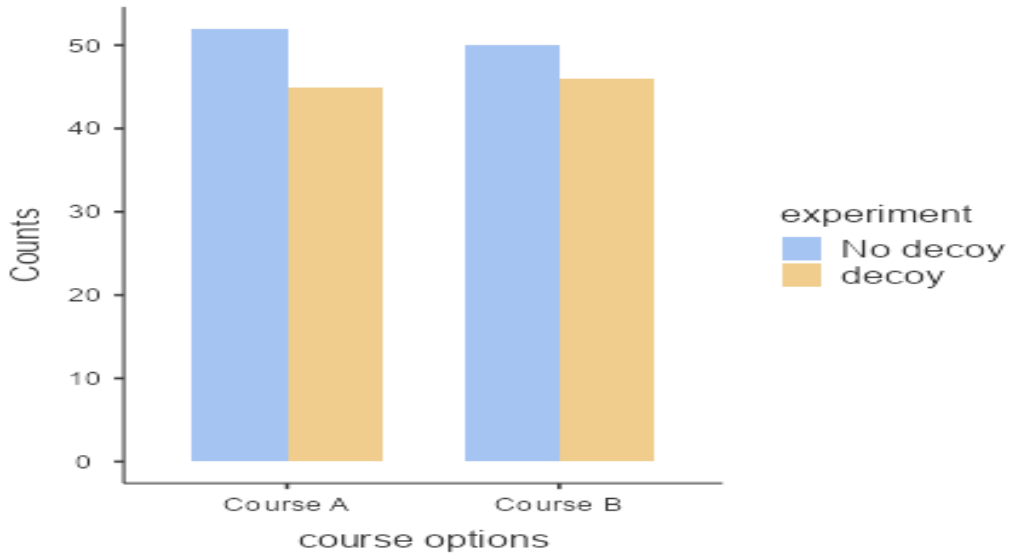

Table 6:

Hypothesis	Description	Results	Conclusion

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H0	The decoy effect is not verified when the attributes of courses are clearly presented.	The response pattern was not different between questionnaire X and Y. Adding a decoy option does not create any difference.	Not rejected
H1	The decoy effect is verified even after a clear presentation of the attributes of courses	A p-value greater than 0.5 indicates that the decoy effect was not verified when the attributes of the service were clearly presented.	Rejected
H2	The decoy effect is verified when classifying groups by employment differences.	There was no significant difference in the responses when analyzing the employment status of respondents.	Rejected
H3	The decoy effect is verified when classifying groups by age differences.	There was no significant association between age and the types of decisions made.	Rejected

5. Discussion

This section will present the theoretical and managerial implications of the results obtained. Additionally, limitations of the current study and future research agenda would also be discussed.

5.1- Theoretical implications:

This study has many theoretical implications. First of all, it is relevant to behavioral economics because the proposal was to investigate the decoy effect, which is a famous nudge in behavioral economics. Secondly, this research also includes various attributes of courses in its experimental study to analyze whether the decoy effect is equally effective in this scenario or not. The results of this study were different from those of traditional studies but consistent with research conducted by Fredrick, Lee, and Baskins, and Yang & Lynn (Shane Fredrick et al., 2014; Yang, 2014) suggesting that the decoy effect is not universal, rather its strength depends upon the information presented alongside the product/service.

5.2- Managerial implications:

Regarding managerial implications, this study suggests that the decoy effect is not equally effective for all businesses; rather, its strength depends upon which information is being presented alongside the product/service. So, the managers should not solely rely on decoy strategies, specifically when transparent attribute presentation is required.

6. Conclusion

The main motive of this study was to investigate whether the decoy effect works when product/service attributes are clearly mentioned. For this purpose, two questionnaires, X and Y, were developed. Questionnaire X did not have any decoy options, while questionnaire Y had one decoy option. The questionnaires were filled out by university students. The data was analyzed using Fisher's exact test and the Chi-square test. The study also aimed to detect any potential relationship between the employment status of students and the type of decision made. The results showed that the decoy effect is not evident when

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various attributes of courses are clearly mentioned.

The main conclusion of this study is that the decoy effect is not a universal effect, and its biggest limitation is that it does not work where product dimensions are transparent. The results of the statistical tests applied did not show sufficient significance levels. This finding aligns with studies conducted by Fredrick, Lee, and Baskins, and Yang & Lynn (Shane Fredrick et al., 2014; Yang, 2014). Moreover, it was also analyzed that there is no significant relationship between age and employment status of students with the type of decision made.

7. Limitations and future suggestions:

This research was limited to analyzing the decoy effect in the context of digital learning platforms. For future research, we suggest investigating other fields, specifically service-providing businesses. Moreover, the sample was selected using convenience sampling, and all respondents were students. We recommend using different profiles for the sample.

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